

ENGLISH EDITION

Computer General Awareness

English Edition

Study Material for Government Competitive Examinations

GovBabu helps aspirants find structured, reliable and exam-focused information and study resources for government recruitment examinations. This publication presents computer awareness as clear explanations followed by original practice questions with answers and reasoning.

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About this publication

Computer General Awareness is a regular section of many government recruitment examinations. This book covers the topic chapter by chapter. Each chapter opens with concise notes, then gives practice questions, an answer key, and an explanation for every answer.

How to use this book

- Read the notes of a chapter once, then close the book and attempt the practice questions.
- Check the answer key only after you have attempted every question.
- Read the explanation for every question, including the ones you answered correctly. Where it helps, the explanation also says why the other options are wrong, because those options often appear in other questions.
- Use the one-minute revision box at the end of each chapter just before a test.

About the content and questions

The notes, questions, answers and explanations in this book are written originally for GovBabu. Questions are labelled as original practice questions. A question is described as a previous-year question only when its source has been verified and its reuse has been cleared, and this edition contains none.

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CHAPTER 1

Computer Fundamentals

This chapter builds the base for every other topic in Computer General Awareness: what a computer is, how it is organised, how it is classified and how its data is measured. Questions from this chapter are usually direct, so precise definitions matter.

1.1 What is a computer?

A computer is an electronic machine that accepts data as input, processes it by following a stored set of instructions called a program, keeps the results when required, and presents them as output. The word comes from "compute", meaning to calculate, but a modern computer works with text, images, sound and video as well as numbers.

- The information processing cycle has four stages: Input, Processing, Output and Storage.
- Processing is the stage in which raw data is turned into meaningful results.

DATA AND INFORMATION

Data is a collection of raw facts and figures that has no context by itself, for example 45, 38 and 52. Information is data that has been processed into a meaningful form, for example "the class average is 45".

1.2 Characteristics of a computer

Characteristic	Meaning
Speed	Executes millions to billions of instructions every second.
Accuracy	Gives correct results as long as the data and the program are correct.
Diligence	Does not get tired, bored or distracted, even in long repetitive work.
Versatility	The same machine can do very different tasks when it is given different programs.
Storage	Keeps very large amounts of data and retrieves it quickly.
Automation	Once a program starts, it runs without human intervention at each step.
No intelligence of its own	It cannot think or decide by itself; it only follows the instructions it is given.

GIGO

GIGO stands for "Garbage In, Garbage Out". Wrong or poor input produces wrong or poor output, because the computer does not judge the quality of the data it receives.

1.3 Basic organisation of a computer

Every computer, from a phone to a supercomputer, is built from four functional units: the input unit, the central processing unit (CPU), the memory unit and the output unit.

- Arithmetic Logic Unit (ALU): performs arithmetic operations (add, subtract, multiply, divide) and logical operations (comparisons such as equal to, greater than).
- Control Unit (CU): directs and coordinates all the other parts. It fetches and decodes instructions and tells each unit what to do, but it does not process data itself.
- Registers: very small, extremely fast storage locations inside the CPU that hold the data and instructions currently in use.
- Memory unit: stores the data and instructions that the CPU needs, and the results it produces.

STORED-PROGRAM CONCEPT

In this design the instructions and the data are kept in the same memory, and the CPU fetches the instructions one at a time. It is associated with John von Neumann, whose 1945 report on the EDVAC described it, and the design is called the Von Neumann architecture.

1.4 Hardware, software, firmware and liveware

Term	What it is	Example
Hardware	The physical parts of a computer that can be touched.	Keyboard, monitor, CPU chip
Software	Programs and instructions that tell the hardware what to do. It is of two broad kinds: system software and application software.	Operating system, word processor
Firmware	Low-level software stored in non-volatile memory (such as ROM or flash) that controls a device's basic hardware functions. Firmware can often be updated.	BIOS/UEFI on a motherboard, router firmware
Liveware	The people who operate, program or manage computer systems.	Users, programmers, system administrators

1.5 Classification of computers

Computers are classified in three common ways: by size and power, by the type of data they handle, and by purpose.

Basis	Type	Key points
Size and power	Supercomputer	Fastest and most powerful; uses thousands of processors for weather forecasting and scientific research. The PARAM series, developed by C-DAC, is India's well-known example.
	Mainframe	Large, multi-user systems that handle a huge number of transactions at once, as in banks, railways and insurance.
	Minicomputer	Mid-range, multi-user machine that sits between a mainframe and a microcomputer.
	Microcomputer	Single-user personal computer built around a microprocessor: desktop, laptop, tablet, smartphone.
Type of data	Analog	Works on continuous physical quantities such as temperature, pressure or speed.
	Digital	Works on discrete data represented in binary form (0 and 1). Almost all modern computers are digital.
	Hybrid	Combines both; for example, equipment that measures an analog signal and shows digital readings.
Purpose	General purpose	Can run many kinds of programs, such as a personal computer.
	Special purpose	Built for one task. An embedded computer, such as the controller in a washing machine, is a common example.

1.6 Units of data

A bit (binary digit) is the smallest unit of data and holds either 0 or 1. Larger units are built from bits.

Unit	Equivalent
Nibble	4 bits
Byte	8 bits; an ASCII character uses one byte, but a UTF-8 character may use 1–4 bytes.
Kilobyte (KB)	1024 bytes
Megabyte (MB)	1024 KB
Gigabyte (GB)	1024 MB
Terabyte (TB)	1024 GB
Petabyte (PB)	1024 TB

EXAM NOTE

Storage makers often use decimal units (1 KB = 1000 bytes), and the IEC names the binary units KiB, MiB and GiB. Most exam questions still use KB, MB and GB with the factor 1024, so read the question's wording before choosing.

1.7 Booting

Booting is the process of starting a computer and loading the operating system into main memory so that it is ready to use. The word comes from "bootstrap".

- Power is switched on and the firmware (BIOS or UEFI) starts running.
- The Power-On Self-Test (POST) checks that the essential hardware is working.
- A boot loader is found and started, and it loads the operating system into memory.
- Cold boot (hard boot): starting the computer from the switched-off state. Warm boot (soft boot): restarting a computer that is already on, without cutting its power, for example with the Restart option.

One-minute revision

- Data is raw; information is processed data.
- Control unit directs; ALU calculates and compares; registers hold data in use.
- Bit < nibble (4 bits) < byte (8 bits) < KB < MB < GB < TB < PB.
- Supercomputer: speed; mainframe: many users and transactions; microcomputer: one user.
- Firmware lives in chips; liveware means people; GIGO means bad input gives bad output.

Practice Questions

All questions in this chapter are original GovBabu practice questions written for this book. None of them is presented as a previous-year question. Each question has exactly one correct option. Check your answers only after attempting every question.

Q1. Raw facts and figures that have not yet been processed are called:

- | | |
|-----------------|------------|
| (A) Information | (B) Data |
| (C) Program | (D) Output |
-

Q2. In the information processing cycle, which stage converts raw data into meaningful results?

- | | |
|----------------|-------------|
| (A) Input | (B) Output |
| (C) Processing | (D) Storage |
-

Q3. The idea that wrong input to a computer produces wrong output is summed up by the term:

- | | |
|----------|-------------|
| (A) GIGO | (B) WYSIWYG |
| (C) POST | (D) ASCII |
-

Q4. A computer can do the same repetitive task for hours without losing concentration. Which characteristic does this show?

- | | |
|------------------|---------------|
| (A) Versatility | (B) Storage |
| (C) Intelligence | (D) Diligence |
-

Q5. Which of the following is NOT a part of the CPU?

- | | |
|---------------------------|------------------|
| (A) Arithmetic Logic Unit | (B) Control Unit |
| (C) Registers | (D) Monitor |
-

Q6. The stored-program concept, in which instructions and data share the same memory, is associated with:

- | | |
|---------------------|----------------------|
| (A) Charles Babbage | (B) John von Neumann |
| (C) Blaise Pascal | (D) Herman Hollerith |
-

Q7. A computer that measures continuous physical quantities such as temperature or pressure is called a(n):

- | | |
|------------------------|-----------------------|
| (A) Analog computer | (B) Digital computer |
| (C) Mainframe computer | (D) Embedded computer |
-

Q8. Which type of computer is used for very complex scientific work such as weather forecasting?

- | | |
|-------------------|------------------|
| (A) Microcomputer | (B) Laptop |
| (C) Supercomputer | (D) Minicomputer |
-

Q9. A group of eight bits is called a:

- | | |
|------------|--------------|
| (A) Nibble | (B) Byte |
| (C) Word | (D) Kilobyte |
-

Q10. In the binary convention used in most exams, 1 KB is equal to:

- | | |
|----------------|---------------|
| (A) 8 bits | (B) 100 bytes |
| (C) 1024 bytes | (D) 1024 bits |
-

Q11. Which sequence lists the units of storage in increasing order of size?

- | | |
|--------------------|--------------------|
| (A) KB, MB, GB, TB | (B) MB, KB, GB, TB |
| (C) GB, MB, KB, TB | (D) TB, GB, MB, KB |
-

Q12. Low-level software stored in non-volatile memory that controls a device's basic hardware functions is known as:

- | | |
|---------------|--------------|
| (A) Liveware | (B) Freeware |
| (C) Shareware | (D) Firmware |
-

Q13. In computing, the people who use and operate computer systems are collectively called:

- | | |
|--------------|--------------|
| (A) Hardware | (B) Software |
| (C) Liveware | (D) Firmware |
-

Q14. Which of the following is an example of system software?

- | | |
|-------------------------|------------------|
| (A) Operating system | (B) Web browser |
| (C) Spreadsheet program | (D) Media player |
-

Q15. The process of starting a computer and loading the operating system into main memory is called:

- | | |
|----------------|-------------------|
| (A) Formatting | (B) Booting |
| (C) Compiling | (D) Defragmenting |
-

Q16. Restarting a computer that is already switched on, without cutting its power, is called a:

- | | |
|-----------------|---------------|
| (A) Cold boot | (B) Safe mode |
| (C) Hibernation | (D) Warm boot |
-

Q17. Which of the following contains a dedicated embedded computer built for one specific task?

- | | |
|----------------------------------|---------------------|
| (A) A desktop computer | (B) A mainframe |
| (C) A washing machine controller | (D) A supercomputer |
-

Q18. Which of the following is NOT a characteristic of a computer?

- (A) High speed
 - (B) Taking decisions on its own without any instructions
 - (C) Large storage capacity
 - (D) Accuracy
-

Q19. A nibble consists of how many bits?

- | | |
|-------|--------|
| (A) 4 | (B) 2 |
| (C) 8 | (D) 16 |
-

Q20. Which type of computer is typically used by banks and railways to process a very large number of transactions from many users at the same time?

- | | |
|-----------------------|---------------|
| (A) Personal computer | (B) Palmtop |
| (C) Analog computer | (D) Mainframe |
-

Answer Key

Q1 B	Q2 C	Q3 A	Q4 D	Q5 D
Q6 B	Q7 A	Q8 C	Q9 B	Q10 C
Q11 A	Q12 D	Q13 C	Q14 A	Q15 B
Q16 D	Q17 C	Q18 B	Q19 A	Q20 D

Answers and Explanations

Q1. Answer: (B) Data

Easy · CA-01-01

Raw facts and figures that have not yet been processed are called:

Data is the raw material. Once it is processed into a meaningful form it becomes information, and a program is a set of instructions, not a kind of data.

Q2. Answer: (C) Processing

Easy · CA-01-02

In the information processing cycle, which stage converts raw data into meaningful results?

Input only collects the data, output only presents the results and storage only keeps them. The transformation itself happens during processing.

Q3. Answer: (A) GIGO

Easy · CA-01-03

The idea that wrong input to a computer produces wrong output is summed up by the term:

GIGO means Garbage In, Garbage Out. WYSIWYG means What You See Is What You Get, POST is the Power-On Self-Test and ASCII is a character-encoding scheme.

Q4. Answer: (D) Diligence

Easy · CA-01-04

A computer can do the same repetitive task for hours without losing concentration. Which characteristic does this show?

Diligence means freedom from tiredness, boredom and lack of concentration. Versatility is about handling many different tasks, and a computer has no intelligence of its own.

Q5. Answer: (D) Monitor

Easy · CA-01-05

Which of the following is NOT a part of the CPU?

The CPU contains the ALU, the control unit and the registers. A monitor is an output device that sits outside the CPU.

Q6. Answer: (B) John von Neumann

Medium · CA-01-06

The stored-program concept, in which instructions and data share the same memory, is associated with:

John von Neumann described this design in his 1945 report on the EDVAC, and it is called the Von Neumann architecture. Babbage designed mechanical engines, Pascal built an early mechanical calculator and Hollerith developed punched-card tabulation.

Q7. Answer: (A) Analog computer

Medium · CA-01-07

A computer that measures continuous physical quantities such as temperature or pressure is called a(n):

Analog computers work on continuous quantities. Digital computers work on discrete binary data, while mainframe and embedded describe size and purpose, not the type of data.

- Q8. Answer: (C) Supercomputer** Easy · CA-01-08
Which type of computer is used for very complex scientific work such as weather forecasting?
Supercomputers have the highest processing speed and are used for tasks that need enormous calculation, such as weather forecasting. Microcomputers and laptops are personal machines, and minicomputers are mid-range.
- Q9. Answer: (B) Byte** Easy · CA-01-09
A group of eight bits is called a:
Eight bits make one byte. A nibble is only four bits, and a kilobyte is 1024 bytes. The size of a word depends on the processor, so it is not fixed at eight bits.
- Q10. Answer: (C) 1024 bytes** Easy · CA-01-10
In the binary convention used in most exams, 1 KB is equal to:
One kilobyte is 2 to the power 10, which is 1024 bytes. Eight bits make one byte, not one kilobyte.
- Q11. Answer: (A) KB, MB, GB, TB** Medium · CA-01-11
Which sequence lists the units of storage in increasing order of size?
Each unit is 1024 times the one before it: KB, then MB, then GB, then TB. The last option is the reverse order, from largest to smallest.
- Q12. Answer: (D) Firmware** Medium · CA-01-12
Low-level software stored in non-volatile memory that controls a device's basic hardware functions is known as:
Firmware is low-level software stored in non-volatile memory such as ROM or flash. It controls device functions and can often be updated. Liveware means people, while freeware and shareware describe software distribution models.
- Q13. Answer: (C) Liveware** Easy · CA-01-13
In computing, the people who use and operate computer systems are collectively called:
Liveware, also called humanware, refers to the people in the system. Hardware, software and firmware are all non-human components.
- Q14. Answer: (A) Operating system** Easy · CA-01-14
Which of the following is an example of system software?
System software manages the hardware and provides a platform for other programs, and the operating system is its main example. A browser, a spreadsheet and a media player are application software.
- Q15. Answer: (B) Booting** Easy · CA-01-15
The process of starting a computer and loading the operating system into main memory is called:
Booting brings the system up to a usable state. Formatting prepares a disk, compiling translates source code and defragmenting rearranges file fragments on a disk.
- Q16. Answer: (D) Warm boot** Medium · CA-01-16
Restarting a computer that is already switched on, without cutting its power, is called a:
A warm boot, or soft boot, restarts a running computer. A cold boot starts it from the switched-off state. Safe mode is a limited startup option, and hibernation saves the session to disk and powers the machine off.
- Q17. Answer: (C) A washing machine controller** Medium · CA-01-17
Which of the following contains a dedicated embedded computer built for one specific task?
An embedded computer is a special-purpose system built into a device to control it. The other three are general-purpose machines that run many kinds of programs.

Q18. Answer: (B) Taking decisions on its own without any instructions

Medium · CA-01-18

Which of the following is NOT a characteristic of a computer?

A computer has no intelligence of its own and acts only on the instructions it is given. Speed, storage capacity and accuracy are genuine characteristics.

Q19. Answer: (A) 4

Easy · CA-01-19

A nibble consists of how many bits?

A nibble is half a byte, which is four bits. Eight bits form a byte.

Q20. Answer: (D) Mainframe

Medium · CA-01-20

Which type of computer is typically used by banks and railways to process a very large number of transactions from many users at the same time?

Mainframes are large multi-user systems built for high-volume transaction processing. A personal computer and a palmtop serve one user, and an analog computer handles continuous physical quantities.

CHAPTER 2

History and Generations of Computers

This chapter traces computing from counting frames to artificial intelligence. Exams ask mostly about inventors, landmark machines and the technology that defines each generation.

2.1 Early calculating devices

Long before electronic computers, people built mechanical aids for counting and calculation. The table lists the devices that exams ask about most often.

Device	Person	Year	What it did
Abacus	Ancient origin	Ancient	A frame with beads that are moved to count and calculate; the earliest calculating aid.
Napier's Bones	John Napier	1617	Numbered rods used to multiply and divide.
Pascaline	Blaise Pascal	1642	Mechanical calculator with gears that could add and subtract.
Stepped Reckoner	Gottfried Leibniz	1673	Improved on the Pascaline and could also multiply and divide.
Jacquard loom	Joseph Marie Jacquard	1801	Used punched cards to control weaving patterns; the idea of punched cards later reached computing.
Difference Engine	Charles Babbage	1822	Designed to compute and tabulate polynomial functions automatically.
Analytical Engine	Charles Babbage	1837	A design for a general-purpose mechanical computer with input, store, mill (processing) and output.

FATHER OF THE COMPUTER

Charles Babbage is called the Father of the Computer because the Analytical Engine contained the key ideas of a modern computer. Ada Lovelace, who wrote an algorithm for it in her notes of 1843, is regarded as the first programmer.

2.2 Electronic and stored-program landmarks

Machine	Year	Why it matters
Hollerith tabulating machine	1890	Herman Hollerith's punched-card machine processed the 1890 US census; his firm later became part of the company known as IBM.
Harvard Mark I	1944	An electromechanical computer built by Howard Aiken with IBM.
ENIAC	1946	The first large general-purpose electronic digital computer, built by J. Presper Eckert and John Mauchly with vacuum tubes. It was publicly unveiled in 1946.
EDSAC	1949	Built at the University of Cambridge under Maurice Wilkes; one of the first practical stored-program computers.
UNIVAC I	1951	The first commercially produced computer in the United States.
PARAM 8000	1991	India's first indigenously built supercomputer from C-DAC.

2.3 Generations of computers

Generations are defined by the main hardware technology. The years below are the ones commonly quoted in Indian exam books; some books use slightly different years, so learn the technology first.

Generation	Period	Main technology	Features
First	1946–1959	Vacuum tubes	Very large, slow, hot and costly; machine language; punched cards and magnetic drums.
Second	1959–1965	Transistors	Smaller, faster and more reliable; assembly language and early high-level languages such as FORTRAN and COBOL; magnetic core memory.
Third	1965–1971	Integrated circuits (IC)	Many transistors on one chip; operating systems, keyboards and monitors; lower cost.
Fourth	1971 onwards	Microprocessor (VLSI)	The whole CPU on one chip; personal computers, GUI and networking. The Intel 4004 of 1971 started this generation.
Fifth	Present and future	ULSI, AI	Artificial intelligence, parallel processing, voice recognition and research in quantum computing.

EXAM NOTE

Match the technology to the generation: vacuum tube, transistor, IC, microprocessor, AI. Questions rarely ask for exact years.

2.4 People and their contributions

Person	Known for
Charles Babbage	Father of the computer; Difference and Analytical Engines
Ada Lovelace	First programmer
Alan Turing	Turing machine (1936), a foundation of theoretical computer science
John von Neumann	Stored-program concept
Dennis Ritchie	The C language, and UNIX with Ken Thompson
Bill Gates and Paul Allen	Founded Microsoft (1975)
Steve Jobs and Steve Wozniak	Founded Apple (1976)
Tim Berners-Lee	Proposed the World Wide Web (1989)
Linus Torvalds	Created the Linux kernel (1991)

One-minute revision

- Abacus, Napier, Pascal, Leibniz, Jacquard, Babbage: the mechanical age comes before Hollerith and the electronic machines.
- Babbage is the Father of the Computer; Ada Lovelace is the first programmer.
- ENIAC (1946) is electronic and uses vacuum tubes; UNIVAC I (1951) was the first commercial computer in the US.
- Generations: vacuum tube, transistor, IC, microprocessor, AI.
- C-DAC developed PARAM 8000, India's first indigenous giga-scale supercomputer. C-DAC lists it as a 1990 milestone; its Moscow case study records the first installation at ICAD, Moscow, in 1991-92.

Practice Questions

All questions in this chapter are original GovBabu practice questions written for this book. None of them is presented as a previous-year question. Each question has exactly one correct option. Check your answers only after attempting every question.

Q1. Who is known as the Father of the Computer?

- | | |
|---------------------|----------------------|
| (A) Blaise Pascal | (B) John Napier |
| (C) Charles Babbage | (D) Herman Hollerith |
-

Q2. The Pascaline, an early mechanical calculator that could add and subtract, was invented by:

- | | |
|-----------------------|---------------------|
| (A) Blaise Pascal | (B) Charles Babbage |
| (C) Gottfried Leibniz | (D) John Napier |
-

Q3. Which design of Charles Babbage had the ideas of input, a store (memory), a mill (processing) and output?

- | | |
|-----------------------|-----------------------|
| (A) Difference Engine | (B) Pascaline |
| (C) Abacus | (D) Analytical Engine |
-

Q4. Who is regarded as the first computer programmer?

- | | |
|----------------------|----------------------|
| (A) Charles Babbage | (B) Ada Lovelace |
| (C) Herman Hollerith | (D) John von Neumann |
-

Q5. The punched-card tabulating machine used for the 1890 US census was developed by:

- | | |
|------------------|---------------------------|
| (A) Howard Aiken | (B) Herman Hollerith |
| (C) Alan Turing | (D) Joseph Marie Jacquard |
-

Q6. ENIAC, the first large general-purpose electronic digital computer, used which technology?

- | | |
|---------------------|-------------------------|
| (A) Transistors | (B) Integrated circuits |
| (C) Microprocessors | (D) Vacuum tubes |
-

Q7. ENIAC was publicly unveiled in the year:

- | | |
|----------|----------|
| (A) 1946 | (B) 1936 |
| (C) 1951 | (D) 1971 |
-

Q8. Transistors replaced vacuum tubes in which generation of computers?

- | | |
|-----------------------|----------------------|
| (A) First generation | (B) Third generation |
| (C) Second generation | (D) Fifth generation |
-

Q9. Integrated circuits (ICs) are the main technology of which generation?

- | | |
|-----------------------|-----------------------|
| (A) Third generation | (B) First generation |
| (C) Second generation | (D) Fourth generation |
-

Q10. The microprocessor is associated with which generation of computers?

- | | |
|-----------------------|----------------------|
| (A) Second generation | (B) Third generation |
| (C) Fourth generation | (D) First generation |
-

Q11. Artificial intelligence and parallel processing are the focus of which generation?

- | | |
|-----------------------|----------------------|
| (A) First generation | (B) Third generation |
| (C) Fourth generation | (D) Fifth generation |
-

Q12. Alan Turing, who described the Turing machine in 1936, is best known for his contribution to:

- | | |
|------------------------------------|-------------------------------|
| (A) Inventing the first transistor | (B) The theory of computation |
| (C) Founding Microsoft | (D) Creating the Linux kernel |
-

Q13. Howard Aiken built the Harvard Mark I in 1944 in collaboration with which company?

- | | |
|-----------|---------------|
| (A) Intel | (B) Microsoft |
| (C) IBM | (D) Apple |
-

Q14. Which was the first commercially produced computer in the United States?

- | | |
|--------------|--------------------|
| (A) UNIVAC I | (B) ENIAC |
| (C) EDVAC | (D) Harvard Mark I |
-

Q15. India's PARAM series of supercomputers, beginning with PARAM 8000, was developed by:

- | | |
|----------|-----------|
| (A) ISRO | (B) C-DAC |
| (C) DRDO | (D) BARC |
-

Q16. The first commercially available microprocessor, the Intel 4004, was introduced in:

- | | |
|----------|----------|
| (A) 1946 | (B) 1959 |
| (C) 1981 | (D) 1971 |
-

Q17. The Linux kernel was created by:

- | | |
|---------------------|--------------------|
| (A) Dennis Ritchie | (B) Bill Gates |
| (C) Tim Berners-Lee | (D) Linus Torvalds |
-

Q18. The World Wide Web was proposed in 1989 by:

- | | |
|---------------------|--------------------|
| (A) Tim Berners-Lee | (B) Linus Torvalds |
| (C) Steve Jobs | (D) Dennis Ritchie |
-

Q19. Which sequence shows the main technology used in successive generations, from first to fourth?

- (A) Transistor, vacuum tube, IC, microprocessor
 - (B) Vacuum tube, transistor, IC, microprocessor
 - (C) Vacuum tube, IC, transistor, microprocessor
 - (D) IC, vacuum tube, transistor, microprocessor
-

Q20. Which is the earliest known calculating device in which counting is done by moving beads on rods?

- | | |
|---------------|--------------------|
| (A) Pascaline | (B) Napier's Bones |
| (C) Abacus | (D) Jacquard loom |
-

Answer Key

Q1 C	Q2 A	Q3 D	Q4 B	Q5 B
Q6 D	Q7 A	Q8 C	Q9 A	Q10 C
Q11 D	Q12 B	Q13 C	Q14 A	Q15 B
Q16 D	Q17 D	Q18 A	Q19 B	Q20 C

Answers and Explanations

Q1. Answer: (C) Charles Babbage

Easy · CA-02-01

Who is known as the Father of the Computer?

Babbage designed the Difference Engine and the Analytical Engine, which contained the main ideas of a modern computer. Pascal built an early adding machine, Napier devised calculating rods and Hollerith developed punched-card tabulation.

Q2. Answer: (A) Blaise Pascal

Easy · CA-02-02

The Pascaline, an early mechanical calculator that could add and subtract, was invented by:

The Pascaline (1642) is named after Blaise Pascal. Leibniz later built a machine that could also multiply and divide, and Napier's rods date from 1617.

Q3. Answer: (D) Analytical Engine

Medium · CA-02-03

Which design of Charles Babbage had the ideas of input, a store (memory), a mill (processing) and output?

The Analytical Engine was a design for a general-purpose machine with these four parts. The Difference Engine was meant only for tabulating polynomial functions.

Q4. Answer: (B) Ada Lovelace

Easy · CA-02-04

Who is regarded as the first computer programmer?

Ada Lovelace wrote an algorithm for Babbage's Analytical Engine in her notes of 1843. Babbage designed the machine, but the programming credit goes to her.

Q5. Answer: (B) Herman Hollerith

Medium · CA-02-05

The punched-card tabulating machine used for the 1890 US census was developed by:

Hollerith's machine read data from punched cards. Jacquard used punched cards earlier, but for weaving, and Aiken's Mark I came in 1944.

Q6. Answer: (D) Vacuum tubes

Easy · CA-02-06

ENIAC, the first large general-purpose electronic digital computer, used which technology?

ENIAC was a first-generation machine built with thousands of vacuum tubes. Transistors, ICs and microprocessors came in later generations.

Q7. Answer: (A) 1946

Medium · CA-02-07

ENIAC was publicly unveiled in the year:

ENIAC was unveiled in 1946. UNIVAC I followed in 1951, and 1971 is the year of the Intel 4004 microprocessor.

- Q8. Answer: (C) Second generation** Easy · CA-02-08
Transistors replaced vacuum tubes in which generation of computers?
Transistors made machines smaller, cooler and more reliable and mark the second generation. Integrated circuits arrived in the third.
- Q9. Answer: (A) Third generation** Easy · CA-02-09
Integrated circuits (ICs) are the main technology of which generation?
An IC puts many transistors on a single chip, which is the hallmark of the third generation. The fourth generation moved to the microprocessor.
- Q10. Answer: (C) Fourth generation** Easy · CA-02-10
The microprocessor is associated with which generation of computers?
Putting the whole CPU on one chip started the fourth generation and made personal computers possible.
- Q11. Answer: (D) Fifth generation** Easy · CA-02-11
Artificial intelligence and parallel processing are the focus of which generation?
The fifth generation is about AI, parallel processing and similar advanced goals. The earlier generations are defined by vacuum tubes, transistors, ICs and microprocessors.
- Q12. Answer: (B) The theory of computation** Medium · CA-02-12
Alan Turing, who described the Turing machine in 1936, is best known for his contribution to:
The Turing machine is a theoretical model that became a foundation of computer science. The other options belong to different people and fields.
- Q13. Answer: (C) IBM** Medium · CA-02-13
Howard Aiken built the Harvard Mark I in 1944 in collaboration with which company?
The Mark I was an electromechanical computer built with IBM. Intel, Microsoft and Apple were founded much later.
- Q14. Answer: (A) UNIVAC I** Medium · CA-02-14
Which was the first commercially produced computer in the United States?
UNIVAC I (1951) was built for sale to customers. ENIAC, EDVAC and the Mark I were built as one-off research or military machines.
- Q15. Answer: (B) C-DAC** Medium · CA-02-15
India's PARAM series of supercomputers, beginning with PARAM 8000, was developed by:
PARAM computers were developed by the Centre for Development of Advanced Computing (C-DAC). The other organisations work mainly in space, defence and atomic research.
- Q16. Answer: (D) 1971** Medium · CA-02-16
The first commercially available microprocessor, the Intel 4004, was introduced in:
The Intel 4004 appeared in 1971 and began the fourth generation. 1946 is ENIAC, 1959 is around the start of the second generation and 1981 is the year of the IBM PC.
- Q17. Answer: (D) Linus Torvalds** Easy · CA-02-17
The Linux kernel was created by:
Linus Torvalds released the first Linux kernel in 1991. Ritchie created C, Gates co-founded Microsoft and Berners-Lee proposed the Web.
- Q18. Answer: (A) Tim Berners-Lee** Easy · CA-02-18
The World Wide Web was proposed in 1989 by:
Tim Berners-Lee proposed the Web while working at CERN. The Web is a service that runs on the Internet and is not the Internet itself.

Q19. Answer: (B) Vacuum tube, transistor, IC, microprocessor

Medium · CA-02-19

Which sequence shows the main technology used in successive generations, from first to fourth?

Each generation brought smaller and more capable hardware: vacuum tube, then transistor, then IC, then microprocessor. The other orders break this sequence.

Q20. Answer: (C) Abacus

Easy · CA-02-20

Which is the earliest known calculating device in which counting is done by moving beads on rods?

The abacus is an ancient bead frame. The Pascaline uses gears, Napier's Bones are numbered rods and the Jacquard loom is a weaving machine.

CHAPTER 3

Hardware and the CPU

This chapter looks inside the machine: the registers and cycle of the CPU, the motherboard, the buses and the ports. These are fact-based topics, so exact names and full forms matter.

3.1 Inside the CPU: registers

The CPU contains the ALU, the control unit and a small set of registers. Chapter 1 introduced these parts. Registers are named by the job they do, and each name is a frequent exam item.

Register	Holds
Program Counter (PC)	The address of the next instruction to be fetched.
Instruction Register (IR)	The instruction that is currently being decoded and executed.
Accumulator (ACC)	Intermediate results of arithmetic and logic operations.
Memory Address Register (MAR)	The address of the memory location that is to be read or written.
Memory Data Register (MDR)	The data being moved to or from memory.

3.2 Instruction cycle and processor speed

To run a program, the CPU repeats the instruction cycle again and again: fetch the instruction from memory, decode it to find out what it asks for, and execute it.

- Clock speed is the number of clock cycles the CPU completes each second. It is measured in hertz; 1 GHz is one billion cycles per second.
- MIPS (million instructions per second) measures how many instructions a CPU executes. Supercomputers are rated in FLOPS, which counts floating-point operations per second.
- A core is an independent processing unit. A dual-core chip has two cores on one chip and a quad-core chip has four, so more programs can run at the same time.
- Word length is the number of bits a CPU processes at one time, for example 32 bits or 64 bits.
- A GPU (Graphics Processing Unit) is a processor specialised for graphics and parallel calculations.

3.3 The motherboard

The motherboard is the main circuit board. Every other component plugs into it or communicates through it.

Part	Purpose
CPU socket	Holds the processor.
RAM slots	Hold the memory modules.
Expansion slots (PCI, PCIe)	Take add-in cards such as graphics and sound cards.
BIOS/UEFI chip	Holds the firmware that starts the computer.
CMOS battery	A small cell that keeps the date, time and BIOS settings when the power is off.
SATA connectors	Connect hard disks, SSDs and optical drives.
Chipset	Controls the flow of data between the CPU, memory and other devices.

SMPS

The power supply unit of a desktop computer is an SMPS (Switched Mode Power Supply). It converts the AC mains supply into the low-voltage DC that the components need.

3.4 Buses

A bus is a set of wires that carries signals between components. The system bus has three parts.

- **Data bus:** carries the actual data between the CPU, memory and input-output devices. It is bidirectional, so data can move both ways.
- **Address bus:** carries the address of the memory location or device that the CPU wants to reach. It is unidirectional, from the CPU outwards.
- **Control bus:** carries control and timing signals, such as read and write commands.

ADDRESS LINES AND MEMORY

With n address lines a CPU can address 2^n memory locations. For example 16 address lines give 2^{16} to the power 16, which is 65,536 locations (64K).

3.5 Ports and connectors

Port	Full form	Use
USB	Universal Serial Bus	Keyboards, mice, pen drives, phones and many other devices.
HDMI	High-Definition Multimedia Interface	Carries digital video and audio in a single cable.
VGA	Video Graphics Array	An older analog video connector for monitors and projectors.
RJ-45	Registered Jack 45	The port for an Ethernet network cable.
PS/2	Personal System/2	Older round connector for keyboards and mice.

3.6 Processor architecture

- RISC (Reduced Instruction Set Computer) processors use a small set of simple, mostly fixed-length instructions, each designed to finish quickly. ARM chips in phones follow this approach.
- CISC (Complex Instruction Set Computer) processors have a larger set of more complex instructions, and one instruction can do several low-level operations. The classic x86 family is CISC in design.
- A 64-bit processor works on 64 bits at a time and can address far more memory than a 32-bit processor.

One-minute revision

- Program Counter = next instruction address; IR = current instruction; ACC = intermediate results; MAR = address; MDR = data.
- Instruction cycle: fetch, decode, execute. Clock speed is in hertz; supercomputers are rated in FLOPS.
- Data bus is bidirectional; address bus is unidirectional; n address lines give 2^n locations.
- CMOS battery keeps the time and BIOS settings; SMPS converts AC to DC.
- RISC means few simple instructions; CISC means many complex ones.

Practice Questions

All questions in this chapter are original GovBabu practice questions written for this book. None of them is presented as a previous-year question. Each question has exactly one correct option. Check your answers only after attempting every question.

Q1. What is the full form of CPU?

- | | |
|------------------------------|-----------------------------|
| (A) Central Processing Unit | (B) Central Program Unit |
| (C) Computer Processing Unit | (D) Control Processing Unit |
-

Q2. Which part of the CPU performs arithmetic operations and logical comparisons?

- | | |
|--------------------------|---------------------------|
| (A) Control Unit | (B) Program Counter |
| (C) Instruction Register | (D) Arithmetic Logic Unit |
-

Q3. Which register holds the address of the next instruction to be fetched?

- | | |
|--------------------------|--------------------------|
| (A) Accumulator | (B) Program Counter |
| (C) Instruction Register | (D) Memory Data Register |
-

Q4. Which register stores the intermediate results of arithmetic and logic operations?

- | | |
|---------------------|-----------------------------|
| (A) Program Counter | (B) Memory Address Register |
| (C) Accumulator | (D) Instruction Register |
-

Q5. What is the correct order of the basic instruction cycle?

- | | |
|----------------------------|----------------------------|
| (A) Decode, fetch, execute | (B) Execute, fetch, decode |
| (C) Fetch, decode, execute | (D) Fetch, execute, decode |
-

Q6. In which unit is the clock speed of a processor measured?

- | | |
|-----------|----------|
| (A) Hertz | (B) Byte |
| (C) Pixel | (D) Watt |
-

Q7. MIPS, used to describe processor performance, stands for:

- | | |
|-------------------------------------|-------------------------------------|
| (A) Memory Instructions Per Second | (B) Million Inputs Per Second |
| (C) Maximum Instructions Per Sector | (D) Million Instructions Per Second |
-

Q8. Which is the main circuit board of a computer to which all other components connect?

- | | |
|-----------------------|--------------------|
| (A) Sound card | (B) Motherboard |
| (C) Power supply unit | (D) Expansion card |
-

Q9. Which bus carries the actual data and is bidirectional?

- | | |
|-----------------|---------------|
| (A) Address bus | (B) Power bus |
| (C) Clock bus | (D) Data bus |
-

Q10. The address bus of a computer carries:

- (A) Memory or device addresses from the CPU
 - (B) Data from memory to the CPU
 - (C) Electric power to the components
 - (D) Only read and write commands
-

Q11. A CPU with 16 address lines can address at most how many memory locations?

- | | |
|------------|------------|
| (A) 4,096 | (B) 1,024 |
| (C) 65,536 | (D) 32,768 |
-

Q12. What is the purpose of the small CMOS battery on a motherboard?

- (A) To charge the monitor
 - (B) To keep the date, time and BIOS settings when the power is off
 - (C) To power the hard disk
 - (D) To increase the CPU speed
-

Q13. The SMPS in a desktop computer converts:

- (A) AC mains supply into low-voltage DC
 - (B) DC into AC
 - (C) Low-voltage DC into AC
 - (D) Sound signals into electric power
-

Q14. Which port is used to connect an Ethernet network cable?

- | | |
|-----------|----------|
| (A) VGA | (B) HDMI |
| (C) RJ-45 | (D) PS/2 |
-

Q15. HDMI is used to transmit:

- | | |
|---------------------------|-------------------------------------|
| (A) Only analog video | (B) Digital video and audio signals |
| (C) Only keyboard signals | (D) Only electric power |
-

Q16. What is the full form of USB?

- | | |
|----------------------------|--------------------------|
| (A) Universal System Block | (B) United Serial Bus |
| (C) Unified Storage Bus | (D) Universal Serial Bus |
-

Q17. Compared with a RISC processor, a CISC processor typically has:

- (A) Fewer and simpler instructions
 - (B) A larger and more complex instruction set
 - (C) Only fixed-length instructions that all finish in one cycle
 - (D) No registers at all
-

Q18. A dual-core processor has:

- (A) Two complete separate computers
 - (B) Two motherboards
 - (C) Twice the RAM
 - (D) Two processing cores on a single chip
-

Q19. Which component is specially designed to speed up the rendering of images and video?

- | | |
|---------|----------|
| (A) ALU | (B) BIOS |
| (C) GPU | (D) CMOS |
-

Q20. Which of the following is NOT normally mounted on the motherboard itself?

- | | |
|---------------|--------------------|
| (A) Printer | (B) CPU socket |
| (C) RAM slots | (D) BIOS/UEFI chip |
-

Answer Key

Q1 A	Q2 D	Q3 B	Q4 C	Q5 C
Q6 A	Q7 D	Q8 B	Q9 D	Q10 A
Q11 C	Q12 B	Q13 A	Q14 C	Q15 B
Q16 D	Q17 B	Q18 D	Q19 C	Q20 A

Answers and Explanations

Q1. Answer: (A) Central Processing Unit

Easy · CA-03-01

What is the full form of CPU?

CPU stands for Central Processing Unit; it is the part that processes instructions and data.

Q2. Answer: (D) Arithmetic Logic Unit

Easy · CA-03-02

Which part of the CPU performs arithmetic operations and logical comparisons?

The ALU does the calculations and comparisons. The control unit only directs the work, and the PC and IR are registers.

Q3. Answer: (B) Program Counter

Medium · CA-03-03

Which register holds the address of the next instruction to be fetched?

The Program Counter points to the next instruction. The Instruction Register holds the instruction now being executed and the accumulator holds intermediate results.

Q4. Answer: (C) Accumulator

Medium · CA-03-04

Which register stores the intermediate results of arithmetic and logic operations?

The accumulator keeps partial results while the ALU works. The other registers hold addresses or instructions rather than results.

Q5. Answer: (C) Fetch, decode, execute

Easy · CA-03-05

What is the correct order of the basic instruction cycle?

The CPU must first fetch an instruction, then decode it to understand it, and only then execute it.

Q6. Answer: (A) Hertz

Easy · CA-03-06

In which unit is the clock speed of a processor measured?

Clock speed counts cycles per second, so its unit is the hertz (MHz or GHz). A byte measures data, a pixel is a display element and a watt measures power.

Q7. Answer: (D) Million Instructions Per Second

Easy · CA-03-07

MIPS, used to describe processor performance, stands for:

MIPS counts how many millions of instructions a processor can execute in one second.

- Q8. Answer: (B) Motherboard** Easy · CA-03-08
Which is the main circuit board of a computer to which all other components connect?
The motherboard carries the CPU socket, memory slots and connectors for everything else. A sound card or expansion card plugs into it.
- Q9. Answer: (D) Data bus** Medium · CA-03-09
Which bus carries the actual data and is bidirectional?
Data can flow both to and from the CPU, so the data bus is bidirectional. The address bus works in one direction only.
- Q10. Answer: (A) Memory or device addresses from the CPU** Medium · CA-03-10
The address bus of a computer carries:
The CPU puts the address of the location it wants on the address bus. Data travels on the data bus and commands on the control bus.
- Q11. Answer: (C) 65,536** Medium · CA-03-11
A CPU with 16 address lines can address at most how many memory locations?
n address lines give 2 to the power n locations, and 2 to the power 16 is 65,536. The value 32,768 is 2 to the power 15.
- Q12. Answer: (B) To keep the date, time and BIOS settings when the power is off** Medium · CA-03-12
What is the purpose of the small CMOS battery on a motherboard?
The battery powers the small CMOS memory and real-time clock so that settings and time survive when the computer is switched off.
- Q13. Answer: (A) AC mains supply into low-voltage DC** Medium · CA-03-13
The SMPS in a desktop computer converts:
The components work on low-voltage DC, while the wall socket supplies AC. The SMPS performs this conversion.
- Q14. Answer: (C) RJ-45** Easy · CA-03-14
Which port is used to connect an Ethernet network cable?
RJ-45 is the standard Ethernet connector. VGA and HDMI carry video and PS/2 connects older keyboards and mice.
- Q15. Answer: (B) Digital video and audio signals** Easy · CA-03-15
HDMI is used to transmit:
HDMI carries digital video and audio together in one cable. Analog-only video is the older VGA.
- Q16. Answer: (D) Universal Serial Bus** Easy · CA-03-16
What is the full form of USB?
USB is the Universal Serial Bus standard for connecting peripherals.
- Q17. Answer: (B) A larger and more complex instruction set** Medium · CA-03-17
Compared with a RISC processor, a CISC processor typically has:
CISC offers many complex instructions, while RISC keeps the set small and simple. Both kinds use registers.
- Q18. Answer: (D) Two processing cores on a single chip** Easy · CA-03-18
A dual-core processor has:
A core is an independent processing unit, and a dual-core chip packs two of them together. It says nothing about the amount of RAM.
- Q19. Answer: (C) GPU** Medium · CA-03-19
Which component is specially designed to speed up the rendering of images and video?
The Graphics Processing Unit handles many graphics calculations in parallel. The ALU is a general part of the CPU and BIOS and CMOS relate to start-up and settings.

Q20. Answer: (A) Printer

Easy · CA-03-20

Which of the following is NOT normally mounted on the motherboard itself?

A printer is an external device connected through a port. The socket, memory slots and firmware chip are all on the motherboard.

CHAPTER 4

Memory and Storage

This chapter explains where a computer keeps instructions and data, from the registers inside the CPU to disks and flash drives. Many questions test the contrast between pairs such as RAM and ROM, or SRAM and DRAM.

4.1 The memory hierarchy

A computer uses several kinds of memory because no single kind is fast, large and cheap at the same time. They are arranged in a hierarchy: as you move away from the CPU, memory becomes slower and cheaper per byte, and larger.

Level	Memory	Speed and size
1	Registers	Fastest and smallest; inside the CPU.
2	Cache memory	Very fast, small; sits between the CPU and RAM.
3	Main memory (RAM)	Fast, medium size; holds programs and data in use.
4	Secondary storage	Slowest and largest; keeps data permanently.

VOLATILE AND NON-VOLATILE

Volatile memory loses its contents when the power is switched off. RAM and cache are volatile. Non-volatile memory, such as ROM, flash and disks, keeps its contents.

4.2 RAM: SRAM and DRAM

RAM (Random Access Memory) is the main working memory. The CPU can read from and write to any location in about the same time.

Feature	SRAM	DRAM
Full form	Static RAM	Dynamic RAM
Storage cell	Flip-flop circuit	Capacitor and transistor
Refreshing	Not needed	Needed again and again
Speed and cost	Faster and costlier	Slower and cheaper
Typical use	Cache memory	Main memory

EXAM NOTE

Modern main memory modules are SDRAM of the DDR type (DDR4, DDR5). DDR means Double Data Rate.

4.3 ROM and flash memory

ROM (Read Only Memory) is non-volatile. It holds the start-up firmware, such as the BIOS. Its types differ in how they are written and erased.

Type	Meaning
ROM (mask ROM)	Content is fixed by the manufacturer and cannot be changed.
PROM	Programmable ROM; can be written once by the user after manufacture.
EPROM	Erasable PROM; erased by exposing it to ultraviolet light, then rewritten.
EEPROM	Electrically erasable PROM; erased with electrical signals, without removing the chip.
Flash memory	Non-volatile memory that is erased and written in blocks. Used in pen drives, memory cards and SSDs.

4.4 Cache and virtual memory

- Cache memory is a small, very fast memory between the CPU and RAM. It keeps copies of frequently used data so that the CPU does not have to wait for the slower RAM.
- Cache has levels. L1 is the smallest and fastest and sits closest to the core. L2 is larger and slower. L3 is larger still and is usually shared between cores.
- Virtual memory uses part of the disk as if it were RAM, so programs larger than the physical RAM can still run. The operating system moves data between RAM and the disk; the area on disk is called the page file or swap space.

4.5 Secondary storage

Kind	Device	Key facts
Magnetic	Hard disk drive (HDD)	Rotating platters with read/write heads. Data lies in concentric tracks, which are divided into sectors.
	Magnetic tape	Sequential access; used for backups and archives.
	Floppy disk	The common 3.5-inch type stores 1.44 MB; now obsolete.
Optical	CD	About 700 MB; read with an infrared laser. CD-ROM is read-only, CD-R is write-once and CD-RW is rewritable.
	DVD	4.7 GB for a single-layer disc; red laser.
	Blu-ray	25 GB for a single-layer disc; blue-violet laser.
Solid state	SSD, pen drive, memory card	Flash-based with no moving parts; faster, quieter and more shock-resistant than an HDD.

ACCESS METHOD

Tape gives sequential access: to reach a record you pass the ones before it. Disks and RAM give direct (random) access.

One-minute revision

- Fastest to slowest: registers, cache, RAM, secondary storage.
- RAM and cache are volatile; ROM, flash and disks are non-volatile.
- SRAM: no refresh, faster, used in cache. DRAM: needs refresh, cheaper, used as main memory.
- PROM is written once; EPROM is erased by UV light; EEPROM is erased electrically.
- CD about 700 MB, DVD 4.7 GB, Blu-ray 25 GB (single layer); floppy 1.44 MB.

Practice Questions

All questions in this chapter are original GovBabu practice questions written for this book. None of them is presented as a previous-year question. Each question has exactly one correct option. Check your answers only after attempting every question.

Q1. Which of the following memories is volatile?

- | | |
|------------------|---------------|
| (A) ROM | (B) RAM |
| (C) Flash memory | (D) Hard disk |
-

Q2. Which is the fastest memory in a computer system?

- | | |
|-----------------|------------------|
| (A) Registers | (B) Cache memory |
| (C) Main memory | (D) Hard disk |
-

Q3. Which type of memory is normally used to build cache memory?

- | | |
|----------|-------------------|
| (A) DRAM | (B) Magnetic tape |
| (C) SRAM | (D) EPROM |
-

Q4. Which memory must be refreshed periodically to keep its data?

- | | |
|------------------|----------|
| (A) SRAM | (B) ROM |
| (C) Flash memory | (D) DRAM |
-

Q5. An EPROM chip is erased by exposing it to:

- | | |
|-----------------------------|----------------------|
| (A) Ultraviolet light | (B) A magnetic field |
| (C) A software command only | (D) Infrared heating |
-

Q6. A PROM can be programmed:

- (A) Many times using ultraviolet light
 - (B) Only during manufacture, by the maker
 - (C) Never, because it is volatile
 - (D) Only once by the user after manufacture
-

Q7. Pen drives and SSDs are built using:

- | | |
|-----------------------|------------------|
| (A) Cache memory | (B) Flash memory |
| (C) Magnetic platters | (D) Mask ROM |
-

Q8. The BIOS firmware is generally stored in:

- (A) RAM
 - (B) Cache memory
 - (C) A ROM or flash chip on the motherboard
 - (D) An optical disc
-

Q9. The main purpose of cache memory is to:

- (A) Store files permanently
 - (B) Increase the size of the hard disk
 - (C) Reduce the speed gap between the CPU and main memory
 - (D) Supply power to the CPU
-

Q10. Which cache level is the smallest and fastest?

- | | |
|-----------------|--------|
| (A) L2 | (B) L3 |
| (C) Main memory | (D) L1 |
-

Q11. Virtual memory is best described as:

- (A) A part of secondary storage used as an extension of RAM
 - (B) Extra cache inside the CPU
 - (C) A special type of ROM chip
 - (D) Memory inside a graphics card
-

Q12. What is the typical storage capacity of a standard CD?

- | | |
|------------|------------------|
| (A) 4.7 GB | (B) About 700 MB |
| (C) 25 GB | (D) 1.44 MB |
-

Q13. Blu-ray discs are read and written using which type of laser?

- | | |
|-----------|-----------------|
| (A) Red | (B) Infrared |
| (C) Green | (D) Blue-violet |
-

Q14. A standard 3.5-inch floppy disk stores:

- | | |
|-------------|-------------|
| (A) 144 KB | (B) 1.44 MB |
| (C) 14.4 MB | (D) 1.44 GB |
-

Q15. Which storage device has no moving mechanical parts?

- | | |
|-----------------------|---------------------|
| (A) SSD | (B) Hard disk drive |
| (C) Floppy disk drive | (D) CD-ROM drive |
-

Q16. On a hard disk platter, the concentric circles along which data is recorded are called:

- | | |
|-------------|---------------|
| (A) Sectors | (B) Cylinders |
| (C) Tracks | (D) Clusters |
-

Q17. Which storage medium provides sequential access to data?

- | | |
|-------------------|---------------|
| (A) Magnetic tape | (B) Hard disk |
| (C) SSD | (D) RAM |
-

Q18. Which of the following is NOT a secondary storage device?

- | | |
|---------------------|---------|
| (A) Hard disk drive | (B) SSD |
| (C) RAM | (D) DVD |
-

Q19. A CD-R disc can be:

- (A) Erased and rewritten many times
 - (B) Read but never written, from the start
 - (C) Used only as RAM
 - (D) Written once and read many times
-

Q20. Which list shows the memory types from fastest to slowest?

- | | |
|--------------------------------------|--------------------------------------|
| (A) Cache, registers, RAM, hard disk | (B) Registers, cache, RAM, hard disk |
| (C) RAM, cache, registers, hard disk | (D) Hard disk, RAM, cache, registers |
-

Answer Key

Q1 B	Q2 A	Q3 C	Q4 D	Q5 A
Q6 D	Q7 B	Q8 C	Q9 C	Q10 D
Q11 A	Q12 B	Q13 D	Q14 B	Q15 A
Q16 C	Q17 A	Q18 C	Q19 D	Q20 B

Answers and Explanations

- Q1. Answer: (B) RAM** Easy · CA-04-01
Which of the following memories is volatile?
RAM loses its contents when the power goes off. ROM, flash memory and the hard disk are non-volatile.
- Q2. Answer: (A) Registers** Easy · CA-04-02
Which is the fastest memory in a computer system?
Registers sit inside the CPU and are the fastest. Cache is next, then RAM, then the disk.
- Q3. Answer: (C) SRAM** Medium · CA-04-03
Which type of memory is normally used to build cache memory?
SRAM is fast and needs no refreshing, which suits cache. DRAM is slower and used for main memory.
- Q4. Answer: (D) DRAM** Medium · CA-04-04
Which memory must be refreshed periodically to keep its data?
DRAM stores bits as charge in capacitors, and the charge leaks away, so it has to be refreshed. SRAM, ROM and flash do not need this.
- Q5. Answer: (A) Ultraviolet light** Medium · CA-04-05
An EPROM chip is erased by exposing it to:
EPROM is erased with UV light through a window on the chip. EEPROM is the type that is erased electrically.
- Q6. Answer: (D) Only once by the user after manufacture** Medium · CA-04-06
A PROM can be programmed:
PROM is blank when made and the user can write it once. Content fixed during manufacture is a mask ROM, and PROM is not volatile.
- Q7. Answer: (B) Flash memory** Easy · CA-04-07
Pen drives and SSDs are built using:
Both store data in non-volatile flash memory with no moving parts. Magnetic platters are used in hard disks.
- Q8. Answer: (C) A ROM or flash chip on the motherboard** Medium · CA-04-08
The BIOS firmware is generally stored in:
The BIOS must survive power-off and be available at start-up, so it is kept in non-volatile ROM or flash. RAM and cache lose their contents.

- Q9. Answer: (C) Reduce the speed gap between the CPU and main memory** Easy · CA-04-09
The main purpose of cache memory is to:
Cache keeps frequently used data close to the CPU so it waits less for RAM. It is small and volatile, so it does not store files permanently.
- Q10. Answer: (D) L1** Easy · CA-04-10
Which cache level is the smallest and fastest?
L1 is closest to the core, so it is smallest and fastest. L2 and L3 are larger and slower, and main memory is not a cache level.
- Q11. Answer: (A) A part of secondary storage used as an extension of RAM** Medium · CA-04-11
Virtual memory is best described as:
The operating system uses space on the disk when RAM is short. It is therefore not cache, not a ROM chip and not graphics memory.
- Q12. Answer: (B) About 700 MB** Easy · CA-04-12
What is the typical storage capacity of a standard CD?
A CD holds about 700 MB. 4.7 GB is a single-layer DVD, 25 GB a single-layer Blu-ray and 1.44 MB a floppy.
- Q13. Answer: (D) Blue-violet** Medium · CA-04-13
Blu-ray discs are read and written using which type of laser?
The short wavelength of the blue-violet laser allows more data in the same area. CDs use infrared and DVDs use red lasers.
- Q14. Answer: (B) 1.44 MB** Easy · CA-04-14
A standard 3.5-inch floppy disk stores:
The common 3.5-inch high-density floppy holds 1.44 MB. The other values are off by a factor of ten or a thousand.
- Q15. Answer: (A) SSD** Easy · CA-04-15
Which storage device has no moving mechanical parts?
An SSD stores data in flash chips. The other drives spin a disc and move a head or a laser.
- Q16. Answer: (C) Tracks** Medium · CA-04-16
On a hard disk platter, the concentric circles along which data is recorded are called:
Tracks are the concentric circles. Each track is divided into sectors, and a cylinder is the set of the same track on all platters.
- Q17. Answer: (A) Magnetic tape** Medium · CA-04-17
Which storage medium provides sequential access to data?
On tape you must wind past earlier records to reach a later one. A disk, SSD or RAM can go straight to any location.
- Q18. Answer: (C) RAM** Easy · CA-04-18
Which of the following is NOT a secondary storage device?
RAM is primary memory. The hard disk, SSD and DVD all keep data after the power is off.
- Q19. Answer: (D) Written once and read many times** Medium · CA-04-19
A CD-R disc can be:
CD-R means recordable once. The rewritable type is CD-RW, and a disc that is only read is CD-ROM.

Q20. Answer: (B) Registers, cache, RAM, hard disk

Medium · CA-04-20

Which list shows the memory types from fastest to slowest?

Speed falls as you move away from the CPU: registers, then cache, then RAM, then disk. The last option is the reverse order.

CHAPTER 5

Input and Output Devices

This chapter covers the devices that put data into a computer and take results out of it. Exam questions mostly ask you to pick the right device for a job or to match an abbreviation with its use.

5.1 Input devices

An input device sends data and instructions into the computer. Some devices type or point, some read marks or characters from paper, and some capture sound, pictures or the human body.

Device	What it does
Keyboard	Enters text, numbers and commands. The common layout is QWERTY, named after the first six letter keys of the top row.
Mouse, trackball, touchpad	Pointing devices that move a pointer on the screen.
Joystick, light pen, stylus	Used for games, drawing and selecting on screen.
Scanner	Converts a printed page or picture into a digital image.
OCR	Optical Character Recognition: turns images of printed or typed text into editable text.
OMR	Optical Mark Recognition: detects pencil or pen marks, as on objective answer sheets.
MICR	Magnetic Ink Character Recognition: reads the magnetic-ink numbers printed on bank cheques.
Barcode reader	Reads the pattern of bars on a product label using reflected light.
Microphone, webcam, digital camera	Capture sound, live video and still pictures.
Biometric reader	Identifies a person by a fingerprint, iris or face.

5.2 Output devices

An output device presents the results of processing. Output in electronic form that can be displayed or stored is called a soft copy; output printed on paper is a hard copy. A soft copy can be saved and is not necessarily temporary.

- Soft copy devices: monitor, speakers, headphones, projector.
- Hard copy devices: printers and plotters.
- Some devices work both ways. A touchscreen takes input by touch and also displays output, and a headset has both a microphone and earphones.

5.3 Monitors

- A pixel (picture element) is the smallest unit of a display that can be controlled.
- Resolution is the number of pixels across by the number down. A Full HD screen is 1920×1080 pixels and a 4K screen is about 3840×2160 .
- Refresh rate is how many times per second the screen redraws the picture. It is measured in hertz.
- CRT monitors use an electron beam and are bulky. LCD screens use liquid crystals with a backlight, and LED-backlit LCDs are common. OLED screens use organic compounds that give out their own light, so they need no backlight.

5.4 Printers

Class	Type	How it prints
Impact	Dot-matrix	Pins strike an inked ribbon. Noisy, low quality, but can make carbon copies in one pass.
	Daisy-wheel, line printer	Formed characters strike the ribbon. A line printer prints a whole line at a time.
Non-impact	Inkjet	Sprays tiny droplets of liquid ink through nozzles.
	Laser	A laser forms the image on a photosensitive drum, which picks up toner powder and transfers it to the paper, where heat fixes it. Fast and sharp.
	Thermal	Heats special paper; used for receipts and tickets.

SPEED AND QUALITY UNITS

Dot-matrix printers are rated in CPS (characters per second), line printers in LPM (lines per minute) and page printers such as laser printers in PPM (pages per minute). Print quality is measured in DPI (dots per inch).

5.5 Plotters and other output

- A plotter draws large, precise drawings such as engineering plans, maps and architectural designs. It is common in CAD work.
- A projector throws the screen image on a wall or screen for a group. A 3D printer builds a solid object layer by layer.

One-minute revision

- Input: keyboard, mouse, scanner, OCR, OMR, MICR, barcode reader. OMR reads marks; MICR reads cheques; OCR reads text.
- Soft copy is electronic output that can be displayed or stored; hard copy is a physical printed copy.
- Resolution is pixels across $\times$ down; refresh rate is in hertz.
- Impact printers (dot-matrix, daisy-wheel, line) strike; non-impact (inkjet, laser, thermal) do not.
- CPS, LPM and PPM measure speed; DPI measures quality. Touchscreens work as input and output.

Practice Questions

All questions in this chapter are original GovBabu practice questions written for this book. None of them is presented as a previous-year question. Each question has exactly one correct option. Check your answers only after attempting every question.

Q1. Which of the following is an input device?

- | | |
|-------------|-------------|
| (A) Monitor | (B) Printer |
| (C) Speaker | (D) Scanner |
-

Q2. Which of the following is an output device?

- | | |
|--------------|----------------|
| (A) Keyboard | (B) Plotter |
| (C) Scanner | (D) Microphone |
-

Q3. OMR is mainly used to read:

- (A) Pencil or pen marks on answer sheets
 - (B) Printed text from books
 - (C) Magnetic-ink characters on cheques
 - (D) Bar patterns on products
-

Q4. MICR technology is widely used by:

- | | |
|--|---------------------------------------|
| (A) Schools, for printing report cards | (B) Photographers, for editing images |
| (C) Banks, for processing cheques | (D) Airlines, for measuring fuel |
-

Q5. The technology that converts an image of printed text into editable text is:

- | | |
|----------|----------|
| (A) OMR | (B) OCR |
| (C) MICR | (D) BIOS |
-

Q6. A barcode reader works by:

- (A) Sensing keystrokes
 - (B) Measuring finger pressure
 - (C) Reading the pattern of bars using reflected light
 - (D) Recording sound waves
-

Q7. Digitally displayed or stored output, rather than a printed copy, is called:

- | | |
|-----------------|------------------|
| (A) Soft copy | (B) Hard copy |
| (C) Backup copy | (D) Archive copy |
-

Q8. Which device produces hard copy?

- | | |
|---------------|-------------|
| (A) Monitor | (B) Speaker |
| (C) Projector | (D) Printer |
-

Q9. The smallest controllable element of a display screen is a:

- | | |
|-----------|------------|
| (A) Byte | (B) Raster |
| (C) Pixel | (D) Vector |
-

Q10. A screen resolution of 1920 × 1080 refers to:

- (A) The size of the screen in inches
 - (B) The number of pixels across and down the screen
 - (C) The refresh rate in hertz
 - (D) The number of colours it can show
-

Q11. The refresh rate of a monitor is measured in:

- | | |
|---------|-----------|
| (A) DPI | (B) PPM |
| (C) CPS | (D) Hertz |
-

Q12. Which display technology uses organic compounds that emit light when electric current passes through them?

- | | |
|----------|------------|
| (A) OLED | (B) LCD |
| (C) CRT | (D) Plasma |
-

Q13. Which printer forms characters by striking pins against an inked ribbon?

- | | |
|--------------------|------------------------|
| (A) Laser printer | (B) Dot-matrix printer |
| (C) Inkjet printer | (D) Thermal printer |
-

Q14. Which of the following is a non-impact printer?

- | | |
|------------------------|-------------------------|
| (A) Dot-matrix printer | (B) Daisy-wheel printer |
| (C) Line printer | (D) Laser printer |
-

Q15. A laser printer forms the image using:

- | | |
|-------------------------------------|---------------------------------|
| (A) Pins and an ink ribbon | (B) Nozzles spraying liquid ink |
| (C) Toner and a photosensitive drum | (D) Heat-sensitive paper only |
-

Q16. Inkjet printers create images by:

- (A) Spraying tiny droplets of liquid ink onto the paper
 - (B) Striking pins on a ribbon
 - (C) Charging a drum with toner
 - (D) Burning the paper with a laser
-

Q17. The speed of a laser printer is usually measured in:

- (A) Dots per inch (DPI)
 - (B) Megahertz (MHz)
 - (C) Million instructions per second (MIPS)
 - (D) Pages per minute (PPM)
-

Q18. DPI, used in describing a printer, measures its:

- | | |
|---------------------------------|-----------------|
| (A) Printing speed | (B) Paper size |
| (C) Print quality or resolution | (D) Cost of ink |
-

Q19. Which of the following can work as both an input device and an output device?

- | | |
|--------------|-----------------|
| (A) Keyboard | (B) Touchscreen |
| (C) Speaker | (D) Scanner |
-

Q20. Plotters are mainly used to print:

- (A) Large engineering and architectural drawings
 - (B) Small text letters
 - (C) Bank passbook entries
 - (D) Email messages
-

Answer Key

Q1 D	Q2 B	Q3 A	Q4 C	Q5 B
Q6 C	Q7 A	Q8 D	Q9 C	Q10 B
Q11 D	Q12 A	Q13 B	Q14 D	Q15 C
Q16 A	Q17 D	Q18 C	Q19 B	Q20 A

Answers and Explanations

- Q1. Answer: (D) Scanner** Easy · CA-05-01
Which of the following is an input device?
A scanner brings pages and pictures into the computer. A monitor, printer and speaker all present output.
- Q2. Answer: (B) Plotter** Easy · CA-05-02
Which of the following is an output device?
A plotter draws results on paper. The keyboard, scanner and microphone send data in.
- Q3. Answer: (A) Pencil or pen marks on answer sheets** Medium · CA-05-03
OMR is mainly used to read:
Optical Mark Recognition detects marks in chosen positions, as in objective exams. Printed text is read by OCR, cheques by MICR and bar patterns by a barcode reader.
- Q4. Answer: (C) Banks, for processing cheques** Easy · CA-05-04
MICR technology is widely used by:
MICR reads the special magnetic-ink characters printed on cheques, which is why banks use it.
- Q5. Answer: (B) OCR** Easy · CA-05-05
The technology that converts an image of printed text into editable text is:
OCR recognises characters in an image. OMR recognises marks, MICR recognises magnetic-ink characters, and BIOS is start-up firmware.
- Q6. Answer: (C) Reading the pattern of bars using reflected light** Medium · CA-05-06
A barcode reader works by:
The reader shines light on the label, and dark and light bars reflect it differently, which gives the code.
- Q7. Answer: (A) Soft copy** Easy · CA-05-07
Digitally displayed or stored output, rather than a printed copy, is called:
A soft copy is electronic output that can be viewed or stored. A hard copy is a physical printed copy.
- Q8. Answer: (D) Printer** Easy · CA-05-08
Which device produces hard copy?
A printer produces hard copy by printing output on paper. A monitor or projector displays visual output, while a speaker produces audio output.

- Q9. Answer: (C) Pixel** Easy · CA-05-09
The smallest controllable element of a display screen is a:
A pixel is a single picture element. A byte measures data, and raster and vector describe ways of storing images.
- Q10. Answer: (B) The number of pixels across and down the screen** Medium · CA-05-10
A screen resolution of 1920 × 1080 refers to:
The two numbers are the pixel count horizontally and vertically. Screen size is given in inches and refresh rate in hertz.
- Q11. Answer: (D) Hertz** Medium · CA-05-11
The refresh rate of a monitor is measured in:
Refresh rate counts redraws per second, so it is in hertz. DPI, PPM and CPS are printer measures.
- Q12. Answer: (A) OLED** Medium · CA-05-12
Which display technology uses organic compounds that emit light when electric current passes through them?
OLED means Organic Light-Emitting Diode. A conventional LCD needs a backlight, and CRT and plasma use different principles.
- Q13. Answer: (B) Dot-matrix printer** Medium · CA-05-13
Which printer forms characters by striking pins against an inked ribbon?
A dot-matrix printer is an impact printer and so it can make carbon copies. Laser, inkjet and thermal printers do not strike the paper.
- Q14. Answer: (D) Laser printer** Easy · CA-05-14
Which of the following is a non-impact printer?
A laser printer forms the image without striking the paper. The other three are impact printers.
- Q15. Answer: (C) Toner and a photosensitive drum** Medium · CA-05-15
A laser printer forms the image using:
The laser draws the image on a drum, which attracts toner and transfers it to the paper. Pins and ribbon describe dot-matrix, nozzles describe inkjet and heated paper describes thermal printing.
- Q16. Answer: (A) Spraying tiny droplets of liquid ink onto the paper** Easy · CA-05-16
Inkjet printers create images by:
Nozzles fire microscopic ink droplets in the pattern of the image. The other methods belong to other printer types.
- Q17. Answer: (D) Pages per minute (PPM)** Medium · CA-05-17
The speed of a laser printer is usually measured in:
PPM counts finished pages each minute. DPI describes print quality, MHz is for clock speed and MIPS is for processors.
- Q18. Answer: (C) Print quality or resolution** Medium · CA-05-18
DPI, used in describing a printer, measures its:
Dots per inch tells how finely the printer places dots, so a higher figure gives sharper output. Speed is a separate measure.
- Q19. Answer: (B) Touchscreen** Easy · CA-05-19
Which of the following can work as both an input device and an output device?
A touchscreen takes input by touch and also displays output. The keyboard and scanner are input only and the speaker is output only.
- Q20. Answer: (A) Large engineering and architectural drawings** Medium · CA-05-20
Plotters are mainly used to print:
A plotter draws precise large-format drawings, which suits CAD work. Ordinary documents go to normal printers.

CHAPTER 6

Software

This chapter explains the kinds of software, how programs written in different languages are translated for the CPU, and how software is licensed. Many questions ask you to tell two similar terms apart.

6.1 System software and application software

Software is the set of programs that tells the hardware what to do. It is divided into two broad kinds according to the job it performs.

- General-purpose (packaged) application software is written for many users, such as an office suite. Custom or tailor-made software is written for the needs of one organisation, such as a payroll program for one company.

Kind	Purpose	Examples
System software	Manages and controls the hardware and gives other programs a platform to run on.	Operating system, device drivers, utility programs, language translators
Application software	Helps the user do a specific task such as writing, calculating or browsing.	Word processor, spreadsheet, web browser, media player

6.2 Utility software and device drivers

- Utility software maintains and protects the computer. Examples are antivirus programs, disk clean-up, disk defragmenter, backup tools and file-compression tools.
- A device driver is a small program that lets the operating system communicate with a particular hardware device, such as a printer or a graphics card. Without the right driver the device may not work.
- A patch is a small update that fixes bugs or security flaws in existing software. An upgrade moves to a newer version with new features.

6.3 Programming languages and translators

A computer understands only machine language, which is written in binary. Other languages need a translator.

Level	Language	Features
Low level	Machine language	Written in 0s and 1s; runs directly on the CPU; hard to write and machine-specific.
	Assembly language	Uses short mnemonic codes such as ADD and MOV; translated by an assembler.
High level	C, C++, Java, Python	Close to human language, portable across machines; needs a compiler or interpreter.

6.4 Compiler, interpreter and assembler

- A linker combines object modules and library routines into one executable program. A loader places the executable in main memory so it can run.
- A syntax error breaks the grammar rules of the language and is caught when the program is translated. A logical error lets the program run but gives a wrong result. A runtime error occurs while the program is running, for example dividing by zero. Finding and fixing errors is called debugging.

Translator	What it does
Assembler	Converts an assembly-language program into machine language.
Compiler	Translates the whole source program into machine code (object code) before it runs, and reports all errors together. The compiled program then runs fast.
Interpreter	Translates and executes the program one statement at a time, stopping at the first error. It makes testing easy but running is usually slower.

6.5 Software licensing

Type	Meaning
Proprietary	The owner keeps the source code and sells a licence to use the software. Example: Microsoft Windows.
Open source	The source code is available to view, modify and share under a licence. Example: the Linux kernel.
Freeware	Free of charge, but the author keeps the copyright and does not share the source code.
Shareware	Free for a trial period or with limited features; payment is needed for continued or full use.
Public domain	Not protected by copyright; anyone may use or change it.

EXAM NOTE

Free software or open source does not always mean free of cost, and freeware is not always open source. Read the wording of the question carefully.

One-minute revision

- System software runs the machine; application software helps the user do tasks.
- Assembler: assembly to machine code. Compiler: whole program at once. Interpreter: line by line.
- Linker joins object modules; loader puts the program in memory.
- Syntax error: grammar broken. Logical error: wrong result. Runtime error: fails while running.
- Open source shares code; freeware is free but closed; shareware is a trial; public domain has no copyright.

Practice Questions

All questions in this chapter are original GovBabu practice questions written for this book. None of them is presented as a previous-year question. Each question has exactly one correct option. Check your answers only after attempting every question.

Q1. Which of the following is system software?

- | | |
|--------------------|---------------------------|
| (A) Word processor | (B) Device driver |
| (C) Web browser | (D) Presentation software |
-

Q2. A payroll program written specially for the needs of one company is an example of:

- | | |
|----------------------|-----------------------------------|
| (A) System software | (B) Firmware |
| (C) Utility software | (D) Custom (tailor-made) software |
-

Q3. Which translator converts the entire source program into machine code before the program is executed?

- | | |
|---------------|-----------------|
| (A) Compiler | (B) Interpreter |
| (C) Assembler | (D) Loader |
-

Q4. Which translator translates and executes a program one statement at a time?

- | | |
|-----------------|---------------|
| (A) Compiler | (B) Linker |
| (C) Interpreter | (D) Assembler |
-

Q5. A program written in assembly language is converted into machine language by:

- | | |
|------------------|--------------------|
| (A) A compiler | (B) An interpreter |
| (C) An assembler | (D) A linker |
-

Q6. Which program combines object modules and library routines into a single executable program?

- | | |
|--------------|-----------------|
| (A) Linker | (B) Loader |
| (C) Compiler | (D) Text editor |
-

Q7. Which program places an executable file into main memory so that it can run?

- | | |
|--------------|---------------|
| (A) Linker | (B) Assembler |
| (C) Debugger | (D) Loader |
-

Q8. Which software lets the operating system communicate with hardware such as a printer?

- | | |
|---------------|-------------------|
| (A) Compiler | (B) Device driver |
| (C) Antivirus | (D) Spreadsheet |
-

-
- Q9.** Disk defragmenter, backup tools and antivirus programs are examples of:
- (A) Utility software (B) Application packages
(C) Language translators (D) Firmware
-
- Q10.** Software whose source code is available for anyone to view, modify and share is called:
- (A) Proprietary software (B) Shareware
(C) Demoware (D) Open-source software
-
- Q11.** Which of the following is an open-source operating system kernel?
- (A) Microsoft Windows (B) Linux
(C) Apple iOS (D) Apple macOS
-
- Q12.** Software distributed at no cost, but whose author keeps the copyright and does not share the source code, is:
- (A) Shareware (B) Open-source software
(C) Freeware (D) Public-domain software
-
- Q13.** Software offered free for a trial period, after which payment is needed to continue using it, is called:
- (A) Freeware (B) Firmware
(C) Liveware (D) Shareware
-
- Q14.** A small piece of code released to fix bugs or security flaws in existing software is called a:
- (A) Driver (B) Patch
(C) Compiler (D) Macro
-
- Q15.** The process of finding and correcting errors in a program is called:
- (A) Compiling (B) Booting
(C) Debugging (D) Formatting
-
- Q16.** Which programming language is written directly in binary (0s and 1s)?
- (A) Machine language (B) Assembly language
(C) High-level language (D) Fourth-generation language
-
- Q17.** Which of the following is a high-level programming language?
- (A) Python (B) Machine language
(C) Assembly language (D) Object code
-

Q18. The machine-level output produced by a compiler is called:

- | | |
|-----------------|----------------|
| (A) Source code | (B) Flowchart |
| (C) Object code | (D) Pseudocode |
-

Q19. A mistake that breaks the grammar rules of a programming language and is caught when the program is translated is a:

- | | |
|--------------------|-------------------|
| (A) Logical error | (B) Runtime error |
| (C) Hardware error | (D) Syntax error |
-

Q20. Compared with a compiler, an interpreter typically:

- (A) Produces a standalone executable for the whole program
 - (B) Executes the program statement by statement and reports an error when it reaches it
 - (C) Translates the entire program before running any of it
 - (D) Always runs the program faster
-

Answer Key

Q1 B	Q2 D	Q3 A	Q4 C	Q5 C
Q6 A	Q7 D	Q8 B	Q9 A	Q10 D
Q11 B	Q12 C	Q13 D	Q14 B	Q15 C
Q16 A	Q17 A	Q18 C	Q19 D	Q20 B

Answers and Explanations

- Q1. Answer: (B) Device driver** Easy · CA-06-01
Which of the following is system software?
A device driver helps the operating system control hardware, so it is system software. The other three are application software.
- Q2. Answer: (D) Custom (tailor-made) software** Medium · CA-06-02
A payroll program written specially for the needs of one company is an example of:
Software built for one organisation's specific needs is custom software. It is application software, not system software, firmware or a utility.
- Q3. Answer: (A) Compiler** Easy · CA-06-03
Which translator converts the entire source program into machine code before the program is executed?
A compiler translates the whole program first and then it is run. An interpreter works statement by statement, an assembler handles assembly language and a loader only places a program in memory.
- Q4. Answer: (C) Interpreter** Easy · CA-06-04
Which translator translates and executes a program one statement at a time?
An interpreter reads, translates and runs each statement in turn and stops at the first error.
- Q5. Answer: (C) An assembler** Easy · CA-06-05
A program written in assembly language is converted into machine language by:
The assembler is the translator meant for assembly language. Compilers and interpreters handle high-level languages.
- Q6. Answer: (A) Linker** Medium · CA-06-06
Which program combines object modules and library routines into a single executable program?
The linker joins the pieces. The loader comes afterwards and puts the executable into memory.
- Q7. Answer: (D) Loader** Medium · CA-06-07
Which program places an executable file into main memory so that it can run?
The loader copies the program into memory and starts it. The linker prepares the executable earlier, and a debugger is used to find errors.
- Q8. Answer: (B) Device driver** Easy · CA-06-08
Which software lets the operating system communicate with hardware such as a printer?
The driver is written for a specific device and acts as the go-between. The others do not do this job.

- Q9. Answer: (A) Utility software** Easy · CA-06-09
Disk defragmenter, backup tools and antivirus programs are examples of:
Utilities maintain, protect and tune the computer. They are part of system software.
- Q10. Answer: (D) Open-source software** Easy · CA-06-10
Software whose source code is available for anyone to view, modify and share is called:
Open-source software makes its code available under a licence. Proprietary software keeps the code closed.
- Q11. Answer: (B) Linux** Easy · CA-06-11
Which of the following is an open-source operating system kernel?
The Linux kernel is released under an open-source licence. Windows, iOS and macOS are proprietary.
- Q12. Answer: (C) Freeware** Medium · CA-06-12
Software distributed at no cost, but whose author keeps the copyright and does not share the source code, is:
That description fits freeware. Shareware asks for payment after a trial, open source shares its code and public-domain software has no copyright holder.
- Q13. Answer: (D) Shareware** Easy · CA-06-13
Software offered free for a trial period, after which payment is needed to continue using it, is called:
Shareware is trial software. Freeware stays free, firmware lives in chips and liveware means people.
- Q14. Answer: (B) Patch** Medium · CA-06-14
A small piece of code released to fix bugs or security flaws in existing software is called a:
A patch repairs a problem in software already installed. A driver, compiler and macro have different purposes.
- Q15. Answer: (C) Debugging** Easy · CA-06-15
The process of finding and correcting errors in a program is called:
Debugging means finding and fixing bugs. Compiling translates code, booting starts the computer and formatting prepares a disk.
- Q16. Answer: (A) Machine language** Easy · CA-06-16
Which programming language is written directly in binary (0s and 1s)?
Machine language is binary code that the CPU runs directly. Assembly uses mnemonics and high-level languages use English-like statements.
- Q17. Answer: (A) Python** Easy · CA-06-17
Which of the following is a high-level programming language?
Python is a high-level language. Machine language, assembly language and object code are low-level forms.
- Q18. Answer: (C) Object code** Medium · CA-06-18
The machine-level output produced by a compiler is called:
A compiler turns source code into object code. A flowchart and pseudocode are design aids, not compiler output.
- Q19. Answer: (D) Syntax error** Medium · CA-06-19
A mistake that breaks the grammar rules of a programming language and is caught when the program is translated is a:
A syntax error is a grammar mistake. A logical error gives wrong output from a program that runs, and a runtime error happens while it is running.

Q20. Answer: (B) Executes the program statement by statement and reports an error when it reaches it

Medium · CA-06-20

Compared with a compiler, an interpreter typically:

An interpreter works one statement at a time. The other three options describe a compiler or make a claim that is not generally true.

CHAPTER 7

Operating Systems

This chapter covers what an operating system does, the main types, how it schedules processes and manages memory, and the Windows facts that are asked most often.

7.1 What an operating system does

An operating system (OS) is the system software that manages the hardware, runs the programs and provides a way for the user to work with the computer. It starts when the computer boots and stays in memory while the machine is on.

- The kernel is the core of the OS that directly controls hardware, memory and processes. The shell is the outer layer that takes the user's commands and passes them to the kernel.

Function	Meaning
Process management	Creates, schedules and ends processes and shares the CPU between them.
Memory management	Allocates and frees main memory and uses virtual memory when RAM is short.
File management	Creates, names, stores, protects and retrieves files and folders.
Device management	Controls input and output devices through their drivers.
Security	Protects data and resources through passwords, user accounts and permissions.
User interface	Lets the user give commands, either by typing (command line) or through windows and icons (graphical).

7.2 Types of operating systems

Type	Key idea
Batch	Similar jobs are collected and run together with no user interaction while they run.
Multiprogramming	Several programs are kept in memory so the CPU never sits idle while one waits for input or output.
Multitasking	One user can run several programs at the same time; the CPU switches between them quickly.
Time-sharing	Each user or process gets a short time slice of the CPU in turn, so many users feel they have the machine to themselves.
Multiprocessing	The system has more than one CPU working together.
Real-time	Must respond within strict time limits. Used in missile control, industrial robots and medical equipment.
Distributed / network	Many computers connected by a network share resources and work together.

7.3 Process scheduling and deadlock

A process is a program in execution. The scheduler decides which waiting process gets the CPU next.

- Deadlock is a situation in which two or more processes wait forever for resources held by one another. It needs four conditions together: mutual exclusion, hold and wait, no pre-emption and circular wait.

Algorithm	How it chooses
FCFS (First Come First Served)	Serves processes in the order they arrive.
SJF (Shortest Job First)	Picks the process with the smallest CPU time needed.
Round Robin	Gives each process a fixed time quantum in cyclic order; designed for time-sharing.
Priority	Runs the process with the highest priority first.

7.4 Memory management in the OS

- Paging divides memory into fixed-size blocks: pages for the program (logical memory) and frames for physical memory. Segmentation divides a program into variable-size parts called segments, such as code and data.
- Thrashing happens when the system spends more time moving pages between RAM and disk than executing programs.
- Spooling (Simultaneous Peripheral Operations On-Line) stores output for a slow device, such as a printer, temporarily on disk, so the CPU is free to continue.

7.5 Popular operating systems and file systems

Name	Notes
Windows	Microsoft's graphical OS for PCs; uses the NTFS file system.
macOS and iOS	Apple's operating systems for Mac computers and iPhones; proprietary.
Linux	Open-source, Unix-like OS; the kernel was created by Linus Torvalds.
Unix	An early multi-user, multitasking OS developed at AT&T Bell Labs.
Android	A mobile OS built on the Linux kernel.
MS-DOS	An older single-user, command-line OS.

7.6 Useful Windows facts and shortcuts

Shortcut	Action
Ctrl + Shift + Esc	Opens Task Manager directly.
Ctrl + Alt + Delete	Opens the security screen with lock, switch user and Task Manager.
Alt + F4	Closes the active window or program.
Alt + Tab	Switches between open windows.
Windows key + L	Locks the computer.
Windows key + D	Shows or hides the desktop.
Windows key + E	Opens File Explorer.
Windows key + R	Opens the Run box.
Shift + Delete	Deletes the selected item permanently, without sending it to the Recycle Bin.

SAFE MODE

Safe mode starts Windows with only a minimal set of drivers and services. It is used to troubleshoot problems caused by software or drivers.

One-minute revision

- OS functions: process, memory, file, device management, security and user interface.
- Kernel is the core; shell takes commands. Multitasking is one user, many programs; time-sharing shares the CPU in slices; real-time has strict deadlines.
- Round Robin uses a time quantum; FCFS serves in arrival order; deadlock needs four conditions.
- Thrashing is too much paging; spooling frees the CPU from slow devices.
- Ctrl+Shift+Esc Task Manager; Alt+F4 close; Win+L lock; Shift+Delete deletes permanently.

Practice Questions

All questions in this chapter are original GovBabu practice questions written for this book. None of them is presented as a previous-year question. Each question has exactly one correct option. Check your answers only after attempting every question.

Q1. The software that manages hardware resources and provides services to application programs is the:

- | | |
|----------------------|-----------------|
| (A) Compiler | (B) Assembler |
| (C) Operating system | (D) Spreadsheet |
-

Q2. The core part of an operating system that directly manages hardware, memory and processes is the:

- | | |
|------------|--------------|
| (A) Kernel | (B) Shell |
| (C) BIOS | (D) Compiler |
-

Q3. The part of an operating system that accepts the user's commands and passes them to the kernel is called the:

- | | |
|------------|------------|
| (A) Kernel | (B) Loader |
| (C) Driver | (D) Shell |
-

Q4. Which type of operating system lets one user run several programs at the same time?

- | | |
|-----------------|------------------|
| (A) Batch | (B) Multitasking |
| (C) Single-task | (D) Real-time |
-

Q5. In a time-sharing operating system, each process or user gets:

- (A) The CPU permanently until it finishes
 - (B) A short slice of CPU time in turn
 - (C) No CPU time unless it has the highest priority
 - (D) A separate CPU of its own
-

Q6. An operating system used in missile control or industrial robots, which must respond within strict time limits, is a:

- | | |
|----------------------------------|-----------------------------------|
| (A) Batch operating system | (B) Time-sharing operating system |
| (C) Distributed operating system | (D) Real-time operating system |
-

Q7. In which operating system are jobs of a similar type collected and run together without user interaction?

- | | |
|-----------------------------------|--------------------------------|
| (A) Batch operating system | (B) Real-time operating system |
| (C) Time-sharing operating system | (D) Mobile operating system |
-

Q8. Round Robin CPU scheduling gives each process:

- (A) The CPU until it completes, in arrival order
 - (B) The CPU strictly by shortest job first
 - (C) A fixed time quantum, in cyclic order
 - (D) The CPU only if it has the highest priority
-

Q9. Which CPU scheduling algorithm serves processes in the order in which they arrive?

- | | |
|----------|-------------------------|
| (A) SJF | (B) Round Robin |
| (C) FCFS | (D) Priority scheduling |
-

Q10. A situation in which two or more processes wait forever for resources held by each other is called:

- | | |
|--------------|---------------|
| (A) Deadlock | (B) Thrashing |
| (C) Spooling | (D) Paging |
-

Q11. When the system spends more time swapping pages between RAM and disk than executing programs, it is called:

- | | |
|--------------|---------------|
| (A) Deadlock | (B) Thrashing |
| (C) Spooling | (D) Booting |
-

Q12. In paging, the fixed-size blocks of a program's logical memory are called:

- | | |
|--------------|-------------|
| (A) Segments | (B) Sectors |
| (C) Clusters | (D) Pages |
-

Q13. Storing the output meant for a slow device such as a printer temporarily on disk, so the CPU is free to continue, is called:

- | | |
|--------------|--------------|
| (A) Paging | (B) Spooling |
| (C) Swapping | (D) Booting |
-

Q14. NTFS is the standard file system of modern versions of which operating system?

- | | |
|----------------------------|--------------------------------|
| (A) Linux (ext4 is common) | (B) Apple macOS (APFS is used) |
| (C) MS-DOS (FAT is used) | (D) Microsoft Windows |
-

Q15. Which shortcut opens Task Manager directly in Windows?

- | | |
|------------------------|----------------------|
| (A) Alt + F4 | (B) Ctrl + Alt + Tab |
| (C) Ctrl + Shift + Esc | (D) Windows key + R |
-

Q16. In Windows, pressing Alt + F4 is used to:

- | | |
|--|---------------------------------|
| (A) Close the active window or program | (B) Switch between open windows |
| (C) Lock the computer | (D) Open the Run box |
-

Q17. In Windows, pressing the Windows key together with L:

- | | |
|-------------------------|------------------------|
| (A) Opens File Explorer | (B) Opens the Run box |
| (C) Shows the desktop | (D) Locks the computer |
-

Q18. Pressing Shift + Delete on a selected file in Windows:

- (A) Moves it to the Recycle Bin
 - (B) Deletes it permanently, without moving it to the Recycle Bin
 - (C) Copies it to the clipboard
 - (D) Renames it
-

Q19. The Android operating system is built on the kernel of which operating system?

- | | |
|--------------------|----------------|
| (A) Linux | (B) Windows NT |
| (C) Darwin (Apple) | (D) MS-DOS |
-

Q20. Safe mode in Windows starts the system with:

- (A) All drivers and extra start-up programs
 - (B) No operating system at all
 - (C) A minimal set of drivers and services, for troubleshooting
 - (D) Only the network drivers
-

Answer Key

Q1 C	Q2 A	Q3 D	Q4 B	Q5 B
Q6 D	Q7 A	Q8 C	Q9 C	Q10 A
Q11 B	Q12 D	Q13 B	Q14 D	Q15 C
Q16 A	Q17 D	Q18 B	Q19 A	Q20 C

Answers and Explanations

Q1. Answer: (C) Operating system

Easy · CA-07-01

The software that manages hardware resources and provides services to application programs is the:

The OS controls the hardware and gives programs a platform to run. The compiler and assembler only translate code, and a spreadsheet is an application.

Q2. Answer: (A) Kernel

Medium · CA-07-02

The core part of an operating system that directly manages hardware, memory and processes is the:

The kernel is the heart of the OS. The shell is the layer that takes the user's commands, and the BIOS is start-up firmware.

Q3. Answer: (D) Shell

Medium · CA-07-03

The part of an operating system that accepts the user's commands and passes them to the kernel is called the:

The shell is the interface between the user and the kernel. It can be a command line or a graphical shell.

Q4. Answer: (B) Multitasking

Easy · CA-07-04

Which type of operating system lets one user run several programs at the same time?

Multitasking switches rapidly between programs so that they appear to run together. Batch systems run queued jobs without interaction.

Q5. Answer: (B) A short slice of CPU time in turn

Medium · CA-07-05

In a time-sharing operating system, each process or user gets:

Time-sharing divides CPU time into small slices and hands them out in turn. That is why many users feel they have the machine to themselves.

Q6. Answer: (D) Real-time operating system

Easy · CA-07-06

An operating system used in missile control or industrial robots, which must respond within strict time limits, is a:

Real-time systems guarantee a response within a fixed time, which these tasks demand. The others do not give that guarantee.

Q7. Answer: (A) Batch operating system

Easy · CA-07-07

In which operating system are jobs of a similar type collected and run together without user interaction?

A batch system groups jobs and runs them with no interaction while they run, which suits long routine work such as payroll runs.

- Q8. Answer: (C) A fixed time quantum, in cyclic order** Medium · CA-07-08
Round Robin CPU scheduling gives each process:
Round Robin is built for time-sharing and rotates through the processes with a fixed quantum. The other choices describe FCFS, SJF and priority scheduling.
- Q9. Answer: (C) FCFS** Easy · CA-07-09
Which CPU scheduling algorithm serves processes in the order in which they arrive?
First Come First Served is the simplest scheduling method. SJF picks the shortest job and Round Robin rotates with a quantum.
- Q10. Answer: (A) Deadlock** Medium · CA-07-10
A situation in which two or more processes wait forever for resources held by each other is called:
Deadlock is a circular wait with no way forward. Thrashing is excessive paging, and spooling and paging are normal OS techniques.
- Q11. Answer: (B) Thrashing** Medium · CA-07-11
When the system spends more time swapping pages between RAM and disk than executing programs, it is called:
Thrashing usually appears when RAM is too small for the load. Deadlock is a different problem, about waiting for resources.
- Q12. Answer: (D) Pages** Medium · CA-07-12
In paging, the fixed-size blocks of a program's logical memory are called:
Pages are fixed-size. Segments are variable-size parts, and sectors and clusters belong to disk storage.
- Q13. Answer: (B) Spooling** Medium · CA-07-13
Storing the output meant for a slow device such as a printer temporarily on disk, so the CPU is free to continue, is called:
Spooling queues the output on disk for the device to take at its own speed. Paging and swapping move memory contents, and booting starts the system.
- Q14. Answer: (D) Microsoft Windows** Medium · CA-07-14
NTFS is the standard file system of modern versions of which operating system?
NTFS comes from Windows NT and is Windows' main file system. Linux, Apple and DOS systems use the other file systems listed.
- Q15. Answer: (C) Ctrl + Shift + Esc** Medium · CA-07-15
Which shortcut opens Task Manager directly in Windows?
Ctrl+Shift+Esc opens Task Manager at once. Alt+F4 closes a window and Windows+R opens the Run box.
- Q16. Answer: (A) Close the active window or program** Easy · CA-07-16
In Windows, pressing Alt + F4 is used to:
Alt+F4 closes the window in focus. Alt+Tab switches windows, Windows+L locks and Windows+R opens Run.
- Q17. Answer: (D) Locks the computer** Easy · CA-07-17
In Windows, pressing the Windows key together with L:
Windows+L locks the screen. File Explorer is Windows+E, Run is Windows+R and the desktop is Windows+D.
- Q18. Answer: (B) Deletes it permanently, without moving it to the Recycle Bin** Medium · CA-07-18
Pressing Shift + Delete on a selected file in Windows:
Shift+Delete bypasses the Recycle Bin, so the file cannot be restored from it. A plain Delete sends the file there.

Q19. Answer: (A) Linux

Medium · CA-07-19

The Android operating system is built on the kernel of which operating system?

Android uses a modified Linux kernel. Windows NT, Darwin and MS-DOS belong to other systems.

Q20. Answer: (C) A minimal set of drivers and services, for troubleshooting

Medium · CA-07-20

Safe mode in Windows starts the system with:

Starting with fewer drivers and services makes it easier to find what is causing a problem. It does start the operating system.

CHAPTER 8

Number Systems and Codes

This chapter covers the number systems a computer uses, how to convert between them, binary arithmetic, character codes and logic gates. These questions are calculation-based, so practise the conversions until they are quick.

8.1 Number systems

A number system is defined by its base (or radix), which is the number of different digits it uses. Computers work internally in binary, while people prefer decimal. Octal and hexadecimal are shorthand for long binary numbers.

System	Base	Digits used
Binary	2	0, 1
Octal	8	0 to 7
Decimal	10	0 to 9
Hexadecimal	16	0 to 9 and A to F (A = 10, B = 11, C = 12, D = 13, E = 14, F = 15)

BITS AND VALUES

With n bits you can represent 2 to the power n different values. So 4 bits give 16 values, and 8 bits give 256 values, from 0 to 255 when unsigned.

8.2 Converting between systems

- Binary to decimal: multiply each bit by its place value (powers of 2, from the right) and add. For example $1011 = 8 + 0 + 2 + 1 = 11$.
- Decimal to binary: divide repeatedly by 2 and read the remainders from bottom to top. For example 25 gives 11001, and 45 gives 101101.
- Binary to octal: group the bits in threes from the right. For example 111000 is 111 and 000, which is 70 in octal. Binary to hexadecimal: group in fours. For example 1010 1100 is A and C, so AC.
- Octal or hexadecimal to decimal: multiply each digit by a power of the base. For example octal $17 = 1 \times 8 + 7 = 15$, hexadecimal $2F = 2 \times 16 + 15 = 47$, and FF = 255.

8.3 Binary arithmetic and complements

- Binary addition rules: $0 + 0 = 0$, $0 + 1 = 1$, $1 + 0 = 1$ and $1 + 1 = 10$ (write 0, carry 1). For example $1101 + 0111 = 10100$, which is $13 + 7 = 20$.
- The 1's complement of a binary number is found by flipping every bit. The 1's complement of 1010 is 0101.

- The 2's complement is the 1's complement plus 1. For 4-bit 0101, the 1's complement is 1010 and the 2's complement is 1011. Computers use 2's complement to store negative numbers and to subtract by adding.

8.4 Character codes

Code	Details
ASCII	American Standard Code for Information Interchange. The standard version uses 7 bits, giving 128 characters; the extended version uses 8 bits, giving 256. Examples: A = 65, a = 97, 0 = 48.
EBCDIC	Extended Binary Coded Decimal Interchange Code; an 8-bit code used on IBM mainframes.
BCD	Binary Coded Decimal: each decimal digit is stored as its own 4-bit binary group.
Unicode	Unicode is a character standard that assigns code points to characters in many scripts, including Hindi (Devanagari). UTF-8, UTF-16 and UTF-32 are encoding forms used to represent Unicode text.

8.5 Logic gates

A logic gate takes one or more binary inputs and gives one binary output. Computers are built from billions of gates.

Gate	Output is 1 when
AND	all inputs are 1
OR	at least one input is 1
NOT	the input is 0 (it inverts the input)
NAND	not all inputs are 1 (NOT of AND)
NOR	all inputs are 0 (NOT of OR)
XOR	the two inputs are different
XNOR	the two inputs are the same

UNIVERSAL GATES

NAND and NOR are called universal gates because any other gate, and so any digital circuit, can be built using only NAND gates or only NOR gates.

One-minute revision

- Bases: binary 2, octal 8, decimal 10, hexadecimal 16 (A to F stand for 10 to 15).
- Binary to octal: group by 3 bits. Binary to hex: group by 4 bits. n bits give 2 to the power n values.
- 1's complement flips the bits; 2's complement adds 1 to it.
- Basic ASCII uses 7-bit codes for 128 code values; 'A' = 65 and 'a' = 97. Unicode supports a wide range of scripts, including Devanagari.
- AND needs all 1s; OR needs any 1; XOR needs different inputs; NAND and NOR are universal.

Practice Questions

All questions in this chapter are original GovBabu practice questions written for this book. None of them is presented as a previous-year question. Each question has exactly one correct option. Check your answers only after attempting every question.

Q1. What is the base of the binary number system?

- | | |
|--------|--------|
| (A) 2 | (B) 8 |
| (C) 10 | (D) 16 |
-

Q2. Which of the following is NOT a valid digit in the octal number system?

- | | |
|-------|-------|
| (A) 0 | (B) 5 |
| (C) 8 | (D) 7 |
-

Q3. In hexadecimal, the letter F stands for the decimal value:

- | | |
|--------|--------|
| (A) 10 | (B) 16 |
| (C) 14 | (D) 15 |
-

Q4. The decimal value of the binary number 1011 is:

- | | |
|--------|--------|
| (A) 13 | (B) 11 |
| (C) 9 | (D) 10 |
-

Q5. The binary equivalent of the decimal number 25 is:

- | | |
|-----------|-----------|
| (A) 10011 | (B) 11001 |
| (C) 11100 | (D) 10101 |
-

Q6. The decimal value of the hexadecimal number 2F is:

- | | |
|--------|--------|
| (A) 37 | (B) 57 |
| (C) 41 | (D) 47 |
-

Q7. The binary number 1010 1100 written in hexadecimal is:

- | | |
|--------|--------|
| (A) AC | (B) CA |
| (C) BC | (D) AD |
-

Q8. The decimal value of the octal number 17 is:

- | | |
|--------|--------|
| (A) 17 | (B) 7 |
| (C) 15 | (D) 13 |
-

Q9. The sum of the binary numbers 1101 and 0111 is:

- | | |
|-----------|-----------|
| (A) 10010 | (B) 10110 |
| (C) 10100 | (D) 11100 |
-

Q10. The 1's complement of the binary number 1010 is:

- | | |
|----------|----------|
| (A) 0110 | (B) 1010 |
| (C) 1111 | (D) 0101 |
-

Q11. The 2's complement of the 4-bit binary number 0101 is:

- | | |
|----------|----------|
| (A) 1010 | (B) 1011 |
| (C) 0101 | (D) 1100 |
-

Q12. What is the largest unsigned decimal value that can be stored in 8 bits?

- | | |
|---------|---------|
| (A) 255 | (B) 256 |
| (C) 127 | (D) 128 |
-

Q13. How many different values can be represented with 4 bits?

- | | |
|--------|--------|
| (A) 8 | (B) 15 |
| (C) 32 | (D) 16 |
-

Q14. Standard ASCII uses how many bits to represent a character?

- | | |
|--------|--------|
| (A) 7 | (B) 4 |
| (C) 16 | (D) 32 |
-

Q15. Which character encoding can represent Hindi and the characters of many other languages in a single standard?

- | | |
|------------|-------------|
| (A) ASCII | (B) Unicode |
| (C) EBCDIC | (D) BCD |
-

Q16. In ASCII, the capital letter A has the decimal code:

- | | |
|--------|--------|
| (A) 97 | (B) 48 |
| (C) 65 | (D) 32 |
-

Q17. The output of an AND gate is 1 only when:

- | | |
|--------------------------|------------------------------|
| (A) Any one input is 1 | (B) The inputs are different |
| (C) All its inputs are 0 | (D) All its inputs are 1 |
-

Q18. The output of a two-input XOR gate is 1 when:

- | | |
|---------------------------------|----------------------------------|
| (A) The two inputs are the same | (B) The two inputs are different |
| (C) Both inputs are 1 only | (D) Both inputs are 0 only |
-

Q19. Which of the following is a universal gate?

- | | |
|----------|---------|
| (A) AND | (B) OR |
| (C) NAND | (D) XOR |
-

Q20. The output of a NOR gate is 1 only when:

- | | |
|--------------------------|------------------------------|
| (A) All its inputs are 0 | (B) Any input is 1 |
| (C) All its inputs are 1 | (D) The inputs are different |
-

Answer Key

Q1 A	Q2 C	Q3 D	Q4 B	Q5 B
Q6 D	Q7 A	Q8 C	Q9 C	Q10 D
Q11 B	Q12 A	Q13 D	Q14 A	Q15 B
Q16 C	Q17 D	Q18 B	Q19 C	Q20 A

Answers and Explanations

- Q1. Answer: (A) 2** Easy · CA-08-01
 What is the base of the binary number system?
 Binary uses only two digits, 0 and 1, so its base is 2. The bases 8, 10 and 16 belong to octal, decimal and hexadecimal.
- Q2. Answer: (C) 8** Easy · CA-08-02
 Which of the following is NOT a valid digit in the octal number system?
 Octal uses the digits 0 to 7 only, so 8 is not allowed.
- Q3. Answer: (D) 15** Easy · CA-08-03
 In hexadecimal, the letter F stands for the decimal value:
 Hexadecimal counts 0 to 9 and then A to F for 10 to 15, so F is 15. The base itself is 16, but there is no digit 16.
- Q4. Answer: (B) 11** Easy · CA-08-04
 The decimal value of the binary number 1011 is:
 $1011 = 8 + 0 + 2 + 1 = 11$. The value 13 is 1101 and 9 is 1001.
- Q5. Answer: (B) 11001** Medium · CA-08-05
 The binary equivalent of the decimal number 25 is:
 $25 = 16 + 8 + 1$, which is 11001. The other choices equal 19, 28 and 21.
- Q6. Answer: (D) 47** Medium · CA-08-06
 The decimal value of the hexadecimal number 2F is:
 $2F = 2 \times 16 + 15 = 47$.
- Q7. Answer: (A) AC** Medium · CA-08-07
 The binary number 1010 1100 written in hexadecimal is:
 Group in fours: 1010 is A and 1100 is C, so the number is AC. CA reverses the order.
- Q8. Answer: (C) 15** Medium · CA-08-08
 The decimal value of the octal number 17 is:
 $\text{Octal } 17 = 1 \times 8 + 7 = 15$. The value 17 would be the same digits read as decimal.
- Q9. Answer: (C) 10100** Medium · CA-08-09
 The sum of the binary numbers 1101 and 0111 is:
 1101 is 13 and 0111 is 7, and $13 + 7 = 20$, which is 10100 in binary.

- Q10. Answer: (D) 0101** Medium · CA-08-10
The 1's complement of the binary number 1010 is:
The 1's complement flips every bit: 1010 becomes 0101.
- Q11. Answer: (B) 1011** Medium · CA-08-11
The 2's complement of the 4-bit binary number 0101 is:
The 1's complement of 0101 is 1010, and adding 1 gives 1011. The value 1010 is only the 1's complement.
- Q12. Answer: (A) 255** Easy · CA-08-12
What is the largest unsigned decimal value that can be stored in 8 bits?
8 bits give 256 values, from 0 to 255. The value 127 is the largest positive number in signed 8-bit form.
- Q13. Answer: (D) 16** Easy · CA-08-13
How many different values can be represented with 4 bits?
4 bits give 2 to the power 4, which is 16 values, from 0 to 15.
- Q14. Answer: (A) 7** Easy · CA-08-14
Standard ASCII uses how many bits to represent a character?
Standard ASCII is a 7-bit code with 128 characters. The extended form uses 8 bits.
- Q15. Answer: (B) Unicode** Easy · CA-08-15
Which character encoding can represent Hindi and the characters of many other languages in a single standard?
Unicode assigns code points to characters across many scripts, including Devanagari. ASCII represents basic Latin letters, digits, punctuation and control codes; EBCDIC is a family of character encodings used in IBM systems, while BCD represents decimal digits.
- Q16. Answer: (C) 65** Medium · CA-08-16
In ASCII, the capital letter A has the decimal code:
A is 65. Lower-case a is 97, the digit 0 is 48 and the space is 32.
- Q17. Answer: (D) All its inputs are 1** Easy · CA-08-17
The output of an AND gate is 1 only when:
AND needs every input to be 1. A gate that needs any one input to be 1 is OR, and one that needs different inputs is XOR.
- Q18. Answer: (B) The two inputs are different** Medium · CA-08-18
The output of a two-input XOR gate is 1 when:
XOR is the exclusive OR: 0 and 1 give 1, but 1 and 1 give 0. The gate that gives 1 for equal inputs is XNOR.
- Q19. Answer: (C) NAND** Medium · CA-08-19
Which of the following is a universal gate?
Any digital circuit can be built from NAND gates alone, which is why NAND (and NOR) are called universal. AND, OR and XOR cannot do this on their own.
- Q20. Answer: (A) All its inputs are 0** Medium · CA-08-20
The output of a NOR gate is 1 only when:
NOR is NOT of OR, so it gives 1 only when OR would give 0, that is when every input is 0.

CHAPTER 9

MS Word

This chapter covers Microsoft Word: file types, the tabs of the ribbon, formatting, tables, mail merge and the keyboard shortcuts that exams ask about most. Learn the shortcuts in pairs and the tabs by what they contain.

9.1 About MS Word

Microsoft Word is a word processor: application software for creating, editing, formatting, saving and printing text documents such as letters, reports and resumes. It is part of the Microsoft Office suite. Questions are usually based on recent versions (Word 2016 and later), where commands are organised in a ribbon of tabs.

File type	Extension
Word document (2007 and later)	.docx
Word 97–2003 document	.doc
Word template	.dotx
Macro-enabled document	.docm

9.2 The ribbon and its tabs

Tab	Main features
File	New, Open, Save, Save As, Print, Share, Options (the Backstage view).
Home	Clipboard (cut, copy, paste, Format Painter), Font, Paragraph, Styles and Editing (find, replace, select).
Insert	Pages (cover page, blank page, page break), tables, pictures, shapes, header, footer, page number, text box, symbols.
Design	Themes, watermark, page colour and page borders.
Layout	Margins, orientation, size, columns, breaks, indents and spacing. It is called Page Layout in Word 2007 and 2010.
References	Table of contents, footnotes, endnotes, citations, captions and index.
Mailings	Mail merge, envelopes and labels.
Review	Spelling and grammar, thesaurus, word count, comments and Track Changes.
View	Views (Print Layout, Read Mode, Web Layout, Outline, Draft), zoom, ruler, gridlines and navigation pane.

9.3 Formatting and editing

- Character formatting changes the look of selected text: font, size, bold, italic, underline, colour, subscript and superscript.
- Paragraph formatting covers alignment (left, centre, right, justify), line spacing, indents, bullets and numbering.
- Format Painter copies the formatting of one piece of text and applies it to another. Styles apply a saved set of formatting, such as Heading 1, in one click.
- A header is text repeated at the top of every page, and a footer is text repeated at the bottom. Page numbers are usually placed in one of them.
- Margins are the blank space between the text and the page edge. Orientation is either portrait (taller than wide) or landscape (wider than tall).

9.4 Tables, mail merge and review tools

- A table is made of rows and columns; the box where a row and a column meet is a cell. Cells can be merged or split, and the Table Design and Layout tabs appear when a table is selected.
- Mail merge creates personalised copies of one letter for many recipients by combining a main document with a data source such as a list of names and addresses.
- Track Changes records every edit made to a document so that others can accept or reject it, and Comments add notes in the margin. The Thesaurus suggests words with similar meaning.

9.5 Keyboard shortcuts in Word

Shortcut	Action	Shortcut	Action
Ctrl + B	Bold	Ctrl + N	New document
Ctrl + I	Italic	Ctrl + O	Open
Ctrl + U	Underline	Ctrl + S	Save
Ctrl + E	Centre align	F12	Save As
Ctrl + L	Left align	Ctrl + P	Print
Ctrl + R	Right align	Ctrl + A	Select all
Ctrl + J	Justify	Ctrl + Z	Undo
Ctrl + H	Replace	Ctrl + Y	Redo or repeat
Ctrl + F	Find	Ctrl + K	Insert hyperlink
Ctrl + Enter	Page break	F7	Spelling and grammar
Shift + F3	Change case	Ctrl + Home	Go to start of document

EXAM NOTE

The same Ctrl shortcuts (C, X, V, Z, A, S, P) work across most Windows programs, so learn them once. Ctrl+Y redoes the undone action, and Ctrl+H is Replace, not Help.

One-minute revision

- Default format .docx; older .doc; template .dotx.
- Home: font, paragraph, styles. Insert: header, footer, tables, pictures. Layout: margins, orientation. Mailings: mail merge. Review: spelling, comments, Track Changes.
- Ctrl: B bold, I italic, U underline, E centre, L left, R right, J justify.
- Ctrl+H replace, Ctrl+F find, Ctrl+Y redo, Ctrl+K hyperlink, Ctrl+Enter page break.
- F12 Save As, F7 spelling, Shift+F3 change case.

Practice Questions

All questions in this chapter are original GovBabu practice questions written for this book. None of them is presented as a previous-year question. Each question has exactly one correct option. Check your answers only after attempting every question.

Q1. What is the default file extension of a document saved in Word 2007 and later versions?

- | | |
|-----------|-----------|
| (A) .xlsx | (B) .pptx |
| (C) .txt | (D) .docx |
-

Q2. Which keyboard shortcut makes the selected text bold in MS Word?

- | | |
|--------------|--------------|
| (A) Ctrl + I | (B) Ctrl + B |
| (C) Ctrl + U | (D) Ctrl + L |
-

Q3. Which shortcut underlines the selected text?

- | | |
|--------------|--------------|
| (A) Ctrl + B | (B) Ctrl + I |
| (C) Ctrl + U | (D) Ctrl + E |
-

Q4. Which shortcut centres the selected paragraph?

- | | |
|--------------|--------------|
| (A) Ctrl + E | (B) Ctrl + L |
| (C) Ctrl + R | (D) Ctrl + J |
-

Q5. Which shortcut justifies the selected paragraph, aligning it to both margins?

- | | |
|--------------|--------------|
| (A) Ctrl + J | (B) Ctrl + E |
| (C) Ctrl + R | (D) Ctrl + L |
-

Q6. Which shortcut redoes (or repeats) an action that was undone in Word?

- | | |
|--------------|--------------|
| (A) Ctrl + Z | (B) Ctrl + X |
| (C) Ctrl + Y | (D) Ctrl + V |
-

Q7. Which shortcut selects all the content of the document?

- | | |
|--------------|--------------|
| (A) Ctrl + S | (B) Ctrl + A |
| (C) Ctrl + P | (D) Ctrl + O |
-

Q8. Which shortcut opens the Replace dialog box in MS Word?

- | | |
|--------------|--------------|
| (A) Ctrl + F | (B) Ctrl + K |
| (C) Ctrl + P | (D) Ctrl + H |
-

Q9. Which function key opens the Save As dialog in Word?

(A) F7

(B) F12

(C) F5

(D) F1

Q10. Which shortcut inserts a page break in Word?

(A) Shift + Enter

(B) Alt + Enter

(C) Ctrl + Enter

(D) Ctrl + Tab

Q11. Which function key runs the spelling and grammar check in Word?

(A) F12

(B) F4

(C) F9

(D) F7

Q12. Which shortcut changes the case of the selected text (UPPERCASE, lowercase, Capitalise)?

(A) Shift + F3

(B) Ctrl + F3

(C) Alt + F3

(D) Shift + F7

Q13. Which shortcut inserts a hyperlink in Word?

(A) Ctrl + H

(B) Ctrl + L

(C) Ctrl + K

(D) Ctrl + G

Q14. In MS Word, headers, footers and page numbers are inserted from which tab?

(A) Home

(B) Review

(C) View

(D) Insert

Q15. In Word 2016, page margins and orientation are set from the:

(A) Layout tab

(B) Home tab

(C) Insert tab

(D) Review tab

Q16. The Mail Merge feature is found on which tab of the Word ribbon?

(A) Insert

(B) Mailings

(C) Design

(D) References

Q17. Track Changes and Comments are available on which tab?

(A) Home

(B) Layout

(C) Review

(D) References

Q18. The Format Painter in Word is used to:

- (A) Copy the formatting of one piece of text and apply it to another
 - (B) Copy the text itself to another place
 - (C) Check the spelling of a document
 - (D) Insert pictures from a file
-

Q19. What is the file extension of a Word template?

- | | |
|-----------|-----------|
| (A) .docx | (B) .txt |
| (C) .xltx | (D) .dotx |
-

Q20. Mail Merge in Word is used to:

- (A) Compress a document into a smaller file
 - (B) Create personalised letters for many recipients from a data list
 - (C) Translate a document into another language
 - (D) Check the spelling of a document
-

Answer Key

Q1 D	Q2 B	Q3 C	Q4 A	Q5 A
Q6 C	Q7 B	Q8 D	Q9 B	Q10 C
Q11 D	Q12 A	Q13 C	Q14 D	Q15 A
Q16 B	Q17 C	Q18 A	Q19 D	Q20 B

Answers and Explanations

- Q1. Answer: (D) .docx** Easy · CA-09-01
 What is the default file extension of a document saved in Word 2007 and later versions?
 Word 2007 and later save documents as .docx. The extensions .xlsx and .pptx belong to Excel and PowerPoint, and .txt is plain text.
- Q2. Answer: (B) Ctrl + B** Easy · CA-09-02
 Which keyboard shortcut makes the selected text bold in MS Word?
 Ctrl+B is bold. Ctrl+I is italic, Ctrl+U is underline and Ctrl+L is left alignment.
- Q3. Answer: (C) Ctrl + U** Easy · CA-09-03
 Which shortcut underlines the selected text?
 U stands for underline. B is bold, I is italic and E centres the text.
- Q4. Answer: (A) Ctrl + E** Easy · CA-09-04
 Which shortcut centres the selected paragraph?
 Ctrl+E centres. Ctrl+L aligns left, Ctrl+R aligns right and Ctrl+J justifies.
- Q5. Answer: (A) Ctrl + J** Medium · CA-09-05
 Which shortcut justifies the selected paragraph, aligning it to both margins?
 Justified text is spread so that both left and right edges are straight, and that is Ctrl+J.
- Q6. Answer: (C) Ctrl + Y** Medium · CA-09-06
 Which shortcut redoes (or repeats) an action that was undone in Word?
 Ctrl+Z undoes, so Ctrl+Y redoes. Ctrl+X cuts and Ctrl+V pastes.
- Q7. Answer: (B) Ctrl + A** Easy · CA-09-07
 Which shortcut selects all the content of the document?
 A is for All. Ctrl+S saves, Ctrl+P prints and Ctrl+O opens a file.
- Q8. Answer: (D) Ctrl + H** Medium · CA-09-08
 Which shortcut opens the Replace dialog box in MS Word?
 Ctrl+H is Find and Replace. Ctrl+F is Find, Ctrl+K inserts a hyperlink and Ctrl+P prints.
- Q9. Answer: (B) F12** Easy · CA-09-09
 Which function key opens the Save As dialog in Word?
 F12 is Save As. F7 is spelling and grammar, F5 is Go To in Word and F1 is Help.

- Q10. Answer: (C) Ctrl + Enter** Medium · CA-09-10
Which shortcut inserts a page break in Word?
Ctrl+Enter starts a new page. Shift+Enter only breaks the line without starting a new paragraph.
- Q11. Answer: (D) F7** Easy · CA-09-11
Which function key runs the spelling and grammar check in Word?
F7 starts Spelling and Grammar. F12 is Save As and F4 repeats the last action.
- Q12. Answer: (A) Shift + F3** Medium · CA-09-12
Which shortcut changes the case of the selected text (UPPERCASE, lowercase, Capitalise)?
Shift+F3 cycles through the case options. Shift+F7 opens the Thesaurus.
- Q13. Answer: (C) Ctrl + K** Medium · CA-09-13
Which shortcut inserts a hyperlink in Word?
Ctrl+K opens the Insert Hyperlink box. Ctrl+H is Replace and Ctrl+G is Go To.
- Q14. Answer: (D) Insert** Easy · CA-09-14
In MS Word, headers, footers and page numbers are inserted from which tab?
The Insert tab has the Header & Footer group, which includes Page Number. Home is for font and paragraph, Review is for proofing and View is for display.
- Q15. Answer: (A) Layout tab** Medium · CA-09-15
In Word 2016, page margins and orientation are set from the:
Margins, orientation, size and columns are in the Layout tab, which was called Page Layout in Word 2007 and 2010.
- Q16. Answer: (B) Mailings** Easy · CA-09-16
The Mail Merge feature is found on which tab of the Word ribbon?
Mail merge, envelopes and labels are grouped under the Mailings tab.
- Q17. Answer: (C) Review** Medium · CA-09-17
Track Changes and Comments are available on which tab?
The Review tab handles proofing, comments and tracking of changes. References handles footnotes and the table of contents.
- Q18. Answer: (A) Copy the formatting of one piece of text and apply it to another** Medium · CA-09-18
The Format Painter in Word is used to:
Format Painter copies only the formatting, not the words. It is in the Clipboard group on the Home tab.
- Q19. Answer: (D) .dotx** Medium · CA-09-19
What is the file extension of a Word template?
A Word template is saved as .dotx. The .docx extension is an ordinary document and .xltx is an Excel template.
- Q20. Answer: (B) Create personalised letters for many recipients from a data list** Easy · CA-09-20
Mail Merge in Word is used to:
Mail merge combines one main letter with a list of recipients, such as names and addresses, to make many personalised copies.

CHAPTER 10

MS Excel

This chapter covers Microsoft Excel: workbooks and cells, formulas and functions, references, error values, data tools, charts and shortcuts. Practise by writing small formulas yourself; most questions test exactly that.

10.1 About MS Excel

Microsoft Excel is a spreadsheet program for storing, calculating and analysing data arranged in rows and columns. A file is a workbook, and a workbook contains one or more worksheets.

Item	Fact
Rows and columns	1,048,576 rows and 16,384 columns (A to XFD) in Excel 2007 and later.
Cell and address	The box where a row meets a column. Its address is the column letter and row number, such as B3.
Active cell and Name Box	The selected cell is the active cell; the Name Box shows its address, and the Formula Bar shows its contents.
File types	.xlsx (workbook), .xls (older), .xlsm (macro-enabled), .csv (comma-separated text).
Default alignment	Text is left-aligned and numbers are right-aligned.

10.2 Formulas and functions

A formula always begins with the equals sign (=). It may use cell references, operators and functions.

Function	Purpose
SUM, AVERAGE	Total and mean of a range, e.g. =SUM(A1:A5).
MAX, MIN	Largest and smallest value in a range.
COUNT, COUNTA	COUNT counts cells containing numbers; COUNTA counts all non-empty cells.
IF	=IF(condition, value_if_true, value_if_false).
COUNTIF, SUMIF	Count or add only the cells that meet a condition.
VLOOKUP, HLOOKUP	Look up a value in the first column (V, vertical) or first row (H, horizontal) of a table and return a value from another column or row.
LEN, UPPER, LOWER	Length of text; convert text to capitals or small letters.
TODAY, NOW	Current date; current date and time.

OPERATORS

Excel evaluates brackets first, then exponent (^), then multiplication and division, then addition and subtraction. So $=2+3*4$ gives 14, not 20.

10.3 Cell references

- A relative reference such as A1 changes when the formula is copied to another cell.
- An absolute reference such as \$A\$1 stays fixed when copied. A mixed reference such as \$A1 or A\$1 fixes only the column or only the row. Pressing F4 while editing toggles between these forms.
- A range is written with a colon, as in A1:B5. A reference to another sheet is written as Sheet2!A1.

10.4 Error values

Error	Cause
#DIV/0!	A number is divided by zero or by an empty cell.
#NAME?	Excel does not recognise a function or name, often because of a typing mistake.
#VALUE!	The wrong type of value is used, such as text in an arithmetic formula.
#REF!	A cell reference is not valid, for example the referred cell was deleted.
#N/A	A value is not available, as when a lookup finds no match.
#####	The column is too narrow to show the number.

10.5 Data tools and charts

- Sort arranges data in ascending or descending order. Filter shows only the rows that meet a condition and hides the others. Both are on the Data tab.
- A PivotTable summarises a large table by grouping and totalling it, and can be rearranged by dragging fields. It is on the Insert tab.
- Conditional formatting changes the look of cells automatically when they meet a rule. Data validation limits what can be typed into a cell.
- Common charts: column and bar (compare values), line (trend over time), pie (parts of a whole) and scatter (relationship between two sets of numbers).
- Freeze Panes keeps chosen rows or columns visible while you scroll. It is on the View tab.

10.6 Excel shortcuts

Shortcut	Action	Shortcut	Action
F2	Edit the active cell	Ctrl + ;	Insert today's date
F4	Toggle reference type; repeat last action	Ctrl + Shift + ;	Insert the current time
Alt + =	AutoSum	Ctrl + Space	Select the whole column
Ctrl + Home	Go to cell A1	Shift + Space	Select the whole row
Ctrl + Arrow key	Jump to the edge of the data	Alt + Enter	New line inside a cell
Shift + F11	Insert a new worksheet	Ctrl + 1	Open Format Cells

One-minute revision

- 1,048,576 rows × 16,384 columns (XFD). Default: text left, numbers right.
- Formulas start with =. Order: brackets, ^, × ÷, + −.
- \$A\$1 absolute; A1 relative; F4 toggles. COUNT numbers only; COUNTA all non-empty.
- #DIV/0! zero divide; #NAME? unknown name; #REF! bad reference; #N/A not found; ##### narrow column.
- Alt+= AutoSum; F2 edit; Ctrl+; date; Ctrl+Space column; Shift+Space row.

Practice Questions

All questions in this chapter are original GovBabu practice questions written for this book. None of them is presented as a previous-year question. Each question has exactly one correct option. Check your answers only after attempting every question.

Q1. What is the default file extension of an Excel 2007 (and later) workbook?

- | | |
|-----------|-----------|
| (A) .docx | (B) .pptx |
| (C) .xlsx | (D) .xlt |
-

Q2. Every formula in Excel must begin with:

- | | |
|-------------------------|------------------------|
| (A) The equals sign (=) | (B) A dollar sign (\$) |
| (C) An at sign (@) | (D) A hash sign (#) |
-

Q3. The cell address of the cell in column D and row 7 is:

- | | |
|---------|---------|
| (A) 7D | (B) D7 |
| (C) D:7 | (D) D-7 |
-

Q4. What is the last column in an Excel 2007 or later worksheet?

- | | |
|---------|---------|
| (A) IV | (B) ZZ |
| (C) XFZ | (D) XFD |
-

Q5. By default, numbers entered in a cell are:

- | | |
|------------------|--------------------|
| (A) Left-aligned | (B) Centre-aligned |
| (C) Justified | (D) Right-aligned |
-

Q6. Which function adds all the numbers in a range of cells?

- | | |
|-------------|---------|
| (A) COUNT | (B) SUM |
| (C) AVERAGE | (D) MAX |
-

Q7. What is the result of the formula =2+3*4 in Excel?

- | | |
|--------|--------|
| (A) 14 | (B) 20 |
| (C) 24 | (D) 9 |
-

Q8. If cells A1 to A4 contain 10, 20, 30 and 40, what does =AVERAGE(A1:A4) return?

- | | |
|---------|--------|
| (A) 100 | (B) 20 |
| (C) 25 | (D) 40 |
-

Q9. If A1 holds 10, A2 holds 20 and A3 is empty, what does =COUNT(A1:A3) return?

- | | |
|--------|-------|
| (A) 3 | (B) 2 |
| (C) 30 | (D) 0 |

Q10. Which function counts all the non-empty cells in a range, including text?

- | | |
|----------------|-----------|
| (A) COUNTA | (B) COUNT |
| (C) COUNTBLANK | (D) SUM |

Q11. In =IF(A1>50,"Pass","Fail"), what is shown if A1 contains 40?

- | | |
|----------|--------------|
| (A) Pass | (B) 40 |
| (C) Fail | (D) An error |

Q12. Which function looks up a value in the first column of a table and returns a value from another column of the same row?

- | | |
|-----------------|-------------|
| (A) HLOOKUP | (B) COUNTIF |
| (C) CONCATENATE | (D) VLOOKUP |

Q13. Which of the following is an absolute cell reference?

- | | |
|------------|----------|
| (A) \$B\$2 | (B) B2 |
| (C) B\$2 | (D) \$B2 |

Q14. Which key toggles a reference between relative and absolute while editing a formula?

- | | |
|--------|--------|
| (A) F2 | (B) F5 |
| (C) F4 | (D) F9 |

Q15. Which error value appears when a number is divided by zero?

- | | |
|------------|-------------|
| (A) #NAME? | (B) #REF! |
| (C) #N/A | (D) #DIV/0! |

Q16. A row of ##### appears in a cell that contains a number. The usual reason is that:

- (A) The formula divides by zero
- (B) The column is too narrow to display the number
- (C) The workbook is damaged
- (D) The function name is misspelt

Q17. Which shortcut puts the active cell into edit mode?

(A) F4

(B) F2

(C) F7

(D) F12

Q18. Which shortcut inserts the AutoSum formula in Excel?

(A) Ctrl + =

(B) Shift + =

(C) Alt + S

(D) Alt + =

Q19. Which Excel feature summarises a large table by grouping and totalling its data?

(A) PivotTable

(B) Freeze Panes

(C) Data Validation

(D) Goal Seek

Q20. Which type of chart is best for showing parts of a whole, such as a percentage share?

(A) Line chart

(B) Scatter chart

(C) Pie chart

(D) Radar chart

Answer Key

Q1 C	Q2 A	Q3 B	Q4 D	Q5 D
Q6 B	Q7 A	Q8 C	Q9 B	Q10 A
Q11 C	Q12 D	Q13 A	Q14 C	Q15 D
Q16 B	Q17 B	Q18 D	Q19 A	Q20 C

Answers and Explanations

- Q1. Answer: (C) .xlsx** Easy · CA-10-01
 What is the default file extension of an Excel 2007 (and later) workbook?
 Excel 2007 and later save workbooks as .xlsx. The .docx and .pptx extensions belong to Word and PowerPoint.
- Q2. Answer: (A) The equals sign (=)** Easy · CA-10-02
 Every formula in Excel must begin with:
 Excel treats an entry as a formula only when it starts with =. Entries starting with other signs are treated as text or have special meaning.
- Q3. Answer: (B) D7** Medium · CA-10-03
 The cell address of the cell in column D and row 7 is:
 An address is written as the column letter followed by the row number, so D7.
- Q4. Answer: (D) XFD** Medium · CA-10-04
 What is the last column in an Excel 2007 or later worksheet?
 There are 16,384 columns, and the last is XFD. IV was the last column in the older .xls format, which had 256 columns.
- Q5. Answer: (D) Right-aligned** Easy · CA-10-05
 By default, numbers entered in a cell are:
 Excel right-aligns numbers and left-aligns text, which helps you spot numbers stored as text.
- Q6. Answer: (B) SUM** Easy · CA-10-06
 Which function adds all the numbers in a range of cells?
 SUM gives the total. COUNT counts numeric cells, AVERAGE gives the mean and MAX the largest value.
- Q7. Answer: (A) 14** Medium · CA-10-07
 What is the result of the formula =2+3*4 in Excel?
 Multiplication is done before addition: $3 \times 4 = 12$, and $2 + 12 = 14$. The value 20 would need brackets, =(2+3)*4.
- Q8. Answer: (C) 25** Medium · CA-10-08
 If cells A1 to A4 contain 10, 20, 30 and 40, what does =AVERAGE(A1:A4) return?
 The total is 100 and there are four values, so the average is $100 \div 4 = 25$.
- Q9. Answer: (B) 2** Medium · CA-10-09
 If A1 holds 10, A2 holds 20 and A3 is empty, what does =COUNT(A1:A3) return?
 COUNT counts only the cells that contain numbers, and two of the three do.

- Q10. Answer: (A) COUNTA** Medium · CA-10-10
Which function counts all the non-empty cells in a range, including text?
COUNTA counts every cell that is not empty. COUNT only counts numbers and COUNTBLANK counts empty cells.
- Q11. Answer: (C) Fail** Medium · CA-10-11
In =IF(A1>50,"Pass","Fail"), what is shown if A1 contains 40?
40 is not greater than 50, so the condition is false and the third argument, Fail, is returned.
- Q12. Answer: (D) VLOOKUP** Easy · CA-10-12
Which function looks up a value in the first column of a table and returns a value from another column of the same row?
V stands for vertical: the search runs down the first column. HLOOKUP searches the first row instead.
- Q13. Answer: (A) \$B\$2** Medium · CA-10-13
Which of the following is an absolute cell reference?
Only \$B\$2 has the dollar sign before both the column and the row. The others are relative or mixed.
- Q14. Answer: (C) F4** Medium · CA-10-14
Which key toggles a reference between relative and absolute while editing a formula?
F4 cycles through A1, \$A\$1, A\$1 and \$A1. F2 edits the cell and F5 opens Go To.
- Q15. Answer: (D) #DIV/0!** Easy · CA-10-15
Which error value appears when a number is divided by zero?
#DIV/0! is the division error. #NAME? is an unknown name, #REF! is a bad reference and #N/A is a value not available.
- Q16. Answer: (B) The column is too narrow to display the number** Medium · CA-10-16
A row of ##### appears in a cell that contains a number. The usual reason is that:
The data is intact; widening the column displays it. The other options produce different error values.
- Q17. Answer: (B) F2** Easy · CA-10-17
Which shortcut puts the active cell into edit mode?
F2 edits the cell in place. F4 toggles references, F7 checks spelling and F12 is Save As.
- Q18. Answer: (D) Alt + =** Medium · CA-10-18
Which shortcut inserts the AutoSum formula in Excel?
Alt+= enters =SUM() for the nearby numbers. The other combinations do different things.
- Q19. Answer: (A) PivotTable** Medium · CA-10-19
Which Excel feature summarises a large table by grouping and totalling its data?
A PivotTable builds summaries that can be rearranged by dragging fields. Freeze Panes holds rows in view and Data Validation restricts entries.
- Q20. Answer: (C) Pie chart** Easy · CA-10-20
Which type of chart is best for showing parts of a whole, such as a percentage share?
A pie chart divides a circle into shares of one total. A line chart shows change over time and a scatter chart shows how two sets of values relate.

CHAPTER 11

MS PowerPoint

This chapter covers Microsoft PowerPoint: file types, ribbon tabs, views, masters and the shortcuts used to run a slide show. The tabs and the shortcuts are the most examined parts.

11.1 About MS PowerPoint

Microsoft PowerPoint is presentation software used to create slide shows that combine text, pictures, charts, audio and video. A slide is one page of the presentation.

File type	Extension
Presentation (2007 and later)	.pptx
Older presentation	.ppt
Slide show (opens directly in show mode)	.ppsx
Template	.potx

11.2 Ribbon tabs

Tab	Main features
Home	New Slide, Layout, Reset, font and paragraph formatting, drawing tools.
Insert	Tables, pictures, shapes, charts, SmartArt, text box, header and footer, audio and video.
Design	Themes, variants and slide size, background format.
Transitions	The effect used when moving from one slide to the next.
Animations	Effects applied to objects on a slide, such as text and pictures.
Slide Show	Start the show, Rehearse Timings, Record, Set Up Slide Show, Custom Show.
Review	Spelling, thesaurus, comments, language.
View	Presentation views, Slide Master, zoom, gridlines, ruler.

TRANSITION VERSUS ANIMATION

A transition belongs to the whole slide and plays as it appears. An animation belongs to an object on the slide, such as a title or a picture.

11.3 Views and masters

- The Slide Master holds the common design of the whole presentation, such as fonts, background and logos. A change made in the master applies to all the slides that use it.
- A layout decides how placeholders for title, text, pictures and charts are arranged on a slide. Handouts are printed pages with several slides on each page.

View	Use
Normal	The main editing view with the slide pane, thumbnails and notes.
Slide Sorter	Shows thumbnails of all slides, useful for reordering, deleting and copying slides.
Reading View	Shows the presentation in a window with simple controls.
Slide Show	Runs the presentation full screen.
Notes Page	Shows the slide with the speaker's notes below it.

11.4 PowerPoint shortcuts

Shortcut	Action
F5	Start the slide show from the first slide
Shift + F5	Start the slide show from the current slide
Esc	End the slide show
Ctrl + M	Insert a new slide
Ctrl + D	Duplicate the selected slide or object
Page Down / Right arrow / N	Next slide, during the show
B or W (during show)	Black or white screen
Ctrl + P (during show)	Pen pointer

REHEARSE AND KIOSK

Rehearse Timings records how long you spend on each slide so the show can advance by itself. A kiosk show runs on its own without a presenter.

One-minute revision

- Default format .pptx; show .ppsx; template .potx.
- Transitions are between slides; animations are on objects.
- Slide Sorter reorders slides; Slide Master changes the design of all slides.
- F5 from start; Shift+F5 from current slide; Esc ends the show.
- Ctrl+M new slide; Ctrl+D duplicate; B black screen; W white screen.

Practice Questions

All questions in this chapter are original GovBabu practice questions written for this book. None of them is presented as a previous-year question. Each question has exactly one correct option. Check your answers only after attempting every question.

Q1. What is the default file extension of a PowerPoint 2007 (and later) presentation?

- | | |
|-----------|-----------|
| (A) .docx | (B) .xlsx |
| (C) .pdf | (D) .pptx |
-

Q2. A PowerPoint file saved so that it opens directly in slide show mode has the extension:

- | | |
|-----------|-----------|
| (A) .pptx | (B) .ppsx |
| (C) .potx | (D) .pptm |
-

Q3. In PowerPoint, one page of a presentation is called a:

- | | |
|-----------|-----------|
| (A) Sheet | (B) Frame |
| (C) Slide | (D) Panel |
-

Q4. Which key starts a slide show from the first slide?

- | | |
|--------|---------|
| (A) F5 | (B) F2 |
| (C) F7 | (D) F10 |
-

Q5. Which shortcut starts the slide show from the current slide?

- | | |
|----------------|---------------|
| (A) Shift + F5 | (B) Ctrl + F5 |
| (C) Alt + F5 | (D) F5 |
-

Q6. Which key ends a slide show?

- | | |
|---------|------------|
| (A) Tab | (B) Home |
| (C) Esc | (D) Insert |
-

Q7. Which shortcut inserts a new slide in PowerPoint?

- | | |
|--------------|--------------|
| (A) Ctrl + N | (B) Ctrl + M |
| (C) Ctrl + S | (D) Ctrl + L |
-

Q8. Which shortcut duplicates the selected slide or object?

- | | |
|--------------|--------------|
| (A) Ctrl + E | (B) Ctrl + Y |
| (C) Ctrl + K | (D) Ctrl + D |
-

-
- Q9.** The effect that plays when one slide changes to the next is called a:
- (A) Animation (B) Layout
(C) Transition (D) Theme
-
- Q10.** Effects applied to text or pictures on a slide are set from which tab?
- (A) Transitions (B) Animations
(C) Design (D) Review
-
- Q11.** Which tab contains the Themes gallery?
- (A) Insert (B) Home
(C) View (D) Design
-
- Q12.** Which view is best for rearranging the order of slides by dragging thumbnails?
- (A) Slide Sorter view (B) Notes Page view
(C) Reading view (D) Slide Show view
-
- Q13.** The Slide Master is used to:
- (A) Change the text of only one slide
(B) Make a design change that applies to all slides using it
(C) Check the spelling of the notes
(D) Record the narration
-
- Q14.** Where does a presenter's private text for each slide appear in PowerPoint?
- (A) On the slide itself (B) In the Slide Master only
(C) In the Review tab only (D) In the Notes pane
-
- Q15.** In PowerPoint, the arrangement of placeholders for title, text and pictures on a slide is decided by its:
- (A) Layout (B) Transition
(C) Hyperlink (D) Handout
-
- Q16.** A printed page that shows several slides on one sheet of paper is called a:
- (A) Template (B) Master
(C) Handout (D) Transition
-

Q17. During a slide show, pressing the letter B turns the screen:

- | | |
|-----------|----------|
| (A) White | (B) Blue |
| (C) Black | (D) Red |
-

Q18. Rehearse Timings in PowerPoint is used to:

- (A) Record the time spent on each slide so the show can advance automatically
 - (B) Correct the spelling of the slides
 - (C) Compress the pictures
 - (D) Change the theme colours
-

Q19. Which tab holds the Table, Picture and Shapes commands?

- | | |
|------------|----------------|
| (A) Home | (B) Insert |
| (C) Review | (D) Slide Show |
-

Q20. A kiosk-style PowerPoint show is one that:

- (A) Needs the presenter to click for every slide
 - (B) Can only be edited, never shown
 - (C) Prints each slide as a handout
 - (D) Runs automatically without a presenter
-

Answer Key

Q1 D	Q2 B	Q3 C	Q4 A	Q5 A
Q6 C	Q7 B	Q8 D	Q9 C	Q10 B
Q11 D	Q12 A	Q13 B	Q14 D	Q15 A
Q16 C	Q17 C	Q18 A	Q19 B	Q20 D

Answers and Explanations

- Q1. Answer: (D) .pptx** Easy · CA-11-01
 What is the default file extension of a PowerPoint 2007 (and later) presentation?
 PowerPoint 2007 and later use .pptx. The .docx and .xlsx extensions belong to Word and Excel.
- Q2. Answer: (B) .ppsx** Medium · CA-11-02
 A PowerPoint file saved so that it opens directly in slide show mode has the extension:
 PPSX is a PowerPoint Show. PPTX is the normal editable presentation, POTX a template and PPTM a macro-enabled presentation.
- Q3. Answer: (C) Slide** Easy · CA-11-03
 In PowerPoint, one page of a presentation is called a:
 A slide is a single page of a presentation. A sheet belongs to Excel.
- Q4. Answer: (A) F5** Easy · CA-11-04
 Which key starts a slide show from the first slide?
 F5 begins the show from the start. F7 checks spelling and F2 edits text in a selected shape.
- Q5. Answer: (A) Shift + F5** Medium · CA-11-05
 Which shortcut starts the slide show from the current slide?
 Shift+F5 starts at the slide you are on, while plain F5 starts at slide one.
- Q6. Answer: (C) Esc** Easy · CA-11-06
 Which key ends a slide show?
 Esc exits the show and returns to the editing view.
- Q7. Answer: (B) Ctrl + M** Easy · CA-11-07
 Which shortcut inserts a new slide in PowerPoint?
 Ctrl+M adds a slide. Ctrl+N creates a new presentation file.
- Q8. Answer: (D) Ctrl + D** Medium · CA-11-08
 Which shortcut duplicates the selected slide or object?
 Ctrl+D creates a copy right away. Ctrl+E centres text, Ctrl+Y redoes and Ctrl+K inserts a hyperlink.
- Q9. Answer: (C) Transition** Medium · CA-11-09
 The effect that plays when one slide changes to the next is called a:
 A transition is applied to the whole slide as it appears. An animation is applied to an object inside the slide.

- Q10. Answer: (B) Animations** Medium · CA-11-10
Effects applied to text or pictures on a slide are set from which tab?
The Animations tab works on objects within a slide. Slide-to-slide effects are in Transitions.
- Q11. Answer: (D) Design** Easy · CA-11-11
Which tab contains the Themes gallery?
Themes are chosen on the Design tab and give the slides a coordinated look.
- Q12. Answer: (A) Slide Sorter view** Medium · CA-11-12
Which view is best for rearranging the order of slides by dragging thumbnails?
Slide Sorter shows all slides as thumbnails side by side, which makes reordering easy.
- Q13. Answer: (B) Make a design change that applies to all slides using it** Medium · CA-11-13
The Slide Master is used to:
The master holds shared fonts, backgrounds and logos, so one change updates every slide that follows it.
- Q14. Answer: (D) In the Notes pane** Medium · CA-11-14
Where does a presenter's private text for each slide appear in PowerPoint?
Speaker notes sit below the slide in the Notes pane and are not shown to the audience during the show.
- Q15. Answer: (A) Layout** Easy · CA-11-15
In PowerPoint, the arrangement of placeholders for title, text and pictures on a slide is decided by its:
A layout fixes where each placeholder goes. A handout is a printed page of slides.
- Q16. Answer: (C) Handout** Medium · CA-11-16
A printed page that shows several slides on one sheet of paper is called a:
Handouts are meant to be given to the audience. A template and a master are design files, not printouts.
- Q17. Answer: (C) Black** Medium · CA-11-17
During a slide show, pressing the letter B turns the screen:
B blanks the screen to black and W to white; pressing the key again returns to the slide.
- Q18. Answer: (A) Record the time spent on each slide so the show can advance automatically** Medium · CA-11-18
Rehearse Timings in PowerPoint is used to:
It stores slide timings, which is how a self-running show is set up.
- Q19. Answer: (B) Insert** Easy · CA-11-19
Which tab holds the Table, Picture and Shapes commands?
Anything added to a slide, such as tables, pictures and shapes, is inserted from the Insert tab.
- Q20. Answer: (D) Runs automatically without a presenter** Medium · CA-11-20
A kiosk-style PowerPoint show is one that:
A kiosk show loops by itself, as used for displays in public places.

CHAPTER 12

Computer Networks

This chapter covers network types, topologies, devices, transmission media, the OSI and TCP/IP models and the addresses and ports used on a network. Most questions test names, full forms and numbers.

12.1 Types of networks

A computer network is a group of computers and devices connected so that they can share data and resources such as files and printers.

- An intranet is a private network that uses Internet technology inside one organisation. An extranet extends an intranet to selected outsiders such as partners. A VPN (Virtual Private Network) creates a secure, encrypted link across a public network.
- In a client-server network a powerful server provides services to many clients. In a peer-to-peer network every computer is equal and shares directly.

Type	Area covered	Example
PAN (Personal Area Network)	A few metres around one person	Phone connected to earphones by Bluetooth
LAN (Local Area Network)	A room, building or campus	An office or school network
MAN (Metropolitan Area Network)	A city or large town	A cable-TV network across a city
WAN (Wide Area Network)	Countries or continents	The Internet is the largest WAN

12.2 Topologies

Topology is the way in which the devices of a network are arranged and connected.

Topology	Features
Bus	All devices share a single cable. Cheap and simple, but a break in the main cable stops the network.
Star	Every device connects to a central hub or switch. Easy to manage and a faulty cable affects only one device, but the centre is a single point of failure.
Ring	Each device connects to two neighbours, forming a loop; data travels in one direction.
Mesh	Devices are connected to many others. Very reliable but costly; a full mesh of n devices needs $n(n-1)/2$ links.
Tree	A hierarchy of star networks joined to a root.

MESH LINKS

For 5 devices a full mesh needs $5 \times 4 \div 2 = 10$ links.

12.3 Network devices

Device	Function
NIC (Network Interface Card)	Connects a computer to a network; it carries the MAC address.
Modem	Modulator-demodulator: converts digital signals to analog for telephone lines and back.
Hub	Sends incoming data to all connected devices; no intelligence.
Switch	Forwards known unicast Ethernet frames based on destination MAC addresses; broadcast and unknown-destination frames may be flooded.
Router	Forwards packets between different networks using IP addresses and chooses the best path.
Bridge	Joins two LANs and filters traffic by MAC address.
Repeater	Regenerates a weak signal so that it can travel farther.
Gateway	Connects networks that use different protocols and translates between them.
Access point	Lets wireless devices join a wired network.

12.4 Transmission media and modes

- Guided (wired) media: twisted pair cable (used in Ethernet), coaxial cable (cable TV) and optical fibre (light pulses; highest speed and least interference).
- Unguided (wireless) media: radio waves, microwaves, infrared and satellite links.
- Simplex: communication in one direction only (a keyboard to a computer). Half duplex: both directions, but one at a time (a walkie-talkie). Full duplex: both directions at once (a telephone call).
- Bandwidth is the amount of data that a link can carry per second, measured in bits per second (bps, Kbps, Mbps, Gbps).

12.5 Network models and protocols

- The TCP/IP model has four layers: Application, Transport, Internet and Network access.
- TCP is reliable and connection-oriented; UDP is faster but does not guarantee delivery.

OSI layer	Name	Role
7	Application	Services to the user, such as email and web
6	Presentation	Translation, encryption and compression
5	Session	Opens, manages and closes sessions
4	Transport	End-to-end delivery, error control (TCP, UDP)
3	Network	Logical addressing and routing (IP)
2	Data link	Frames and MAC addressing
1	Physical	Bits on the cable or radio

12.6 Addresses and common ports

- An IPv4 address is 32 bits long, written as four decimal numbers from 0 to 255 separated by dots, such as 192.168.1.1. An IPv6 address is 128 bits long, written in hexadecimal.
- A typical Ethernet MAC address is a 48-bit link-layer identifier assigned to a network interface. It may be factory-assigned, locally administered or randomized, so it is not always a permanent value burned into the card.

Protocol	Port	Protocol	Port
HTTP	80	HTTPS	443
FTP	21	SSH	22
SMTP	25	DNS	53

One-minute revision

- PAN < LAN < MAN < WAN. The Internet is the largest WAN.
- Star: central switch. Bus: one cable. Ring: loop. Mesh: many links, $n(n-1)/2$.
- Hub broadcasts; switch uses MAC; router uses IP; gateway joins different protocols; repeater boosts signal.
- OSI has 7 layers: Physical, Data link, Network, Transport, Session, Presentation, Application.
- IPv4 32-bit; IPv6 128-bit; MAC 48-bit. HTTP 80, HTTPS 443, FTP 21, SMTP 25, DNS 53.

Practice Questions

All questions in this chapter are original GovBabu practice questions written for this book. None of them is presented as a previous-year question. Each question has exactly one correct option. Check your answers only after attempting every question.

Q1. Which type of network covers a single building or campus?

- | | |
|---------|---------|
| (A) LAN | (B) WAN |
| (C) MAN | (D) PAN |
-

Q2. The Internet is the largest example of a:

- | | |
|---------|--------------|
| (A) LAN | (B) PAN |
| (C) WAN | (D) Intranet |
-

Q3. A private network of an organisation that uses Internet technology is called an:

- | | |
|--------------|--------------|
| (A) Extranet | (B) Ethernet |
| (C) Cybernet | (D) Intranet |
-

Q4. A VPN is used mainly to:

- (A) Increase the CPU speed
 - (B) Create a secure, encrypted connection over a public network
 - (C) Store files on a local disk
 - (D) Print documents faster
-

Q5. In which topology are all devices connected to a central hub or switch?

- | | |
|----------|----------|
| (A) Bus | (B) Star |
| (C) Ring | (D) Mesh |
-

Q6. In a bus topology, what happens if the main cable breaks?

- | | |
|--------------------------------------|--|
| (A) Only one device is affected | (B) Nothing happens at all |
| (C) Traffic reroutes through the hub | (D) The whole network can stop working |
-

Q7. How many links does a full mesh of 5 devices need?

- | | |
|--------|--------|
| (A) 5 | (B) 15 |
| (C) 10 | (D) 20 |
-

-
- Q8.** Which device connects two different networks and forwards packets using IP addresses?
- | | |
|--------------|------------|
| (A) Router | (B) Hub |
| (C) Repeater | (D) Switch |
-
- Q9.** Which LAN device forwards known unicast Ethernet frames based on the destination MAC address?
- | | |
|-----------|--------------|
| (A) Hub | (B) Repeater |
| (C) Modem | (D) Switch |
-
- Q10.** A modem converts:
- (A) AC power to DC power
 - (B) Text to speech
 - (C) Digital signals to analog signals and back
 - (D) Binary to hexadecimal
-
- Q11.** Which device regenerates a weak signal so that it can travel a longer distance?
- | | |
|--------------|------------|
| (A) Repeater | (B) Router |
| (C) Gateway | (D) Bridge |
-
- Q12.** Which device joins networks that use different protocols?
- | | |
|--------------|-------------|
| (A) Hub | (B) Gateway |
| (C) Repeater | (D) NIC |
-
- Q13.** Which transmission medium uses pulses of light and gives the highest speed with the least interference?
- | | |
|-------------------|-------------------|
| (A) Twisted pair | (B) Coaxial cable |
| (C) Optical fibre | (D) Infrared |
-
- Q14.** A telephone conversation, where both people can talk at the same time, is an example of:
- | | |
|-----------------|--------------------|
| (A) Full duplex | (B) Simplex |
| (C) Half duplex | (D) Broadcast only |
-
- Q15.** How many layers does the OSI reference model have?
- | | |
|-------|-------|
| (A) 4 | (B) 7 |
| (C) 5 | (D) 6 |
-

Q16. Which OSI layer is responsible for routing and logical (IP) addressing?

- | | |
|---------------------|---------------------|
| (A) Transport layer | (B) Data link layer |
| (C) Session layer | (D) Network layer |
-

Q17. An IPv4 address is made up of how many bits?

- | | |
|---------|--------|
| (A) 16 | (B) 48 |
| (C) 128 | (D) 32 |
-

Q18. The default port number of HTTPS is:

- | | |
|--------|---------|
| (A) 80 | (B) 443 |
| (C) 21 | (D) 25 |
-

Q19. Which network device is used to connect a computer to a network and carries its MAC address?

- | | |
|----------------------------------|-------------|
| (A) Repeater | (B) Gateway |
| (C) NIC (network interface card) | (D) Hub |
-

Q20. A MAC address is how many bits long?

- | | |
|--------|---------|
| (A) 48 | (B) 32 |
| (C) 64 | (D) 128 |
-

Answer Key

Q1 A	Q2 C	Q3 D	Q4 B	Q5 B
Q6 D	Q7 C	Q8 A	Q9 D	Q10 C
Q11 A	Q12 B	Q13 C	Q14 A	Q15 B
Q16 D	Q17 D	Q18 B	Q19 C	Q20 A

Answers and Explanations

- Q1. Answer: (A) LAN** Easy · CA-12-01
 Which type of network covers a single building or campus?
 A LAN is local. A MAN covers a city, a WAN covers countries and a PAN covers one person's immediate surroundings.
- Q2. Answer: (C) WAN** Easy · CA-12-02
 The Internet is the largest example of a:
 The Internet connects networks across the world, so it is a wide area network. An intranet is private to one organisation.
- Q3. Answer: (D) Intranet** Medium · CA-12-03
 A private network of an organisation that uses Internet technology is called an:
 An intranet is internal to the organisation. An extranet shares part of it with outsiders, and Ethernet is a LAN technology.
- Q4. Answer: (B) Create a secure, encrypted connection over a public network** Medium · CA-12-04
 A VPN is used mainly to:
 A Virtual Private Network tunnels traffic privately over the Internet. It does not change the speed of the computer or printer.
- Q5. Answer: (B) Star** Easy · CA-12-05
 In which topology are all devices connected to a central hub or switch?
 A star has a central device. A bus uses one shared cable, a ring forms a loop and a mesh has many direct links.
- Q6. Answer: (D) The whole network can stop working** Medium · CA-12-06
 In a bus topology, what happens if the main cable breaks?
 All devices share that cable, so a break can bring everything down. A star isolates a faulty cable to one device.
- Q7. Answer: (C) 10** Medium · CA-12-07
 How many links does a full mesh of 5 devices need?
 $n(n-1)/2 = 5 \times 4 \div 2 = 10$. The value 20 would be counting each link twice.
- Q8. Answer: (A) Router** Easy · CA-12-08
 Which device connects two different networks and forwards packets using IP addresses?
 A router works at the network layer with IP addresses. A hub simply repeats data and a switch works with MAC addresses inside a LAN.

- Q9. Answer: (D) Switch** Medium · CA-12-09
Which LAN device forwards known unicast Ethernet frames based on the destination MAC address?
A switch learns MAC-to-port mappings and forwards known unicast frames to the associated port. Broadcast and unknown-destination frames may be flooded; a hub repeats incoming signals across its ports.
- Q10. Answer: (C) Digital signals to analog signals and back** Easy · CA-12-10
A modem converts:
Modem stands for modulator-demodulator and makes digital data suitable for analog lines. The SMPS converts AC to DC.
- Q11. Answer: (A) Repeater** Medium · CA-12-11
Which device regenerates a weak signal so that it can travel a longer distance?
A repeater boosts the signal. A gateway translates between protocols, and a bridge joins two LANs.
- Q12. Answer: (B) Gateway** Medium · CA-12-12
Which device joins networks that use different protocols?
A gateway converts between different protocols. A hub and a repeater do not interpret data at all.
- Q13. Answer: (C) Optical fibre** Easy · CA-12-13
Which transmission medium uses pulses of light and gives the highest speed with the least interference?
Fibre carries light through glass and is immune to electrical noise. The copper cables are slower and more affected by interference.
- Q14. Answer: (A) Full duplex** Medium · CA-12-14
A telephone conversation, where both people can talk at the same time, is an example of:
Full duplex allows both directions at once. A walkie-talkie is half duplex and a keyboard to a computer is simplex.
- Q15. Answer: (B) 7** Medium · CA-12-15
How many layers does the OSI reference model have?
OSI has seven layers. The TCP/IP model has four.
- Q16. Answer: (D) Network layer** Medium · CA-12-16
Which OSI layer is responsible for routing and logical (IP) addressing?
Routing and IP addressing belong to layer 3. The Transport layer handles end-to-end delivery and the Data link layer handles MAC addressing.
- Q17. Answer: (D) 32** Medium · CA-12-17
An IPv4 address is made up of how many bits?
IPv4 uses 32 bits. 48 bits is a MAC address and 128 bits is IPv6.
- Q18. Answer: (B) 443** Easy · CA-12-18
The default port number of HTTPS is:
HTTPS uses 443. HTTP uses 80, FTP 21 and SMTP 25.
- Q19. Answer: (C) NIC (network interface card)** Easy · CA-12-19
Which network device is used to connect a computer to a network and carries its MAC address?
The NIC is the adapter inside the computer and has a unique hardware address. A hub, repeater and gateway are separate networking devices.
- Q20. Answer: (A) 48** Medium · CA-12-20
A MAC address is how many bits long?
A MAC address has 48 bits, usually shown as six pairs of hexadecimal digits. 32 bits is IPv4 and 128 bits is IPv6.

CHAPTER 13

Internet and Web Services

This chapter covers the Internet and the Web, addresses and domains, email, cloud computing and online services. Be careful to separate pairs such as Internet and Web, or POP3 and IMAP.

13.1 Internet and the Web

The Internet is a worldwide network of networks that uses the TCP/IP protocols. The World Wide Web (WWW) is one service that runs on it, a collection of linked pages that are read with a browser. The two are not the same thing.

- The forerunner of the Internet was ARPANET, a US research network that began in 1969. Tim Berners-Lee proposed the Web in 1989.
- An ISP (Internet Service Provider) gives users access to the Internet. A web server stores web pages and sends them when asked. A browser such as Chrome, Firefox, Edge or Safari requests and displays them.
- A search engine such as Google or Bing finds pages that match the words you type.

13.2 URL, domain and DNS

A URL (Uniform Resource Locator) is the full address of a web page. In <https://www.example.com/page.html>, https is the protocol, www.example.com is the domain name and /page.html is the path.

Term	Meaning
DNS	Domain Name System: turns a domain name into an IP address, like a phone book of the Internet.
HTTP / HTTPS	The protocol for transferring web pages. HTTPS adds encryption, shown by a padlock in the browser.
HTML	HyperText Markup Language: the language used to build web pages.
Hyperlink	Text or an image that takes you to another page when clicked.
Cookie	A small file that a website stores on your device to remember you or your choices.
Cache	Saved copies of pages kept by the browser to load them faster next time.
Bookmark	A saved link to a page for quick return.

DOMAIN EXTENSIONS

.com is commonly associated with commercial use, .org with organisations, and .net is a generic domain with broad uses. New .edu registrations are generally restricted to eligible, institutionally accredited U.S. postsecondary institutions; some older registrations are grandfathered. In India, .in is the country-code domain; eligible academic and research institutions may use .ac.in, .edu.in or .res.in, while .gov.in is for eligible government bodies.

13.3 Email

- An email address has the form username@domain, such as name@example.com. The @ sign separates the user from the mail server's domain.
- To: main recipients. Cc (carbon copy): others who get a visible copy. Bcc (blind carbon copy): recipients whose addresses are hidden from the others.
- SMTP sends mail from a client to a server and between servers. POP3 downloads mail to one device and usually removes it from the server. IMAP keeps the mail on the server so that it can be read from many devices.
- Spam is unwanted bulk mail. An attachment is a file sent with a message. Inbox, Sent, Drafts, Outbox and Trash are the usual folders.

13.4 Cloud computing and web generations

- Cloud types: public (shared, run by a provider), private (for one organisation) and hybrid (a mix of both).
- Web 1.0 pages were read-only. Web 2.0 added user participation, as in blogs and social media. Web 3.0 aims at a smarter, more connected web, often linked with data meaning and decentralisation.

Model	What is provided	Example
IaaS	Infrastructure as a Service: virtual servers, storage and networks.	Renting virtual machines
PaaS	Platform as a Service: a ready platform to build and run applications.	An app-development platform
SaaS	Software as a Service: ready-to-use software over the Internet.	Web-based email or online office tools

13.5 Online services and e-commerce

- E-commerce is buying and selling through the Internet. B2B is business to business, B2C is business to consumer and C2C is consumer to consumer.
- Net banking and UPI let a user move money online. Never share an OTP, PIN or password with anyone, including people who claim to be from a bank.
- IoT (Internet of Things) connects everyday objects, such as sensors, watches and appliances, to the Internet so that they can send and receive data.

One-minute revision

- Internet = network of networks; WWW = a service on it. ARPANET began in 1969; the Web was proposed in 1989.
- URL = protocol + domain + path. DNS converts names to IP addresses. HTTPS is encrypted.
- Cc shows copies; Bcc hides them. SMTP sends; POP3 downloads; IMAP syncs.
- IaaS infrastructure; PaaS platform; SaaS software. Clouds: public, private, hybrid.
- Cookies remember you; cache speeds loading; never share OTP or PIN.

Practice Questions

All questions in this chapter are original GovBabu practice questions written for this book. None of them is presented as a previous-year question. Each question has exactly one correct option. Check your answers only after attempting every question.

Q1. What is the full form of URL?

- | | |
|------------------------------|--------------------------------|
| (A) Universal Resource Link | (B) Uniform Retrieval Language |
| (C) Uniform Resource Locator | (D) Unified Remote Location |
-

Q2. Who proposed the World Wide Web in 1989?

- | | |
|---------------------|--------------------|
| (A) Tim Berners-Lee | (B) Vint Cerf |
| (C) Bill Gates | (D) Linus Torvalds |
-

Q3. The forerunner of the Internet, which began in 1969, was:

- | | |
|------------|--------------|
| (A) NSFNET | (B) Ethernet |
| (C) Bitnet | (D) ARPANET |
-

Q4. Which statement about the Internet and the World Wide Web is correct?

- (A) They are two names for the same thing
 - (B) The Web is a service that runs on the Internet
 - (C) The Internet runs on top of the Web
 - (D) The Web existed before computer networks
-

Q5. DNS is used to:

- (A) Encrypt web traffic
 - (B) Translate domain names into IP addresses
 - (C) Store web pages
 - (D) Block unwanted mail
-

Q6. In the address `https://www.example.com/index.html`, the part "https" is the:

- | | |
|----------------------|---------------|
| (A) Domain name | (B) File path |
| (C) Top-level domain | (D) Protocol |
-

Q7. Which of the following uses encryption to secure a website's traffic?

- | | |
|-----------|----------|
| (A) HTTPS | (B) HTTP |
| (C) FTP | (D) SMTP |
-

Q8. HTML is used to:

- | | |
|---------------------------------------|------------------------------------|
| (A) Manage a database | (B) Transfer files between servers |
| (C) Create the structure of web pages | (D) Compress video |
-

Q9. A small file stored by a website on a user's device to remember the user is called a:

- | | |
|--------------|------------|
| (A) Macro | (B) Patch |
| (C) Firewall | (D) Cookie |
-

Q10. Which of the following is a web browser?

- | | |
|-------------------|---------------------|
| (A) Google Search | (B) Mozilla Firefox |
| (C) Gmail | (D) Microsoft Excel |
-

Q11. In an email, recipients entered in the Bcc field:

- (A) Are visible to all recipients
 - (B) Cannot open the message
 - (C) Receive the message but are hidden from the other recipients
 - (D) Receive only the attachment
-

Q12. Which protocol is used to send outgoing email?

- | | |
|----------|----------|
| (A) SMTP | (B) POP3 |
| (C) IMAP | (D) HTTP |
-

Q13. Which email protocol keeps messages on the server so they can be read from several devices?

- | | |
|----------|----------|
| (A) IMAP | (B) POP3 |
| (C) SMTP | (D) FTP |
-

Q14. Unwanted bulk email is called:

- | | |
|-----------|------------|
| (A) Draft | (B) Cookie |
| (C) Spam | (D) Cache |
-

Q15. In cloud computing, SaaS stands for:

- | | |
|-------------------------|----------------------------|
| (A) Storage as a Server | (B) Software as a Service |
| (C) System as a Service | (D) Security as a Software |
-

Q16. Which cloud service model provides virtual servers, storage and networking?

- | | |
|----------|----------|
| (A) SaaS | (B) PaaS |
| (C) DaaS | (D) IaaS |
-

Q17. Which domain extension is generally restricted to eligible, institutionally accredited postsecondary institutions in the United States?

- | | |
|----------|----------|
| (A) .gov | (B) .com |
| (C) .edu | (D) .net |
-

Q18. The Internet of Things (IoT) refers to:

- (A) Everyday objects connected to the Internet so they can send and receive data
 - (B) A type of social media site
 - (C) A programming language
 - (D) A kind of email attachment
-

Q19. A caller claiming to represent a bank asks for an OTP. The safest action is to:

- (A) Share it if the caller knows the account holder's name
 - (B) Share it only with the first digit hidden
 - (C) Post it on social media to verify it
 - (D) Do not disclose the OTP to the caller; end the call and contact the bank through an official channel if needed
-

Q20. Which of the following is a feature of Web 2.0 compared with Web 1.0?

- (A) Pages that can only be read
 - (B) User participation, as in blogs and social media
 - (C) No use of hyperlinks
 - (D) Use of paper documents only
-

Answer Key

Q1 C	Q2 A	Q3 D	Q4 B	Q5 B
Q6 D	Q7 A	Q8 C	Q9 D	Q10 B
Q11 C	Q12 A	Q13 A	Q14 C	Q15 B
Q16 D	Q17 C	Q18 A	Q19 D	Q20 B

Answers and Explanations

- Q1. Answer: (C) Uniform Resource Locator** Easy · CA-13-01
 What is the full form of URL?
 A URL is the address that locates a resource on the Internet.
- Q2. Answer: (A) Tim Berners-Lee** Easy · CA-13-02
 Who proposed the World Wide Web in 1989?
 Berners-Lee proposed the Web while at CERN. Vint Cerf is known for TCP/IP, and the others for Microsoft and Linux.
- Q3. Answer: (D) ARPANET** Medium · CA-13-03
 The forerunner of the Internet, which began in 1969, was:
 ARPANET was the first packet-switched network. NSFNET came later and Ethernet is a LAN technology.
- Q4. Answer: (B) The Web is a service that runs on the Internet** Easy · CA-13-04
 Which statement about the Internet and the World Wide Web is correct?
 The Internet is the network infrastructure, and the Web is one of the services using it, alongside email and file transfer.
- Q5. Answer: (B) Translate domain names into IP addresses** Easy · CA-13-05
 DNS is used to:
 DNS is the Internet's phone book. Encryption is HTTPS, and pages are stored on web servers.
- Q6. Answer: (D) Protocol** Medium · CA-13-06
 In the address `https://www.example.com/index.html`, the part "https" is the:
 The text before `://` names the protocol. The domain is `www.example.com` and the path is `/index.html`.
- Q7. Answer: (A) HTTPS** Easy · CA-13-07
 Which of the following uses encryption to secure a website's traffic?
 HTTPS adds TLS encryption to HTTP. The other three send data in clear form unless a secure variant is used.
- Q8. Answer: (C) Create the structure of web pages** Easy · CA-13-08
 HTML is used to:
 HTML is a markup language that describes the content and structure of a page.
- Q9. Answer: (D) Cookie** Medium · CA-13-09
 A small file stored by a website on a user's device to remember the user is called a:
 Cookies hold things like login state and preferences. A macro is a recorded set of actions and a firewall filters network traffic.

- Q10. Answer: (B) Mozilla Firefox** Easy · CA-13-10
Which of the following is a web browser?
Firefox is a browser. Google Search is a search engine, Gmail is an email service and Excel is a spreadsheet.
- Q11. Answer: (C) Receive the message but are hidden from the other recipients** Medium · CA-13-11
In an email, recipients entered in the Bcc field:
Bcc stands for blind carbon copy, so the other recipients cannot see those addresses. Cc recipients are visible.
- Q12. Answer: (A) SMTP** Medium · CA-13-12
Which protocol is used to send outgoing email?
SMTP sends mail. POP3 and IMAP are used to receive or read it.
- Q13. Answer: (A) IMAP** Medium · CA-13-13
Which email protocol keeps messages on the server so they can be read from several devices?
IMAP syncs with the server. POP3 normally downloads and removes the messages from it.
- Q14. Answer: (C) Spam** Easy · CA-13-14
Unwanted bulk email is called:
Spam is junk mail sent in bulk. A draft is an unsent message.
- Q15. Answer: (B) Software as a Service** Medium · CA-13-15
In cloud computing, SaaS stands for:
SaaS delivers ready-to-use software over the Internet, such as web-based email.
- Q16. Answer: (D) IaaS** Medium · CA-13-16
Which cloud service model provides virtual servers, storage and networking?
IaaS is the infrastructure layer. PaaS provides a platform for building applications and SaaS provides finished software.
- Q17. Answer: (C) .edu** Easy · CA-13-17
Which domain extension is generally restricted to eligible, institutionally accredited postsecondary institutions in the United States?
.edu is generally restricted to eligible, institutionally accredited U.S. postsecondary institutions, with some older registrations grandfathered. It is not a universal domain for educational institutions worldwide; in India, eligible academic and research institutions may use .ac.in, .edu.in or .res.in.
- Q18. Answer: (A) Everyday objects connected to the Internet so they can send and receive data** Easy · CA-13-18
The Internet of Things (IoT) refers to:
Sensors, watches and appliances that are online are IoT devices.
- Q19.**
Answer: (D) Do not disclose the OTP to the caller; end the call and contact the bank through an official channel if needed Medium · CA-13-19
A caller claiming to represent a bank asks for an OTP. The safest action is to:
Do not disclose an OTP to anyone who calls or messages asking you to reveal it. Enter an OTP only on the official app or website for a login or transaction you initiated. If in doubt, end the call and contact the bank through an official channel.
- Q20. Answer: (B) User participation, as in blogs and social media** Medium · CA-13-20
Which of the following is a feature of Web 2.0 compared with Web 1.0?
Web 1.0 was mostly read-only. Web 2.0 lets users create and share content.

CHAPTER 14

Cyber Security

This chapter covers the main threats to computers and data, the defences used against them, encryption and the cyber law of India. Learn the types of malware by how each behaves.

14.1 What cyber security protects

Cyber security is the practice of protecting computers, networks, programs and data from attack, damage and unauthorised access. Its aims are summed up as the CIA triad.

Goal	Meaning
Confidentiality	Only authorised people can see the data.
Integrity	The data is accurate and has not been altered improperly.
Availability	The data and systems can be used when needed.

14.2 Malware

Malware (malicious software) is software made to harm a system or steal data.

Type	Behaviour
Virus	Attaches itself to a program or file and spreads when that file is run or shared.
Worm	Spreads by itself across networks without needing a host file.
Trojan horse	Looks like a useful program but hides harmful code. It does not replicate by itself.
Ransomware	Locks or encrypts files and demands payment to restore them.
Spyware	Secretly watches the user and sends the information to someone else.
Adware	Shows unwanted advertisements.
Keylogger	Records the keys pressed, to steal passwords.
Botnet	A network of infected computers controlled remotely by an attacker.
Rootkit	Hides the presence of malware and gives the attacker deep control.

14.3 Common attacks

Attack	Description
Phishing	A fake email or website that tricks users into giving passwords or card details. Phishing uses phone calls, and smishing uses text messages.
Spoofing	Pretending to be a trusted sender, address or website.
DoS and DDoS	Flooding a server with requests so that real users cannot reach it. In DDoS the flood comes from many computers.
Man-in-the-middle	The attacker secretly sits between two parties and reads or changes their messages.
Brute force	Trying every possible password until one works.
SQL injection	Entering database commands into a web form to read or damage the database.
Social engineering	Tricking people, rather than machines, into giving away secrets.

HACKERS

A white-hat hacker tests systems with permission to improve security. A black-hat hacker breaks in for harm or gain. A grey-hat hacker works without permission but without a harmful aim.

14.4 Defences

- A firewall monitors and filters network traffic according to rules and blocks what is not allowed. It can be hardware or software.
- Antivirus software detects, blocks and removes malware, and needs regular updates of its virus definitions.
- Two-factor authentication (2FA) needs two proofs of identity, such as a password and a one-time password (OTP) sent to the phone. Biometrics use a fingerprint, iris or face.
- A strong password is long, mixes letters, numbers and symbols, and is not reused across sites. Regular backups protect against data loss and ransomware.
- Keep the operating system and software updated, because updates fix known security flaws.

14.5 Encryption and digital signatures

- Encryption converts readable plaintext into unreadable ciphertext using a key; decryption reverses it.
- Symmetric encryption uses the same key to encrypt and decrypt (AES is an example). Asymmetric encryption uses a public key to encrypt and a private key to decrypt (RSA is an example).
- A digital signature proves who sent a document and that it has not been changed. It is made with the sender's private key and checked with the public key. A hash function turns data into a short fixed-size value, and any change in the data changes the hash.

14.6 Cyber law in India

- The Information Technology Act, 2000 is India's main law on cyber crime and electronic commerce. It gives legal recognition to electronic records and digital signatures.
- CERT-In (Indian Computer Emergency Response Team) is the national agency that responds to cyber security incidents. Cyber crimes can be reported on the National Cyber Crime Reporting Portal (cybercrime.gov.in) and through the helpline 1930.
- Copyright protects original creative work; a patent protects an invention; a trademark protects a brand name or logo. Using or copying software without a licence is piracy.

One-minute revision

- CIA triad: confidentiality, integrity, availability.
- Virus needs a host; worm spreads alone; trojan is disguised; ransomware demands payment; spyware watches.
- Phishing tricks for details; DDoS floods a server; brute force guesses passwords.
- Firewall filters traffic; 2FA needs two proofs; update software; keep backups.
- Symmetric = one key; asymmetric = public and private keys. IT Act 2000; CERT-In; cybercrime.gov.in; helpline 1930.

Practice Questions

All questions in this chapter are original GovBabu practice questions written for this book. None of them is presented as a previous-year question. Each question has exactly one correct option. Check your answers only after attempting every question.

Q1. Which of the following is NOT one of the three goals of the CIA triad?

- | | |
|---------------------|------------------|
| (A) Confidentiality | (B) Integrity |
| (C) Authorisation | (D) Availability |
-

Q2. Software designed to harm a computer system or steal data is called:

- | | |
|--------------|----------------|
| (A) Malware | (B) Freeware |
| (C) Firmware | (D) Middleware |
-

Q3. Which malware spreads by itself across a network without needing a host file?

- | | |
|------------------|---------------|
| (A) Virus | (B) Worm |
| (C) Trojan horse | (D) Keylogger |
-

Q4. A program that looks useful but secretly contains harmful code, and does not copy itself, is a:

- | | |
|------------|------------------|
| (A) Worm | (B) Botnet |
| (C) Adware | (D) Trojan horse |
-

Q5. Malware that locks or encrypts a user's files and demands money to restore them is:

- | | |
|-------------|----------------|
| (A) Spyware | (B) Adware |
| (C) Rootkit | (D) Ransomware |
-

Q6. Software that records every key pressed on a keyboard in order to steal passwords is a:

- | | |
|--------------|---------------|
| (A) Firewall | (B) Keylogger |
| (C) Spooler | (D) Debugger |
-

Q7. Sending a fake email that tricks users into revealing passwords or card details is called:

- | | |
|--------------|--------------|
| (A) Phishing | (B) Spooling |
| (C) Booting | (D) Hashing |
-

Q8. Phishing carried out through telephone calls is called:

- | | |
|--------------|--------------|
| (A) Smishing | (B) Pharming |
| (C) Vishing | (D) Spamming |
-

-
- Q9.** In a DDoS attack, a server is made unavailable by:
- (A) Deleting its operating system by hand
 - (B) Flooding it with requests from many computers
 - (C) Encrypting its files for ransom
 - (D) Reading its keystrokes
-
- Q10.** Trying every possible combination until the correct password is found is called a:
- (A) Brute-force attack
 - (B) Phishing attack
 - (C) Spoofing attack
 - (D) Replay attack
-
- Q11.** A system that monitors and filters network traffic according to security rules is a:
- (A) Compiler
 - (B) Modem
 - (C) Firewall
 - (D) Plotter
-
- Q12.** Two-factor authentication requires:
- (A) The same password entered twice
 - (B) Two passwords of the same kind
 - (C) Two antivirus programs
 - (D) Two different proofs of identity, such as a password and an OTP
-
- Q13.** In asymmetric encryption, a message is encrypted with the receiver's public key and decrypted with the:
- (A) Receiver's private key
 - (B) Sender's public key
 - (C) Same public key
 - (D) Hash of the message
-
- Q14.** Which of the following is an example of symmetric-key encryption?
- (A) RSA
 - (B) SMTP
 - (C) AES
 - (D) DNS
-
- Q15.** A digital signature is used to:
- (A) Speed up the Internet connection
 - (B) Increase the storage of a disk
 - (C) Remove viruses from a file
 - (D) Prove who sent a message and that it was not changed
-

Q16. The main Indian law dealing with cyber crime and electronic commerce is the:

- (A) Right to Information Act, 2005
(B) Information Technology Act, 2000
(C) Copyright Act, 1957
(D) Companies Act, 2013

Q17. CERT-In is the national agency in India for:

- (A) Issuing PAN cards
(B) Responding to cyber security incidents
(C) Regulating banks
(D) Allotting domain names to everyone

Q18. Which of the following protects a brand name or logo?

- (A) Patent (B) Copyright
(C) Licence key (D) Trademark

Q19. Software that secretly watches a user's activity and sends the information to someone else is called:

- (A) Spyware (B) Ransomware
(C) Shareware (D) Freeware

Q20. A hacker who tests systems with the owner's permission in order to improve security is called a:

- (A) Black-hat hacker (B) Cracker for profit
(C) White-hat hacker (D) Script spoofer

Answer Key

Q1 C	Q2 A	Q3 B	Q4 D	Q5 D
Q6 B	Q7 A	Q8 C	Q9 B	Q10 A
Q11 C	Q12 D	Q13 A	Q14 C	Q15 D
Q16 B	Q17 B	Q18 D	Q19 A	Q20 C

Answers and Explanations

Q1. Answer: (C) Authorisation

Easy · CA-14-01

Which of the following is NOT one of the three goals of the CIA triad?

The triad is confidentiality, integrity and availability. Authorisation is a related security idea, but it is not part of the triad.

Q2. Answer: (A) Malware

Easy · CA-14-02

Software designed to harm a computer system or steal data is called:

Malware is malicious software. Freeware is free of charge, firmware lives in chips and middleware links applications.

Q3. Answer: (B) Worm

Medium · CA-14-03

Which malware spreads by itself across a network without needing a host file?

A worm replicates on its own. A virus needs a host program, and a trojan only disguises itself.

Q4. Answer: (D) Trojan horse

Medium · CA-14-04

A program that looks useful but secretly contains harmful code, and does not copy itself, is a:

The name comes from the wooden horse of the story. It relies on the user running it willingly.

Q5. Answer: (D) Ransomware

Easy · CA-14-05

Malware that locks or encrypts a user's files and demands money to restore them is:

A ransom is demanded, hence the name. Spyware only watches and adware only shows advertisements.

Q6. Answer: (B) Keylogger

Medium · CA-14-06

Software that records every key pressed on a keyboard in order to steal passwords is a:

A keylogger captures keystrokes secretly. A firewall defends, a spooler queues print jobs and a debugger finds program errors.

Q7. Answer: (A) Phishing

Easy · CA-14-07

Sending a fake email that tricks users into revealing passwords or card details is called:

Phishing fishes for private details with bait. Spooling, booting and hashing have nothing to do with deception.

Q8. Answer: (C) Vishing

Medium · CA-14-08

Phishing carried out through telephone calls is called:

Vishing is voice phishing. Smishing uses text messages (SMS).

- Q9. Answer: (B) Flooding it with requests from many computers** Medium · CA-14-09
In a DDoS attack, a server is made unavailable by:
DDoS means distributed denial of service. The traffic comes from many machines, often a botnet, so real users cannot get in.
- Q10. Answer: (A) Brute-force attack** Medium · CA-14-10
Trying every possible combination until the correct password is found is called a:
Brute force is exhaustive guessing. Longer passwords make it much slower.
- Q11. Answer: (C) Firewall** Easy · CA-14-11
A system that monitors and filters network traffic according to security rules is a:
A firewall allows or blocks traffic by rule. A compiler translates code, a modem connects to the line and a plotter prints drawings.
- Q12. Answer: (D) Two different proofs of identity, such as a password and an OTP** Easy · CA-14-12
Two-factor authentication requires:
The two factors must be of different kinds, such as something you know and something you have. Typing a password twice is only one factor.
- Q13. Answer: (A) Receiver's private key** Medium · CA-14-13
In asymmetric encryption, a message is encrypted with the receiver's public key and decrypted with the:
The two keys form a pair, and only the private key matching the public key can decrypt. The private key is never shared.
- Q14. Answer: (C) AES** Medium · CA-14-14
Which of the following is an example of symmetric-key encryption?
AES uses one shared key. RSA is asymmetric, and SMTP and DNS are not encryption schemes.
- Q15. Answer: (D) Prove who sent a message and that it was not changed** Medium · CA-14-15
A digital signature is used to:
It gives authenticity and integrity. It does not make a connection faster or remove malware.
- Q16. Answer: (B) Information Technology Act, 2000** Easy · CA-14-16
The main Indian law dealing with cyber crime and electronic commerce is the:
The IT Act, 2000 is the cyber law. The other Acts are about information requests, copyright and companies.
- Q17. Answer: (B) Responding to cyber security incidents** Medium · CA-14-17
CERT-In is the national agency in India for:
The Indian Computer Emergency Response Team handles cyber incidents and issues security advisories.
- Q18. Answer: (D) Trademark** Medium · CA-14-18
Which of the following protects a brand name or logo?
A trademark protects identifying marks. A patent protects inventions and copyright protects creative works.
- Q19. Answer: (A) Spyware** Easy · CA-14-19
Software that secretly watches a user's activity and sends the information to someone else is called:
Spyware gathers information without the user's knowledge. Ransomware demands money, and shareware and freeware are ways of distributing software.
- Q20. Answer: (C) White-hat hacker** Medium · CA-14-20
A hacker who tests systems with the owner's permission in order to improve security is called a:
White-hat hackers are ethical hackers. Black-hat hackers break in for harm or gain.

CHAPTER 15

Databases and DBMS

This chapter covers databases, the relational model, SQL commands, normalisation and transactions. The vocabulary of tables and the SQL command groups are examined most often.

15.1 Data, database and DBMS

A database is an organised collection of related data. A DBMS (Database Management System) is the software that creates, stores, retrieves and controls access to the database. Examples are MySQL, Oracle, Microsoft SQL Server, PostgreSQL and Microsoft Access.

- A file-based system stores data in separate files and suffers from repeated data (redundancy) and inconsistency. A DBMS reduces redundancy, keeps data consistent, allows sharing and gives security and backup.
- Data independence means the way data is stored can change without forcing a change in the programs that use it.

15.2 Relational model terms

The relational model, proposed by E. F. Codd in 1970, stores data in tables. A DBMS built on it is an RDBMS.

Term	Meaning
Table (relation)	Data arranged in rows and columns.
Record (row, tuple)	One complete set of related values, such as the details of one student.
Field (column, attribute)	One item of data in every record, such as Name.
Primary key	A field (or fields) whose value uniquely identifies each record. It cannot be repeated or empty (NULL).
Candidate key	Any field that could serve as the primary key; the chosen one becomes the primary key.
Foreign key	A field in one table that refers to the primary key of another table, linking them.
Degree and cardinality	Degree is the number of columns of a table; cardinality is the number of rows.
Domain	The set of values allowed for a field.

15.3 SQL

SQL (Structured Query Language) is the standard language for working with relational databases. Its commands are grouped by purpose.

- A query such as `SELECT Name FROM Student WHERE Marks > 60 ORDER BY Name;` picks the Name field from the Student table for rows where Marks is above 60, in alphabetical order.

- Aggregate functions work on a set of rows: COUNT, SUM, AVG, MAX and MIN. GROUP BY groups rows and HAVING filters the groups.
- DELETE removes selected rows and, within an uncommitted transaction, its effects can generally be undone with ROLLBACK. TRUNCATE removes all rows efficiently, but transaction and rollback behaviour depends on the database system. DROP removes the table definition and its data.

Group	Full form	Commands
DDL	Data Definition Language	CREATE, ALTER, DROP, TRUNCATE
DML	Data Manipulation Language	INSERT, UPDATE, DELETE
DQL	Data Query Language	SELECT
DCL	Data Control Language	GRANT, REVOKE
TCL	Transaction Control Language	COMMIT, ROLLBACK, SAVEPOINT

15.4 Normalisation, ER model and transactions

- Normalisation organises tables to remove redundancy and unwanted dependencies. 1NF needs atomic (single) values in every cell, 2NF removes partial dependency on the key and 3NF removes dependency between non-key fields.
- In traditional Chen notation, an ER (Entity-Relationship) diagram represents entities as rectangles, attributes as ovals and relationships as diamonds. Other ER-diagram notations may use different symbols. Relationships can be one-to-one, one-to-many or many-to-many.
- A transaction is a unit of work that must follow ACID: Atomicity (all or nothing), Consistency, Isolation and Durability.
- A data warehouse stores large amounts of historical data for analysis. Big data means data too large or varied for ordinary tools. A DBA (database administrator) manages the database.

One-minute revision

- DBMS manages databases; RDBMS stores data in related tables.
- Row = record; column = field; degree = columns; cardinality = rows.
- Primary key is unique and not NULL; foreign key links tables.
- DDL defines (CREATE, ALTER, DROP); DML changes data; SELECT queries; DCL grants; TCL commits.
- ACID: atomicity, consistency, isolation, durability. 1NF atomic values.

Practice Questions

All questions in this chapter are original GovBabu practice questions written for this book. None of them is presented as a previous-year question. Each question has exactly one correct option. Check your answers only after attempting every question.

Q1. What is the full form of DBMS?

- | | |
|-----------------------------------|--------------------------------------|
| (A) Data Backup Management System | (B) Digital Base Management Software |
| (C) Database Memory Storage | (D) Database Management System |
-

Q2. Which of the following is a relational database management system?

- | | |
|-------------|--------------------------|
| (A) Notepad | (B) MySQL |
| (C) Paint | (D) Windows Media Player |
-

Q3. The relational model of databases was proposed by:

- | | |
|--------------------|---------------------|
| (A) Dennis Ritchie | (B) Charles Babbage |
| (C) E. F. Codd | (D) Alan Turing |
-

Q4. In a database table, a row is also called a:

- | | |
|--------------------|------------|
| (A) Record (tuple) | (B) Field |
| (C) Attribute | (D) Domain |
-

Q5. In a database table, a column is also called a:

- | | |
|-----------------------|-----------------|
| (A) Field (attribute) | (B) Record |
| (C) Tuple | (D) Cardinality |
-

Q6. A table has 5 columns and 120 rows. What is its degree?

- | | |
|---------|---------|
| (A) 120 | (B) 125 |
| (C) 600 | (D) 5 |
-

Q7. A field whose value uniquely identifies every record in a table is the:

- | | |
|-----------------|----------------|
| (A) Foreign key | (B) Index only |
| (C) Primary key | (D) Alias |
-

Q8. A field in one table that refers to the primary key of another table is called a:

- | | |
|-------------------|-----------------|
| (A) Primary key | (B) Foreign key |
| (C) Candidate key | (D) Super key |
-

Q9. What does SQL stand for?

- | | |
|------------------------------|-------------------------------|
| (A) Simple Question Language | (B) Structured Query Language |
| (C) Sequential Query Logic | (D) Standard Quick Language |
-

Q10. Which SQL command is used to retrieve data from a table?

- | | |
|------------|------------|
| (A) INSERT | (B) UPDATE |
| (C) SELECT | (D) DROP |
-

Q11. Which of the following is a DDL (Data Definition Language) command?

- | | |
|------------|------------|
| (A) CREATE | (B) INSERT |
| (C) DELETE | (D) COMMIT |
-

Q12. Which of the following is a DML (Data Manipulation Language) command?

- | | |
|-----------|------------|
| (A) ALTER | (B) GRANT |
| (C) DROP | (D) UPDATE |
-

Q13. Which SQL commands belong to DCL (Data Control Language)?

- | | |
|-------------------------|-----------------------|
| (A) COMMIT and ROLLBACK | (B) CREATE and DROP |
| (C) GRANT and REVOKE | (D) INSERT and SELECT |
-

Q14. Which SQL command removes a whole table, including its structure?

- | | |
|------------|------------|
| (A) DROP | (B) DELETE |
| (C) SELECT | (D) UPDATE |
-

Q15. Which SQL clause is used to filter rows according to a condition?

- | | |
|--------------|--------------|
| (A) ORDER BY | (B) GROUP BY |
| (C) FROM | (D) WHERE |
-

Q16. Which of the following is an aggregate function in SQL?

- | | |
|-----------|----------|
| (A) JOIN | (B) AVG |
| (C) WHERE | (D) LIKE |
-

Q17. In the ACID properties of a transaction, "A" stands for:

- | | |
|------------------|---------------|
| (A) Availability | (B) Authority |
| (C) Accuracy | (D) Atomicity |
-

Q18. The process of organising tables to reduce redundancy and unwanted dependency is called:

- | | |
|-----------------|-------------------|
| (A) Encryption | (B) Normalisation |
| (C) Compilation | (D) Fragmentation |
-

Q19. In traditional Chen notation, entities in an ER diagram are drawn as:

- | | |
|----------------|---------------|
| (A) Rectangles | (B) Ovals |
| (C) Diamonds | (D) Triangles |
-

Q20. Which SQL command is used to add a new row to a table?

- | | |
|------------|------------|
| (A) SELECT | (B) ALTER |
| (C) INSERT | (D) REVOKE |
-

Answer Key

Q1 D	Q2 B	Q3 C	Q4 A	Q5 A
Q6 D	Q7 C	Q8 B	Q9 B	Q10 C
Q11 A	Q12 D	Q13 C	Q14 A	Q15 D
Q16 B	Q17 D	Q18 B	Q19 A	Q20 C

Answers and Explanations

- Q1. Answer: (D) Database Management System** Easy · CA-15-01
 What is the full form of DBMS?
 DBMS is the software that creates and manages databases.
- Q2. Answer: (B) MySQL** Easy · CA-15-02
 Which of the following is a relational database management system?
 MySQL stores data in related tables. The others are an editor, a drawing tool and a media player.
- Q3. Answer: (C) E. F. Codd** Medium · CA-15-03
 The relational model of databases was proposed by:
 Codd proposed it in 1970 while at IBM. Ritchie created C, Babbage designed early engines and Turing described a theoretical machine.
- Q4. Answer: (A) Record (tuple)** Easy · CA-15-04
 In a database table, a row is also called a:
 A row is a record, also called a tuple. A column is a field or attribute.
- Q5. Answer: (A) Field (attribute)** Easy · CA-15-05
 In a database table, a column is also called a:
 A column holds one kind of data and is called a field or attribute.
- Q6. Answer: (D) 5** Medium · CA-15-06
 A table has 5 columns and 120 rows. What is its degree?
 Degree is the number of columns, so 5. The number of rows, 120, is the cardinality.
- Q7. Answer: (C) Primary key** Medium · CA-15-07
 A field whose value uniquely identifies every record in a table is the:
 A primary key must be unique and cannot be empty. A foreign key only refers to a key in another table.
- Q8. Answer: (B) Foreign key** Medium · CA-15-08
 A field in one table that refers to the primary key of another table is called a:
 The foreign key creates the link between the two tables.
- Q9. Answer: (B) Structured Query Language** Easy · CA-15-09
 What does SQL stand for?
 SQL is the standard language for relational databases.

- Q10. Answer: (C) SELECT** Easy · CA-15-10
Which SQL command is used to retrieve data from a table?
SELECT reads data. INSERT adds rows, UPDATE changes them and DROP removes a table.
- Q11. Answer: (A) CREATE** Medium · CA-15-11
Which of the following is a DDL (Data Definition Language) command?
CREATE defines a structure. INSERT and DELETE are DML and COMMIT is TCL.
- Q12. Answer: (D) UPDATE** Medium · CA-15-12
Which of the following is a DML (Data Manipulation Language) command?
UPDATE changes data held in a table. ALTER and DROP are DDL and GRANT is DCL.
- Q13. Answer: (C) GRANT and REVOKE** Medium · CA-15-13
Which SQL commands belong to DCL (Data Control Language)?
DCL controls permissions. COMMIT and ROLLBACK are TCL.
- Q14. Answer: (A) DROP** Medium · CA-15-14
Which SQL command removes a whole table, including its structure?
DROP deletes the table itself. DELETE removes only chosen rows and keeps the table.
- Q15. Answer: (D) WHERE** Medium · CA-15-15
Which SQL clause is used to filter rows according to a condition?
WHERE filters rows. ORDER BY sorts, GROUP BY groups and FROM names the table.
- Q16. Answer: (B) AVG** Medium · CA-15-16
Which of the following is an aggregate function in SQL?
AVG, COUNT, SUM, MAX and MIN are aggregate functions. JOIN, WHERE and LIKE are clauses or operators.
- Q17. Answer: (D) Atomicity** Medium · CA-15-17
In the ACID properties of a transaction, "A" stands for:
Atomicity means a transaction happens completely or not at all.
- Q18. Answer: (B) Normalisation** Medium · CA-15-18
The process of organising tables to reduce redundancy and unwanted dependency is called:
Normalisation splits data into well-structured tables. Encryption protects data and compilation translates code.
- Q19. Answer: (A) Rectangles** Medium · CA-15-19
In traditional Chen notation, entities in an ER diagram are drawn as:
In traditional Chen notation, entities are rectangles, attributes are ovals and relationships are diamonds.
- Q20. Answer: (C) INSERT** Medium · CA-15-20
Which SQL command is used to add a new row to a table?
INSERT adds records. SELECT only reads, ALTER changes a table's structure and REVOKE withdraws a permission.

CHAPTER 16

Keyboard Shortcuts

This chapter brings the general keyboard shortcuts, the function keys and the browser shortcuts together. The Word, Excel and PowerPoint shortcuts are in their own chapters.

16.1 Common Windows shortcuts

These shortcuts work in almost every Windows program. Chapters 7, 9, 10 and 11 give the ones specific to the operating system, Word, Excel and PowerPoint; this chapter collects the general ones and the function keys in one place.

Shortcut	Action	Shortcut	Action
Ctrl + C	Copy	Ctrl + X	Cut
Ctrl + V	Paste	Ctrl + Z	Undo
Ctrl + Y	Redo	Ctrl + A	Select all
Ctrl + S	Save	Ctrl + P	Print
Ctrl + F	Find	Ctrl + N	New file or window
Ctrl + W	Close the current tab or document	Ctrl + Shift + T	Reopen the last closed browser tab
Alt + Tab	Switch between open programs	Alt + F4	Close the active program
Windows key + D	Show the desktop	Windows key + L	Lock the computer
Windows key + E	Open File Explorer	Windows key + I	Open Settings
Print Screen	Copy the whole screen as an image	Windows key + Shift + S	Capture part of the screen

16.2 Function keys

Key	Usual action	Key	Usual action
F1	Help	F7	Spelling check in Office programs
F2	Rename a selected file; edit a cell in Excel	F11	Full-screen mode in a browser
F3	Search	F12	Save As in Office programs
F4	Repeat the last action; Alt + F4 closes a window	F5	Refresh a web page; start a slide show

EXAM NOTE

F5 reloads a page in a browser, and Ctrl + F5 reloads it ignoring the saved copy (cache). F2 renames a file in File Explorer.

16.3 Keys on the keyboard

- Alphanumeric keys are letters and digits. Modifier keys (Shift, Ctrl, Alt) change what another key does. Function keys are F1 to F12. Navigation keys are the arrows, Home, End, Page Up and Page Down.
- Caps Lock, Num Lock and Scroll Lock are toggle keys: pressing once turns the mode on and pressing again turns it off.
- The Esc key cancels the current operation. The Backspace key deletes the character to the left of the cursor, and the Delete key deletes the character to the right.
- The Tab key moves to the next field or inserts a tab space. The Insert key switches between insert and overwrite typing. A standard keyboard has 101 or 104 keys.

16.4 Browser shortcuts

Shortcut	Action	Shortcut	Action
Ctrl + T	Open a new tab	Ctrl + Shift + N	Open a private (incognito) window in Chrome
Ctrl + D	Bookmark the page	Ctrl + H	Open the history
Ctrl + J	Open the downloads	Ctrl + L	Select the address bar
Ctrl + Tab	Next tab	Ctrl + +	Zoom in

One-minute revision

- Ctrl: C copy, X cut, V paste, Z undo, Y redo, A all, S save, P print, F find.
- Alt+Tab switches programs; Alt+F4 closes; Win+D desktop; Win+L lock; Win+E Explorer.
- F1 help; F2 rename; F5 refresh; F7 spelling; F11 full screen; F12 Save As.
- Modifier keys: Shift, Ctrl, Alt. Toggle keys: Caps Lock, Num Lock.
- Ctrl+T new tab; Ctrl+Shift+T reopen; Ctrl+D bookmark; Ctrl+H history; Ctrl+J downloads.

Practice Questions

All questions in this chapter are original GovBabu practice questions written for this book. None of them is presented as a previous-year question. Each question has exactly one correct option. Check your answers only after attempting every question.

Q1. Which shortcut copies the selected item to the clipboard?

(A) Ctrl + C

(B) Ctrl + X

(C) Ctrl + V

(D) Ctrl + Z

Q2. Which shortcut cuts the selected item?

(A) Ctrl + C

(B) Ctrl + P

(C) Ctrl + X

(D) Ctrl + F

Q3. Which shortcut pastes the contents of the clipboard?

(A) Ctrl + B

(B) Ctrl + V

(C) Ctrl + P

(D) Ctrl + A

Q4. Which shortcut undoes the last action in most programs?

(A) Ctrl + Y

(B) Ctrl + U

(C) Ctrl + R

(D) Ctrl + Z

Q5. Which shortcut switches between open programs in Windows?

(A) Ctrl + Tab

(B) Shift + Tab

(C) Alt + Enter

(D) Alt + Tab

Q6. Which shortcut shows or hides the desktop in Windows?

(A) Windows key + L

(B) Windows key + D

(C) Windows key + E

(D) Windows key + I

Q7. Which function key is used to rename a selected file in File Explorer?

(A) F1

(B) F3

(C) F2

(D) F5

Q8. Which function key opens the Help window in most programs?

(A) F1

(B) F2

(C) F10

(D) F12

Q9. Which key refreshes or reloads a web page in a browser?

- | | |
|--------|---------|
| (A) F3 | (B) F9 |
| (C) F5 | (D) F11 |
-

Q10. Which key switches a browser to full-screen mode?

- | | |
|---------|---------|
| (A) F11 | (B) F5 |
| (C) F7 | (D) F12 |
-

Q11. Which shortcut reopens the most recently closed tab in a browser?

- | | |
|----------------------|----------------------|
| (A) Ctrl + T | (B) Ctrl + W |
| (C) Ctrl + Shift + N | (D) Ctrl + Shift + T |
-

Q12. Which shortcut opens a new private (incognito) window in Chrome?

- | | |
|----------------------|----------------------|
| (A) Ctrl + N | (B) Ctrl + Shift + N |
| (C) Ctrl + Shift + T | (D) Ctrl + Alt + N |
-

Q13. Which shortcut bookmarks the current page in most browsers?

- | | |
|--------------|--------------|
| (A) Ctrl + B | (B) Ctrl + D |
| (C) Ctrl + H | (D) Ctrl + J |
-

Q14. Which of the following is a modifier key?

- | | |
|---------------|--------------|
| (A) Enter | (B) Spacebar |
| (C) Backspace | (D) Ctrl |
-

Q15. Caps Lock and Num Lock are examples of:

- | | |
|---------------------|-------------------|
| (A) Toggle keys | (B) Function keys |
| (C) Navigation keys | (D) Modifier keys |
-

Q16. The Backspace key deletes:

- (A) The character to the right of the cursor
 - (B) The whole line
 - (C) The character to the left of the cursor
 - (D) The whole document
-

Q17. Which key cancels the current operation or closes a menu?

- | | |
|------------|----------|
| (A) Esc | (B) Tab |
| (C) Insert | (D) Home |
-

Q18. In Google Chrome on Windows or Linux, which shortcut reloads the page while ignoring cached content?

- | | |
|------------------------|------------------------------|
| (A) Closes the page | (B) Opens a new window |
| (C) Bookmarks the page | (D) Shift+F5 or Ctrl+Shift+R |
-

Q19. Which key combination captures part of the screen in recent versions of Windows?

- | | |
|-----------------------------|----------------------|
| (A) Windows key + Shift + D | (B) Alt + Shift + S |
| (C) Windows key + Shift + S | (D) Ctrl + Shift + P |
-

Q20. Which shortcut selects all the content in a document or folder?

- | | |
|--------------|--------------|
| (A) Ctrl + S | (B) Ctrl + A |
| (C) Ctrl + E | (D) Ctrl + O |
-

Answer Key

Q1 A	Q2 C	Q3 B	Q4 D	Q5 D
Q6 B	Q7 C	Q8 A	Q9 C	Q10 A
Q11 D	Q12 B	Q13 B	Q14 D	Q15 A
Q16 C	Q17 A	Q18 D	Q19 C	Q20 B

Answers and Explanations

- Q1. Answer: (A) Ctrl + C** Easy · CA-16-01
Which shortcut copies the selected item to the clipboard?
Ctrl+C copies. Ctrl+X cuts, Ctrl+V pastes and Ctrl+Z undoes.
- Q2. Answer: (C) Ctrl + X** Easy · CA-16-02
Which shortcut cuts the selected item?
X looks like a pair of scissors, which helps in remembering cut. Ctrl+C copies, Ctrl+P prints and Ctrl+F finds.
- Q3. Answer: (B) Ctrl + V** Easy · CA-16-03
Which shortcut pastes the contents of the clipboard?
Ctrl+V pastes. Ctrl+B is bold in Office, Ctrl+P prints and Ctrl+A selects all.
- Q4. Answer: (D) Ctrl + Z** Easy · CA-16-04
Which shortcut undoes the last action in most programs?
Ctrl+Z undoes and Ctrl+Y redoes. Ctrl+U underlines text and Ctrl+R right-aligns it.
- Q5. Answer: (D) Alt + Tab** Medium · CA-16-05
Which shortcut switches between open programs in Windows?
Alt+Tab cycles through programs. Ctrl+Tab moves between tabs inside a program.
- Q6. Answer: (B) Windows key + D** Easy · CA-16-06
Which shortcut shows or hides the desktop in Windows?
Win+D toggles the desktop. Win+L locks, Win+E opens File Explorer and Win+I opens Settings.
- Q7. Answer: (C) F2** Medium · CA-16-07
Which function key is used to rename a selected file in File Explorer?
F2 renames. F1 is Help, F3 is search and F5 refreshes.
- Q8. Answer: (A) F1** Easy · CA-16-08
Which function key opens the Help window in most programs?
F1 is universally Help. F12 is Save As in Office.
- Q9. Answer: (C) F5** Easy · CA-16-09
Which key refreshes or reloads a web page in a browser?
F5 reloads the page. F11 switches to full-screen mode.

- Q10. Answer: (A) F11** Medium · CA-16-10
Which key switches a browser to full-screen mode?
F11 toggles full screen. F7 is spelling check in Office programs and F12 is Save As.
- Q11. Answer: (D) Ctrl + Shift + T** Medium · CA-16-11
Which shortcut reopens the most recently closed tab in a browser?
Adding Shift to Ctrl+T reopens a closed tab. Ctrl+T alone opens a new one and Ctrl+W closes the current tab.
- Q12. Answer: (B) Ctrl + Shift + N** Medium · CA-16-12
Which shortcut opens a new private (incognito) window in Chrome?
Ctrl+Shift+N opens incognito. Ctrl+N opens an ordinary new window.
- Q13. Answer: (B) Ctrl + D** Medium · CA-16-13
Which shortcut bookmarks the current page in most browsers?
Ctrl+D adds a bookmark. Ctrl+H opens the history and Ctrl+J opens the downloads.
- Q14. Answer: (D) Ctrl** Easy · CA-16-14
Which of the following is a modifier key?
Shift, Ctrl and Alt are modifier keys that change the action of another key. The others perform their own action.
- Q15. Answer: (A) Toggle keys** Easy · CA-16-15
Caps Lock and Num Lock are examples of:
A toggle key switches a mode on and off with each press.
- Q16. Answer: (C) The character to the left of the cursor** Medium · CA-16-16
The Backspace key deletes:
Backspace removes the character before the cursor, whereas the Delete key removes the one after it.
- Q17. Answer: (A) Esc** Easy · CA-16-17
Which key cancels the current operation or closes a menu?
Esc means escape; it backs out of the current action.
- Q18. Answer: (D) Shift+F5 or Ctrl+Shift+R** Medium · CA-16-18
In Google Chrome on Windows or Linux, which shortcut reloads the page while ignoring cached content?
Chrome documents Shift+F5 or Ctrl+Shift+R for reloading while ignoring cached content. Ctrl+F5 moves focus to the address bar in Chrome, so it is not the correct answer to this question.
- Q19. Answer: (C) Windows key + Shift + S** Medium · CA-16-19
Which key combination captures part of the screen in recent versions of Windows?
Win+Shift+S opens the snipping tool. Print Screen copies the whole screen.
- Q20. Answer: (B) Ctrl + A** Easy · CA-16-20
Which shortcut selects all the content in a document or folder?
A stands for All. Ctrl+S saves, Ctrl+E centres text in Office and Ctrl+O opens a file.

CHAPTER 17

Emerging Technologies and Digital India

This chapter covers AI, blockchain, IoT, 5G and other new technologies, and the main Digital India initiatives and payment systems. Questions here depend on facts that can change, so confirm the latest details from official sources.

17.1 Artificial intelligence and machine learning

- Artificial intelligence (AI) is the ability of a machine to do tasks that normally need human intelligence, such as understanding speech, recognising images and making decisions.
- Machine learning (ML) is a part of AI in which a system learns patterns from data instead of being given fixed rules. Deep learning is a part of ML that uses many-layered neural networks.
- Natural language processing (NLP) lets computers work with human language, as in translation and chatbots. Generative AI creates new text, images, audio or code from a prompt. The Turing test asks whether a machine can converse so well that a person cannot tell it from a human.
- An algorithm used in AI can inherit bias from its training data, so fairness, privacy and accountability are important concerns.

17.2 Other emerging technologies

Technology	What it is
Internet of Things (IoT)	Everyday objects with sensors connected to the Internet.
Blockchain	A shared, tamper-resistant record of transactions kept as linked blocks across many computers. It is the technology behind cryptocurrencies such as Bitcoin.
Cloud computing	Using computing services over the Internet instead of owning the hardware.
Big data	Very large and varied data, described by volume, velocity and variety.
5G	The fifth generation of mobile networks, with higher speed, lower delay and support for many connected devices.
Augmented reality (AR) and virtual reality (VR)	AR adds digital objects to the real view; VR places the user in a fully computer-made world.
Quantum computing	Quantum computing uses qubits whose states can be superpositions of $ 0\rangle$ and $ 1\rangle$. Measurement produces a classical result, and quantum algorithms can offer speedups for specific problems.
Robotics	Design and use of robots that sense, decide and act.

Technology	What it is
3D printing	Building a solid object layer by layer from a digital design.

17.3 Digital India

Digital India is the Government of India's programme, launched on 1 July 2015, to make government services available electronically and to improve Internet access and digital skills across the country.

Initiative	Purpose
Aadhaar (UIDAI)	A 12-digit unique identity number issued by the Unique Identification Authority of India, which was set up in 2009.
UPI	Unified Payments Interface of NPCI, launched in 2016, for instant bank-to-bank payments through a mobile app.
BHIM	A government-promoted mobile app for UPI payments.
DigiLocker	A cloud service for storing and sharing government-issued documents in digital form.
UMANG	A single mobile app giving access to many government services.
MyGov	A platform for citizens to take part in governance and share ideas.
GeM	Government e-Marketplace, started in 2016, for government purchases of goods and services.
Common Service Centres (CSC)	Village-level centres that deliver digital services to rural citizens.
e-Sign	Signing a document online using Aadhaar-based authentication.

EXAM NOTE

Facts about schemes and apps can change, so check the latest official sources before an examination. The facts above are the long-established ones.

17.4 Digital payments and safety

- Digital payment methods include UPI, mobile wallets, debit and credit cards, net banking, IMPS, NEFT and RTGS. Always check the receiver's name before paying.
- RTGS (Real Time Gross Settlement) is used for large-value transfers that settle one by one in real time. NEFT (National Electronic Funds Transfer) settles in batches.

- E-governance means using information technology to deliver government services. Its benefits are transparency, speed and easier access.

One-minute revision

- AI > ML > deep learning. NLP is language; generative AI creates content.
- Blockchain: linked, tamper-resistant blocks. Big data: volume, velocity, variety. Qubits: quantum.
- AR adds to the real view; VR replaces it.
- Digital India: 1 July 2015. Aadhaar: 12 digits, UIDAI. UPI: NPCI, 2016. GeM: 2016.
- DigiLocker stores documents; UMANG is one app for services; RTGS is for large transfers.

Practice Questions

All questions in this chapter are original GovBabu practice questions written for this book. None of them is presented as a previous-year question. Each question has exactly one correct option. Check your answers only after attempting every question.

Q1. Which of the following best describes artificial intelligence?

- (A) A type of computer memory
 - (B) A kind of printer
 - (C) The ability of machines to perform tasks that normally need human intelligence
 - (D) A method of data compression
-

Q2. Machine learning is best described as:

- (A) A part of AI in which systems learn patterns from data
 - (B) A way of storing data on disks
 - (C) A type of network cable
 - (D) A programming error
-

Q3. Deep learning is a subset of machine learning that uses:

- (A) Only spreadsheets
 - (B) Multi-layered neural networks
 - (C) Only database tables
 - (D) Single-layer logic gates only
-

Q4. NLP in the context of AI stands for:

- (A) Network Layer Protocol
 - (B) New Logic Programming
 - (C) Numerical Linear Processing
 - (D) Natural Language Processing
-

Q5. The technology of a shared, tamper-resistant ledger of transactions kept as linked blocks is called:

- (A) Firewall
 - (B) Spreadsheet
 - (C) Firmware
 - (D) Blockchain
-

Q6. Big data is commonly described by which three Vs?

- (A) Value, voltage and version
 - (B) Volume, velocity and variety
 - (C) Video, voice and vector
 - (D) Virus, vault and view
-

Q7. 5G refers to the:

- (A) Fifth generation of mobile networks
 - (B) Fifth generation of programming languages
 - (C) Fifth generation of computers
 - (D) Fifth version of Windows
-

Q8. A technology that places the user inside a fully computer-generated environment is:

- | | |
|-----------------------|---------------------|
| (A) Augmented reality | (B) Cloud computing |
| (C) Virtual reality | (D) Big data |
-

Q9. Quantum computers use the basic unit of information called a:

- | | |
|------------|------------|
| (A) Pixel | (B) Qubit |
| (C) Nibble | (D) Sector |
-

Q10. The Digital India programme was launched in:

- | | |
|----------|----------|
| (A) 2015 | (B) 2005 |
| (C) 2010 | (D) 2020 |
-

Q11. An Aadhaar number consists of how many digits?

- | | |
|--------|--------|
| (A) 10 | (B) 14 |
| (C) 12 | (D) 16 |
-

Q12. Which organisation issues Aadhaar numbers?

- | | |
|----------|-----------|
| (A) NPCI | (B) SEBI |
| (C) TRAI | (D) UIDAI |
-

Q13. UPI, the system for instant mobile payments in India, is run by:

- | | |
|----------|-----------|
| (A) NPCI | (B) UIDAI |
| (C) ISRO | (D) C-DAC |
-

Q14. Which Indian service lets citizens store and share government-issued documents digitally?

- | | |
|----------------|---------------------------|
| (A) GeM | (B) MyGov |
| (C) DigiLocker | (D) Jan Dhan account only |
-

Q15. The Government e-Marketplace (GeM) is used for:

- (A) Filing income tax returns
 - (B) Booking railway tickets
 - (C) Storing personal documents
 - (D) Government purchase of goods and services
-

Q16. Common Service Centres (CSCs) mainly aim to:

- (A) Manufacture computer chips
 - (B) Deliver digital services to citizens, especially in rural areas
 - (C) Print currency notes
 - (D) Launch satellites
-

Q17. Which method is used for large-value fund transfers that are settled one by one in real time?

- (A) NEFT
 - (B) RTGS
 - (C) ECS
 - (D) Cheque clearing only
-

Q18. E-governance means:

- (A) Making all government offices private
 - (B) Closing government offices
 - (C) Printing government forms on paper only
 - (D) Using information technology to deliver government services
-

Q19. A 3D printer builds an object by:

- (A) Adding material layer by layer from a digital design
 - (B) Cutting a block with a hammer
 - (C) Photocopying a picture
 - (D) Recording sound
-

Q20. Which of the following is a generative AI output?

- (A) A printed ledger
 - (B) A power-supply voltage
 - (C) New text, images or code created from a prompt
 - (D) A disk-format type
-

Answer Key

Q1 C	Q2 A	Q3 B	Q4 D	Q5 D
Q6 B	Q7 A	Q8 C	Q9 B	Q10 A
Q11 C	Q12 D	Q13 A	Q14 C	Q15 D
Q16 B	Q17 B	Q18 D	Q19 A	Q20 C

Answers and Explanations

- Q1. Answer: (C) The ability of machines to perform tasks that normally need human intelligence** Easy · CA-17-01
Which of the following best describes artificial intelligence?
AI covers tasks such as understanding speech and recognising images. The other options are unrelated to it.
- Q2. Answer: (A) A part of AI in which systems learn patterns from data** Medium · CA-17-02
Machine learning is best described as:
ML systems improve from data rather than following only fixed rules.
- Q3. Answer: (B) Multi-layered neural networks** Medium · CA-17-03
Deep learning is a subset of machine learning that uses:
Deep means many layers in the neural network.
- Q4. Answer: (D) Natural Language Processing** Medium · CA-17-04
NLP in the context of AI stands for:
NLP lets computers handle human language, as in translation and chatbots.
- Q5. Answer: (D) Blockchain** Medium · CA-17-05
The technology of a shared, tamper-resistant ledger of transactions kept as linked blocks is called:
Blockchain underlies cryptocurrencies such as Bitcoin.
- Q6. Answer: (B) Volume, velocity and variety** Medium · CA-17-06
Big data is commonly described by which three Vs?
The three Vs are the amount, the speed and the variety of the data.
- Q7. Answer: (A) Fifth generation of mobile networks** Easy · CA-17-07
5G refers to the:
5G is the mobile network generation after 4G, with higher speed and lower delay.
- Q8. Answer: (C) Virtual reality** Medium · CA-17-08
A technology that places the user inside a fully computer-generated environment is:
VR replaces the real view; AR adds digital objects to it.
- Q9. Answer: (B) Qubit** Medium · CA-17-09
Quantum computers use the basic unit of information called a:
A qubit can be in a superposition of $|0\rangle$ and $|1\rangle$; measurement yields a classical result. Quantum algorithms may speed up certain problems, but not every problem. A pixel, nibble and sector are classical computing concepts.

- Q10. Answer: (A) 2015** Easy · CA-17-10
The Digital India programme was launched in:
It was launched on 1 July 2015.
- Q11. Answer: (C) 12** Medium · CA-17-11
An Aadhaar number consists of how many digits?
Aadhaar is a 12-digit number issued by UIDAI. A 10-digit number is typical of a mobile number and 16 digits of a card.
- Q12. Answer: (D) UIDAI** Medium · CA-17-12
Which organisation issues Aadhaar numbers?
UIDAI is the Unique Identification Authority of India. NPCI runs UPI, SEBI regulates securities and TRAI regulates telecom.
- Q13. Answer: (A) NPCI** Medium · CA-17-13
UPI, the system for instant mobile payments in India, is run by:
The National Payments Corporation of India built and runs UPI. UIDAI handles Aadhaar and C-DAC builds computing systems.
- Q14. Answer: (C) DigiLocker** Easy · CA-17-14
Which Indian service lets citizens store and share government-issued documents digitally?
DigiLocker is a document storage service. GeM is a procurement portal and MyGov is a citizen-participation platform.
- Q15. Answer: (D) Government purchase of goods and services** Medium · CA-17-15
The Government e-Marketplace (GeM) is used for:
GeM is the public procurement portal for government buyers.
- Q16. Answer: (B) Deliver digital services to citizens, especially in rural areas** Medium · CA-17-16
Common Service Centres (CSCs) mainly aim to:
CSCs are village-level access points for digital government and other services.
- Q17. Answer: (B) RTGS** Medium · CA-17-17
Which method is used for large-value fund transfers that are settled one by one in real time?
RTGS is real-time gross settlement. NEFT settles in batches.
- Q18. Answer: (D) Using information technology to deliver government services** Easy · CA-17-18
E-governance means:
E-governance uses digital means to make services faster, more transparent and easier to reach.
- Q19. Answer: (A) Adding material layer by layer from a digital design** Easy · CA-17-19
A 3D printer builds an object by:
This additive process is why it is also called additive manufacturing.
- Q20. Answer: (C) New text, images or code created from a prompt** Medium · CA-17-20
Which of the following is a generative AI output?
Generative AI produces new content rather than only analysing existing data.

CHAPTER 18

Programming Basics and Common Abbreviations

This chapter covers algorithms, flowcharts, programming concepts, well-known languages, object-oriented ideas and data structures, and ends with a table of common abbreviations. Learn the creators of the languages and the full forms by repeated revision.

18.1 Algorithms and flowcharts

An algorithm is a finite, step-by-step set of instructions for solving a problem. A good algorithm is clear, finite and gives the correct output. Pseudocode writes an algorithm in plain, language-like statements, and a flowchart draws it with symbols.

Flowchart symbol	Meaning
Oval (terminator)	Start or end
Parallelogram	Input or output
Rectangle	Process or calculation
Diamond	Decision (yes or no)
Arrow	Direction of flow
Small circle	Connector

18.2 Programming concepts

- A variable is a named place in memory that holds a value that may change. A constant holds a value that does not change.
- Common data types are integer (whole numbers), float (numbers with a decimal part), character, string (text) and boolean (true or false).
- The three basic control structures are sequence (steps one after another), selection (if-else decisions) and iteration (loops such as for and while).
- An array is a collection of items of the same type stored one after another and reached by an index. In most languages the index starts at 0, so the first element of an array `a` is `a[0]`.
- A function (or procedure) is a named block of code that does one job and can be used again. Recursion means a function calling itself.

18.3 Programming languages

Language	Known for
FORTRAN	One of the first high-level languages (1957), for scientific calculation.
COBOL	Business and banking applications.
BASIC	Simple language for beginners.
C	Created by Dennis Ritchie at Bell Labs in the early 1970s; used for system software.
C++	Extends C with object-oriented features; created by Bjarne Stroustrup.
Java	Object-oriented and platform-independent; developed by James Gosling at Sun Microsystems.
Python	Easy to read, widely used in data science and AI; created by Guido van Rossum.
JavaScript	Adds behaviour to web pages in the browser.
SQL	Queries relational databases.

18.4 Object-oriented programming and data structures

- A stack follows LIFO (last in, first out); push adds an item and pop removes the top item. A queue follows FIFO (first in, first out). A linked list connects nodes through pointers. A tree is a hierarchy of nodes, and a graph is a set of nodes joined by edges.

Concept	Meaning
Class	A blueprint that describes the data and behaviour of a kind of object.
Object	An instance of a class.
Encapsulation	Bundling data and its methods together and hiding internal details.
Inheritance	A class takes over the features of another class.
Polymorphism	The same name or operation behaves differently in different situations.
Abstraction	Showing only essential features and hiding the complexity.

18.5 Common abbreviations

Short form	Full form	Short form	Full form
BIOS	Basic Input Output System	GUI	Graphical User Interface
CMOS	Complementary Metal Oxide Semiconductor	CLI	Command Line Interface
LCD	Liquid Crystal Display	IDE	Integrated Development Environment
LED	Light Emitting Diode	API	Application Programming Interface

Short form	Full form	Short form	Full form
PDF	Portable Document Format	JPEG	Joint Photographic Experts Group
GIF	Graphics Interchange Format	PNG	Portable Network Graphics
MP3	MPEG Audio Layer 3	ZIP	A common compressed archive format
ISP	Internet Service Provider	VoIP	Voice over Internet Protocol
SIM	Subscriber Identity Module	GPS	Global Positioning System
HDD	Hard Disk Drive	SSD	Solid State Drive
DVD	Digital Versatile Disc	PIN	Personal Identification Number
OTP	One-Time Password	UPS	Uninterruptible Power Supply

One-minute revision

- Oval = start/end; parallelogram = input/output; rectangle = process; diamond = decision.
- Array index starts at 0. Control structures: sequence, selection, iteration.
- C: Ritchie. C++: Stroustrup. Java: Gosling. Python: van Rossum.
- OOP: class, object, encapsulation, inheritance, polymorphism, abstraction.
- Stack is LIFO; queue is FIFO. Learn the common full forms.

Practice Questions

All questions in this chapter are original GovBabu practice questions written for this book. None of them is presented as a previous-year question. Each question has exactly one correct option. Check your answers only after attempting every question.

Q1. A finite, step-by-step set of instructions for solving a problem is called an:

- | | |
|----------------------|---------------|
| (A) Operating system | (B) Algorithm |
| (C) Protocol | (D) Database |
-

Q2. In a flowchart, which symbol represents a decision?

- | | |
|-------------------|-------------|
| (A) Rectangle | (B) Oval |
| (C) Parallelogram | (D) Diamond |
-

Q3. In a flowchart, which symbol marks the start or end?

- | | |
|---------------|-------------|
| (A) Oval | (B) Diamond |
| (C) Rectangle | (D) Arrow |
-

Q4. A parallelogram in a flowchart is used for:

- | | |
|---------------------|-------------------|
| (A) A decision | (B) A calculation |
| (C) Input or output | (D) A connector |
-

Q5. A named place in memory that holds a value that can change is called a:

- | | |
|--------------|--------------|
| (A) Constant | (B) Compiler |
| (C) Variable | (D) Comment |
-

Q6. Which data type stores only true or false values?

- | | |
|-------------|-------------|
| (A) Boolean | (B) Integer |
| (C) String | (D) Float |
-

Q7. Which of the following is NOT a basic control structure?

- | | |
|---------------|-----------------|
| (A) Sequence | (B) Selection |
| (C) Iteration | (D) Compilation |
-

Q8. In most programming languages, the first element of an array named `a` is:

- | | |
|------------------------|------------------------|
| (A) <code>a[1]</code> | (B) <code>a[0]</code> |
| (C) <code>a[-1]</code> | (D) <code>a[10]</code> |
-

Q9. Who created the C programming language?

- | | |
|-----------------------|--------------------|
| (A) Bjarne Stroustrup | (B) James Gosling |
| (C) Guido van Rossum | (D) Dennis Ritchie |
-

Q10. Who developed the C++ language?

- | | |
|--------------------|-----------------------|
| (A) Dennis Ritchie | (B) Bjarne Stroustrup |
| (C) James Gosling | (D) Tim Berners-Lee |
-

Q11. Java was developed by:

- | | |
|----------------------|-----------------------|
| (A) Guido van Rossum | (B) Dennis Ritchie |
| (C) James Gosling | (D) Bjarne Stroustrup |
-

Q12. Python was created by:

- | | |
|----------------------|-------------------|
| (A) Guido van Rossum | (B) James Gosling |
| (C) Linus Torvalds | (D) Bill Gates |
-

Q13. Which of the following languages is mainly used to build the structure of web pages?

- | | |
|-----------|-------------|
| (A) HTML | (B) SQL |
| (C) COBOL | (D) FORTRAN |
-

Q14. Which language was designed mainly for business and banking applications?

- | | |
|-------------|----------------|
| (A) FORTRAN | (B) C |
| (C) COBOL | (D) JavaScript |
-

Q15. In object-oriented programming, a blueprint from which objects are created is called a:

- | | |
|--------------|-----------|
| (A) Function | (B) Class |
| (C) Array | (D) Loop |
-

Q16. The OOP feature in which one class takes over the properties of another class is:

- | | |
|-------------------|-----------------|
| (A) Encapsulation | (B) Compilation |
| (C) Recursion | (D) Inheritance |
-

Q17. Bundling data with its methods and hiding internal details is called:

- | | |
|------------------|-------------------|
| (A) Polymorphism | (B) Encapsulation |
| (C) Inheritance | (D) Iteration |
-

Q18. A stack follows which principle?

- | | |
|--------------------------------|-------------------------------|
| (A) FIFO (first in, first out) | (B) Random access only |
| (C) Sorted order only | (D) LIFO (last in, first out) |
-

Q19. A queue follows which principle?

- | | |
|--------------------------------|-------------------------------|
| (A) FIFO (first in, first out) | (B) LIFO (last in, first out) |
| (C) LIFO only | (D) Random removal |
-

Q20. What is the full form of BIOS?

- | | |
|----------------------------------|-------------------------------------|
| (A) Binary Input Output Software | (B) Basic Internal Operating System |
| (C) Basic Input Output System | (D) Base Integrated Output Stage |
-

Answer Key

Q1 B	Q2 D	Q3 A	Q4 C	Q5 C
Q6 A	Q7 D	Q8 B	Q9 D	Q10 B
Q11 C	Q12 A	Q13 A	Q14 C	Q15 B
Q16 D	Q17 B	Q18 D	Q19 A	Q20 C

Answers and Explanations

- Q1. Answer: (B) Algorithm** Easy · CA-18-01
 A finite, step-by-step set of instructions for solving a problem is called an:
 An algorithm is the logic of a solution. The other options are unrelated to it.
- Q2. Answer: (D) Diamond** Easy · CA-18-02
 In a flowchart, which symbol represents a decision?
 A diamond has yes and no branches. A rectangle is a process, an oval is start or end and a parallelogram is input or output.
- Q3. Answer: (A) Oval** Easy · CA-18-03
 In a flowchart, which symbol marks the start or end?
 The oval is the terminator symbol. An arrow only shows the direction of flow.
- Q4. Answer: (C) Input or output** Medium · CA-18-04
 A parallelogram in a flowchart is used for:
 Reading data in and displaying results are shown with a parallelogram.
- Q5. Answer: (C) Variable** Easy · CA-18-05
 A named place in memory that holds a value that can change is called a:
 A variable's value may change while the program runs. A constant's value stays fixed.
- Q6. Answer: (A) Boolean** Easy · CA-18-06
 Which data type stores only true or false values?
 A boolean has two possible values. An integer holds whole numbers, a string holds text and a float holds decimals.
- Q7. Answer: (D) Compilation** Medium · CA-18-07
 Which of the following is NOT a basic control structure?
 The three structures are sequence, selection and iteration. Compilation is the translation of code.
- Q8. Answer: (B) a[0]** Medium · CA-18-08
 In most programming languages, the first element of an array named a is:
 Indexing starts at zero. In many languages a[-1] means the last element.
- Q9. Answer: (D) Dennis Ritchie** Easy · CA-18-09
 Who created the C programming language?
 Ritchie created C at Bell Labs. Stroustrup made C++, Gosling made Java and van Rossum made Python.

- Q10. Answer: (B) Bjarne Stroustrup** Medium · CA-18-10
Who developed the C++ language?
Stroustrup added classes and objects to C.
- Q11. Answer: (C) James Gosling** Medium · CA-18-11
Java was developed by:
Gosling led the Java team at Sun Microsystems.
- Q12. Answer: (A) Guido van Rossum** Medium · CA-18-12
Python was created by:
Van Rossum released Python in 1991. Torvalds created the Linux kernel.
- Q13. Answer: (A) HTML** Easy · CA-18-13
Which of the following languages is mainly used to build the structure of web pages?
HTML marks up page content. SQL queries databases, COBOL serves business and FORTRAN serves science.
- Q14. Answer: (C) COBOL** Easy · CA-18-14
Which language was designed mainly for business and banking applications?
COBOL stands for Common Business-Oriented Language.
- Q15. Answer: (B) Class** Medium · CA-18-15
In object-oriented programming, a blueprint from which objects are created is called a:
A class describes the data and behaviour, and each object is an instance of it.
- Q16. Answer: (D) Inheritance** Medium · CA-18-16
The OOP feature in which one class takes over the properties of another class is:
Inheritance lets a child class reuse the features of a parent class.
- Q17. Answer: (B) Encapsulation** Medium · CA-18-17
Bundling data with its methods and hiding internal details is called:
Encapsulation protects the data inside an object. Polymorphism is about one name behaving differently.
- Q18. Answer: (D) LIFO (last in, first out)** Easy · CA-18-18
A stack follows which principle?
A stack removes the most recently added item first, like a pile of plates. A queue follows FIFO.
- Q19. Answer: (A) FIFO (first in, first out)** Easy · CA-18-19
A queue follows which principle?
A queue serves items in the order they arrived, like people waiting in a line.
- Q20. Answer: (C) Basic Input Output System** Medium · CA-18-20
What is the full form of BIOS?
BIOS is the start-up firmware that prepares the hardware and starts the operating system.