

IPU CET 2023 BCA Question Paper with Solutions

Time Allowed :2 Hours	Maximum Marks :240	Total Questions :150
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General Instructions

1. The test is of 2 hours duration.
2. The question paper consists of a total of 150 questions.
3. The question paper has four sections: Quantitative Ability, Data Interpretation, Logical Reasoning, and General Awareness, with 37-40 questions each depending on the section.
4. Each correct answer carries 4 marks.
5. For each incorrect answer, 1 mark will be deducted as negative marking.
6. There is no negative marking for unattempted questions.

1. The two kinds of main memory are:

- (A) ROM and RAM
- (B) primary and secondary
- (C) floppy disk and hard disk
- (D) direct and sequential

Correct Answer: (A) ROM and RAM

Solution:

Step 1: Understanding the Concept:

Main memory, also known as primary memory, refers to the computer memory that is directly accessed by the CPU.

Step 2: Key Formula or Approach:

Fact Recall: Identify the specific types of memory that classify as main memory in computer architecture.

Step 3: Detailed Explanation:

The main memory is divided into two major types: Random Access Memory (RAM) and Read-Only Memory (ROM).

RAM is volatile and stores data temporarily while the computer is running.

ROM is non-volatile and permanently stores essential startup instructions like the BIOS.

Step 4: Final Answer:

The two kinds of main memory are ROM and RAM.

💡 Quick Tip

Always associate "Main Memory" directly with RAM and ROM. Other options like hard disks are secondary storage.

2. In computer terminology, what is the full form of RAM?

- (A) Random Access Memory
- (B) Repeated Access Memory
- (C) Rapid Access Memory
- (D) Regular Access Memory

Correct Answer: (A) Random Access Memory

Solution:

Step 1: Understanding the Concept:

RAM is a hardware device that allows information to be stored and retrieved on a computer.

Step 2: Key Formula or Approach:

Fact Recall: Recognize standard computer acronyms.

Step 3: Detailed Explanation:

RAM stands for Random Access Memory.

It is called "Random Access" because any storage location can be accessed directly, regardless of its physical position, allowing for extremely fast data read and write speeds.

Step 4: Final Answer:

The full form is Random Access Memory.

 Quick Tip

"Random Access" contrasts with "Sequential Access" (like magnetic tapes), meaning data is accessed instantly anywhere on the chip.

3. Permanent instructions that the computer use when it is turned ON and t changed by other instructions are contained in:

- (A) ROM
- (B) RAM
- (C) ALU
- (D) SRAM

Correct Answer: (A) ROM

Solution:

Step 1: Understanding the Concept:

When a computer boots up, it needs a permanent set of instructions that cannot be modified or erased by standard operations.

Step 2: Key Formula or Approach:

Fact Recall: Identify non-volatile memory responsible for booting.

Step 3: Detailed Explanation:

ROM (Read-Only Memory) stores the BIOS/firmware, which provides the permanent instructions needed to turn on the computer.

Unlike RAM, ROM retains its data even when the power is turned off and is not easily modified (hence "not changed" in the question implies "not changed").

Step 4: Final Answer:

These permanent instructions are contained in ROM.

💡 Quick Tip

ROM contains the BIOS (Basic Input/Output System) responsible for the POST (Power-On Self Test) sequence.

4. What is the full form of PROM?

- (A) Programmable Read Only Memory
- (B) Program Read Output Memory
- (C) Program Read Only Memory
- (D) Primary Read Only Memory

Correct Answer: (A) Programmable Read Only Memory

Solution:

Step 1: Understanding the Concept:

ROM chips come in different variations depending on how they are programmed.

Step 2: Key Formula or Approach:

Fact Recall: Expand standard memory abbreviations.

Step 3: Detailed Explanation:

PROM stands for Programmable Read-Only Memory.

It is a type of memory chip that is manufactured blank and can be programmed once by the user using a special device.

Once programmed, the data is permanent and cannot be erased.

Step 4: Final Answer:

The full form is Programmable Read Only Memory.

💡 Quick Tip

Remember related terms: EPROM (Erasable Programmable ROM) and EEPROM (Electrically Erasable Programmable ROM).

5. Which of the following acts as a buffer between the CPU and the main memory

- (A) primary memory
- (B) cache memory
- (C) secondary memory
- (D) RAM

Correct Answer: (B) cache memory

Solution:

Step 1: Understanding the Concept:

To speed up processing, a fast intermediary memory is needed to bridge the speed gap between the ultra-fast CPU and the slower main memory (RAM).

Step 2: Key Formula or Approach:

Logical Deduction: Identify the memory hierarchy level situated directly next to the CPU.

Step 3: Detailed Explanation:

Cache memory acts as a high-speed buffer.

It temporarily stores frequently used instructions and data so the CPU can access them much faster than fetching them from RAM every time.

Step 4: Final Answer:

Cache memory acts as the buffer between the CPU and main memory.

 Quick Tip

Cache memory operates on the Principle of Locality, keeping recently or frequently used data closest to the processor.

6. The storage device used to compensate for the difference in rates of flow from one device to another is termed as:

- (A) chip
- (B) channel
- (C) floppy
- (D) buffer

Correct Answer: (D) buffer

Solution:

Step 1: Understanding the Concept:

Different computer components transfer data at vastly different speeds (e.g., CPU vs. Printer).

Step 2: Key Formula or Approach:

Fact Recall: Identify the computing term for temporary data holding areas used for speed matching.

Step 3: Detailed Explanation:

A buffer is a region of physical memory storage used to temporarily store data while it is being moved.

It compensates for speed differences, ensuring that a fast device doesn't have to wait idly while

sending data to a slower device.

Step 4: Final Answer:

The correct term is a buffer.

 Quick Tip

Think of streaming a video: the video "buffers" to download a chunk of data so playback remains smooth despite internet speed fluctuations.

7. Which media has the ability to have data/information stored (written) on them by users more than once?

- (A) CD-R discs
- (B) CD-RW discs
- (C) Zip discs
- (D) Optical discs

Correct Answer: (B) CD-RW discs

Solution:

Step 1: Understanding the Concept:

Optical discs have various formatting standards defining whether they are read-only, write-once, or rewritable.

Step 2: Key Formula or Approach:

Logical Deduction: Analyze the abbreviations of the given storage media.

Step 3: Detailed Explanation:

CD-R stands for Compact Disc-Recordable (write once).

CD-RW stands for Compact Disc-ReWritable.

The 'RW' indicates that users can write data, erase it, and rewrite new data multiple times onto the disc.

Step 4: Final Answer:

CD-RW discs allow data to be stored more than once.

 Quick Tip

In media acronyms, "R" is Recordable (Write-Once), and "RW" or "RE" is ReWritable/Recordable-Erasable.

8. The term Bit is short for:

- (A) megabyte
- (B) binary language

- (C) binary digit
- (D) binary number

Correct Answer: (C) binary digit

Solution:

Step 1: Understanding the Concept:

Computers use a base-2 number system to process information.

Step 2: Key Formula or Approach:

Fact Recall: Identify the linguistic origin of the word "Bit".

Step 3: Detailed Explanation:

The word "Bit" is a portmanteau (blend) of the words "Binary digit".

A bit is the smallest unit of data in a computer and has a single binary value, either 0 or 1.

Step 4: Final Answer:

Bit is short for binary digit.

 Quick Tip

8 Bits make 1 Byte, and 4 Bits make 1 Nibble.

9. KiloByte equals how many bytes?

- (A) 1000
- (B) 1035
- (C) 1008
- (D) 1024

Correct Answer: (D) 1024

Solution:

Step 1: Understanding the Concept:

Digital storage sizes are based on the binary numeral system (powers of 2).

Step 2: Key Formula or Approach:

Formula: 1 Unit = 2^{10} of the previous smaller unit.

Step 3: Detailed Explanation:

In computer science, a KiloByte (KB) is traditionally defined using base-2 math rather than the base-10 SI prefix where kilo means 1000.

The exact value is $2^{10} = 1024$.

Therefore, 1 KB = 1024 Bytes.

Step 4: Final Answer:

A KiloByte equals 1024 bytes.

 Quick Tip

Always use 1024 (which is 2^{10}) as the multiplier between standard memory units in computing exams unless stated otherwise.

10. How many kilobytes make a megabyte?

- (A) 128
- (B) 1024
- (C) 256
- (D) 512

Correct Answer: (B) 1024

Solution:

Step 1: Understanding the Concept:

Memory hierarchy scales up sequentially by factors of a common binary multiplier.

Step 2: Key Formula or Approach:

Formula: $1 \text{ MB} = 2^{10} \text{ KB}$.

Step 3: Detailed Explanation:

Just as there are 1024 bytes in a kilobyte, there are 1024 kilobytes in a megabyte.

The progression is: $1 \text{ MB} = 1024 \text{ KB}$.

Step 4: Final Answer:

1024 kilobytes make a megabyte.

 Quick Tip

Sequence: Byte $\rightarrow$ KB $\rightarrow$ MB $\rightarrow$ GB $\rightarrow$ TB. The conversion factor between adjacent units is always 1024.

11. The term 'gigabyte' refers to:

- (A) 1024 byte
- (B) 1024 kilobyte
- (C) 1024 megabyte
- (D) 1024 gigabyte

Correct Answer: (C) 1024 megabyte

Solution:

Step 1: Understanding the Concept:

A gigabyte is the next tier of memory storage above a megabyte.

Step 2: Key Formula or Approach:

Formula: $1 \text{ GB} = 2^{10} \text{ MB}$.

Step 3: Detailed Explanation:

Following the binary multiplier rule, each unit is 1024 times the smaller unit.

Therefore, 1 Gigabyte (GB) = 1024 Megabytes (MB).

Step 4: Final Answer:

The term gigabyte refers to 1024 megabytes.

 Quick Tip

It helps to memorize the exact hierarchy: $1 \text{ GB} = 1024 \text{ MB} = 1024 \times 1024 \text{ KB} = 1024 \times 1024 \times 1024 \text{ Bytes}$.

12. Which of the following is an octal number equal to decimal number $(896)_{16}$?

- (A) 0061
- (B) 6001
- (C) 1006
- (D) 1600

Correct Answer: (D) 1600

Solution:

Step 1: Understanding the Concept:

We need to convert a given number into the octal (base-8) system.

Step 2: Key Formula or Approach:

Method: Convert the decimal number to base-8 by repeated division by 8.

Step 3: Detailed Explanation:

Although the question writes $(896)_{16}$ indicating hexadecimal notation visually, the text explicitly says "decimal number 896". We will treat 896 as a base-10 integer, $(896)_{10}$, as implied by the wording and available options.

We divide 896 by 8 and record the remainders:

$$896 \div 8 = 112 \quad \text{Remainder: } 0$$

$$112 \div 8 = 14 \quad \text{Remainder: } 0$$

$$14 \div 8 = 1 \quad \text{Remainder: } 6$$

$$1 \div 8 = 0 \quad \text{Remainder: } 1$$

Reading the remainders from bottom to top, we get $(1600)_8$.

Step 4: Final Answer:

The octal equivalent is 1600.

 Quick Tip

Always double-check base conversions by converting back: $1(8^3) + 6(8^2) + 0(8^1) + 0(8^0) = 512 + 6(64) = 512 + 384 = 896$.

13. The most widely used code that represents each character as a unique 8-bit code is:

- (A) ASCII
- (B) UNICODE
- (C) BCD
- (D) All of the above

Correct Answer: (A) ASCII

Solution:

Step 1: Understanding the Concept:

Computers use character encoding systems to translate human-readable characters into binary codes.

Step 2: Key Formula or Approach:

Fact Recall: Identify standard 8-bit encoding schemes.

Step 3: Detailed Explanation:

While standard ASCII is a 7-bit code representing 128 characters, Extended ASCII uses 8 bits to represent 256 characters and is extremely widespread in basic computing.

BCD (Binary Coded Decimal) typically uses 4 bits per decimal digit.

UNICODE is much larger (often 16-bit or 32-bit, or variable-length like UTF-8) to encompass all global languages.

Therefore, in the context of standard fundamental computing questions, Extended ASCII is referenced as the primary 8-bit character code.

Step 4: Final Answer:

The most widely used 8-bit code here is ASCII.

 Quick Tip

ASCII stands for American Standard Code for Information Interchange. Extended ASCII strictly uses 8 bits.

14. Two inputs A and B of NAND gate have 0 output, if:

- (A) A is 0
- (B) B is 0
- (C) Both are zero
- (D) Both are 1

Correct Answer: (D) Both are 1

Solution:

Step 1: Understanding the Concept:

A NAND gate is a universal logic gate which produces an output that is false (0) only if all its inputs are true (1).

Step 2: Key Formula or Approach:

Boolean Logic: Output = $\overline{A \cdot B}$.

Step 3: Detailed Explanation:

Let's evaluate the truth table for a NAND gate:

- If $A = 0, B = 0 \implies A \cdot B = 0 \implies \text{NAND} = 1$.
- If $A = 0, B = 1 \implies A \cdot B = 0 \implies \text{NAND} = 1$.
- If $A = 1, B = 0 \implies A \cdot B = 0 \implies \text{NAND} = 1$.
- If $A = 1, B = 1 \implies A \cdot B = 1 \implies \text{NAND} = 0$.

Thus, the output is 0 only when both inputs A and B are 1.

Step 4: Final Answer:

The output is 0 if both are 1.

💡 Quick Tip

A NAND gate is simply an AND gate followed by a NOT gate. Since AND is 1 only when both inputs are 1, NAND is 0 only when both inputs are 1.

15. Which of the following are known as universal gates?

- (A) NAND and NOR
- (B) AND and OR
- (C) XOR and OR
- (D) AND

Correct Answer: (A) NAND and NOR

Solution:

Step 1: Understanding the Concept:

A universal gate is a logic gate that can be used to implement any other Boolean function without needing any other type of gate.

Step 2: Key Formula or Approach:

Fact Recall: Identify the specific gates that possess functional completeness in digital logic.

Step 3: Detailed Explanation:

The NAND and NOR gates are universal gates.

By combining only NAND gates (or only NOR gates), you can construct an AND, OR, NOT, or any other logic circuit.

AND and OR gates are basic gates but cannot function universally on their own (they lack inversion capability).

Step 4: Final Answer:

NAND and NOR are known as universal gates.

💡 Quick Tip

To remember this, notice that both universal gates (NAND, NOR) begin with the letter 'N', indicating they have built-in inversion (NOT functionality), which is essential for universality.

16. If A represents '1' and o represents '0'. What will be the one's complement of oΔΔooΔ ?

- (A) 011001
- (B) 100110
- (C) 101010
- (D) 000000

Correct Answer: (B) 100110

Solution:**Step 1: Understanding the Concept:**

One's complement of a binary number is obtained by flipping all its bits (changing every 0 to a 1, and every 1 to a 0).

Step 2: Key Formula or Approach:

Bitwise operation: Invert the translated binary string.

Step 3: Detailed Explanation:

First, decode the string based on the given rules. The question says "A represents 1", but the string uses the symbol Δ. We infer that Δ represents 1, as it's a common typo or substitution in the paper.

Given string: oΔΔooΔ

Translate to binary: 011001

Now, calculate the one's complement by inverting each bit:

0 → 1

1 → 0

1 → 0

0 → 1

0 → 1

1 → 0

The resulting binary string is 100110.

Step 4: Final Answer:

The one's complement is 100110.

💡 Quick Tip

Always translate symbols to binary first before performing bitwise operations to avoid confusion.

17. A collection of various programs that helps to control your computer is called:

- (A) system software
- (B) application software
- (C) Microsoft Excel
- (D) Microsoft Word

Correct Answer: (A) system software

Solution:**Step 1: Understanding the Concept:**

Software is broadly categorized into system software and application software.

Step 2: Key Formula or Approach:

Fact Recall: Define the purpose of system software.

Step 3: Detailed Explanation:

System software is designed to manage and control computer hardware and provide a platform for running application software.

It includes operating systems, device drivers, and utility programs.

Application software (like Excel and Word) performs specific tasks for the user, not control operations for the computer hardware.

Step 4: Final Answer:

This collection of programs is called system software.

💡 Quick Tip

System software serves as the interface between hardware and the user/applications.

18. Operating system is a:

- (A) application software
- (B) system software
- (C) hardware
- (D) language

Correct Answer: (B) system software

Solution:

Step 1: Understanding the Concept:

An Operating System (OS) manages all the other programs in a computer.

Step 2: Key Formula or Approach:

Categorization: Classify the OS into the correct computing component category.

Step 3: Detailed Explanation:

The OS (like Windows, Linux, or macOS) is the core example of system software.

It controls hardware resources, handles memory management, manages processes, and provides common services for computer programs.

It is not hardware (physical components) and not application software (user-specific tasks).

Step 4: Final Answer:

An operating system is system software.

 Quick Tip

The OS is the most important piece of system software running on any computer.

19. A kind of system software, which is responsible for loading and relocating of the executable program in the main memory is:

- (A) loader
- (B) linker
- (C) translator
- (D) presentation software

Correct Answer: (A) loader

Solution:

Step 1: Understanding the Concept:

For a program to execute, it must be placed into the main memory (RAM).

Step 2: Key Formula or Approach:

Fact Recall: Identify the specific system utility responsible for memory placement.

Step 3: Detailed Explanation:

A **loader** is the part of an operating system that is responsible for loading programs and libraries into memory, preparing them for execution.

A **linker** combines multiple object files into a single executable, but doesn't place it in memory.

A **translator** (compiler/interpreter) converts high-level code to machine code.

Step 4: Final Answer:

The software responsible is the loader.

 Quick Tip

Linkers "link" files together on the disk; Loaders "load" the linked executable into RAM.

20. Application software:

- (A) is used to control the operating system
- (B) is designed to help programmers
- (C) performs specific task for computer users
- (D) is used for making design only

Correct Answer: (C) performs specific task for computer users

Solution:

Step 1: Understanding the Concept:

Software exists to either run the machine (System Software) or serve the user (Application Software).

Step 2: Key Formula or Approach:

Definition Matching: Identify the primary function of application software.

Step 3: Detailed Explanation:

Application software (often just called an "app") is a program or group of programs designed for end-users to perform specific tasks.

Examples include word processors, web browsers, and media players.

They do not control the OS (that is system software's job) and are not exclusively for design or helping programmers.

Step 4: Final Answer:

Application software performs specific tasks for computer users.

 Quick Tip

If you use it to do your work or play a game, it's Application Software. If it runs in the background to keep the PC working, it's System Software.

21. Which among the following is not an example of system software?

- (A) Operating System
- (B) Debugger
- (C) Software Driver
- (D) Adobe Photoshop

Correct Answer: (D) Adobe Photoshop

Solution:**Step 1: Understanding the Concept:**

Differentiating between system management tools and user productivity applications.

Step 2: Key Formula or Approach:

Process of Elimination: Identify which option is an application software.

Step 3: Detailed Explanation:

Operating Systems, Debuggers (tools used by programmers to test and debug system/app code), and Software Drivers (which tell the OS how to communicate with hardware) fall under the broad category of system or programming software.

Adobe Photoshop, however, is an image editing application designed specifically for user tasks.

Step 4: Final Answer:

Adobe Photoshop is not system software.

💡 Quick Tip

Commercial products aimed at creatives or office workers (like Photoshop, MS Word) are almost exclusively Application Software.

22. Example(s) of open-source software is/are:

- (A) Linux
- (B) Unix
- (C) MySQL
- (D) All of these

Correct Answer: (D) All of these

Solution:**Step 1: Understanding the Concept:**

Open-source software is software with source code that anyone can inspect, modify, and enhance.

Step 2: Key Formula or Approach:

Fact Recall: Check the licensing models of the given software options.

Step 3: Detailed Explanation:

Linux is the most famous example of open-source software.

MySQL is a widely used open-source relational database management system.

Unix, historically proprietary, has many open-source distributions and variants (like Free BSD, and historically influenced open-source heavily). In multiple-choice contexts like this, it is frequently grouped into the open-source legacy family when presented alongside Linux and MySQL, making "All of these" the intended answer.

Step 4: Final Answer:

All of these are considered examples in this context.

💡 Quick Tip

Whenever Linux and MySQL appear together as open-source examples, "All of the above" is highly likely the intended answer in standard introductory IT exams.

23. Which of the following is the correct reason to use an operating system?

- (A) To manage resources
- (B) To control the hardware
- (C) To provide an interface between the hardware and user
- (D) All of the above

Correct Answer: (D) All of the above

Solution:

Step 1: Understanding the Concept:

The Operating System is a multi-functional layer of software required for a computer to operate effectively.

Step 2: Key Formula or Approach:

Logical Deduction: Evaluate the primary roles of an OS.

Step 3: Detailed Explanation:

An OS performs several critical functions:

It manages system resources (CPU time, memory space, file storage).

It controls hardware peripherals (printers, disk drives) through drivers.

It provides a User Interface (UI), either graphical (GUI) or command-line (CLI), allowing humans to interact with the underlying hardware seamlessly.

Step 4: Final Answer:

All of the above are correct reasons.

💡 Quick Tip

The three main goals of an OS are Convenience (UI), Efficiency (Resource Management), and Ability to Evolve.

24. Which of the following is an operating system?

- (A) Linux
- (B) Debugger
- (C) Mozilla
- (D) Google Chrome

Correct Answer: (A) Linux

Solution:**Step 1: Understanding the Concept:**

Identify which of the given software programs functions as the core system software.

Step 2: Key Formula or Approach:

Fact Recall: Distinguish OS names from web browsers and programming tools.

Step 3: Detailed Explanation:

Linux is an open-source operating system kernel.

Mozilla (Firefox) and Google Chrome are web browsers (application software).

A Debugger is a programming tool.

Step 4: Final Answer:

Linux is the operating system.

💡 Quick Tip

Common operating systems to memorize: Windows, macOS, Linux, Unix, Android, iOS.

25. Which one of the following is not an operating system?

- (A) Linux
- (B) Unix
- (C) Intel
- (D) Windows

Correct Answer: (C) Intel

Solution:**Step 1: Understanding the Concept:**

Differentiating between software (operating systems) and hardware manufacturers.

Step 2: Key Formula or Approach:

Process of Elimination: Identify the hardware entity.

Step 3: Detailed Explanation:

Linux, Unix, and Windows are all well-known operating systems.

Intel is a multinational corporation and technology company famous for designing and manufacturing microprocessors (CPUs) and hardware, not operating systems.

Step 4: Final Answer:

Intel is not an operating system.

💡 Quick Tip

Intel produces the physical chips (like the Core i5, i7) upon which operating systems run.

26. Which among the following is not a mobile operating system?

- (A) Android
- (B) Safari
- (C) Symbian
- (D) iOS

Correct Answer: (B) Safari

Solution:

Step 1: Understanding the Concept:

Mobile operating systems are specifically designed to run on smartphones and tablets.

Step 2: Key Formula or Approach:

Fact Recall: Differentiate between mobile OS and mobile web browsers.

Step 3: Detailed Explanation:

Android (Google), iOS (Apple), and Symbian (historically used by Nokia) are all operating systems designed for mobile devices.

Safari is Apple's web browser software, which runs *on* operating systems like iOS and macOS, but is not an OS itself.

Step 4: Final Answer:

Safari is not a mobile operating system.

 Quick Tip

Do not confuse Apple's default browser (Safari) with its mobile OS (iOS).

27. Python is a:

- (A) low level language
- (B) high level language
- (C) machine language
- (D) assembly language

Correct Answer: (B) high level language

Solution:

Step 1: Understanding the Concept:

Programming languages are classified by how closely they resemble human language vs machine code.

Step 2: Key Formula or Approach:

Fact Recall: Identify the abstraction level of Python.

Step 3: Detailed Explanation:

Python is characterized by strong abstraction from the details of the computer. It uses natural language elements, making it easier for humans to read and write.

Languages like this are known as High-Level Languages.

Machine language (binary) and assembly language (mnemonics) are Low-Level Languages because they are closely tied to the hardware architecture.

Step 4: Final Answer:

Python is a high level language.

💡 Quick Tip

If a language uses English-like syntax (like 'print', 'if', 'while'), it is a High-Level Language.

28. The central processing unit consist of:

- (A) The arithmetic logic unit
- (B) The registers
- (C) The control unit
- (D) All of the above

Correct Answer: (D) All of the above

Solution:

Step 1: Understanding the Concept:

The CPU is the brain of the computer, composed of several distinct functional sub-units.

Step 2: Key Formula or Approach:

Logical Deduction: Recall the Von Neumann architecture components of a CPU.

Step 3: Detailed Explanation:

A standard CPU consists of three main parts:

1. ALU (Arithmetic Logic Unit) for performing mathematical and logical operations.
2. Control Unit (CU) for fetching instructions and directing data flow.
3. Registers for ultra-fast, temporary storage of intermediate data.

Step 4: Final Answer:

The CPU consists of all of the above.

💡 Quick Tip

CPU = ALU + CU + Registers. Always look for these three core components.

29. The computer keyboard in English normally uses:

- (A) Abcdef base
- (B) QWERTY base
- (C) Asdfg base
- (D) None of the above

Correct Answer: (B) QWERTY base

Solution:

Step 1: Understanding the Concept:

Standard hardware layouts for English language input devices.

Step 2: Key Formula or Approach:

Fact Recall: Identify the universal layout name for English keyboards.

Step 3: Detailed Explanation:

The standard layout of letters on an English computer keyboard is called QWERTY.

The name comes from the first six letters appearing on the top-left row of alphabetic keys (*Q – W – E – R – T – Y*).

It was originally designed for typewriters to prevent mechanical jamming.

Step 4: Final Answer:

It normally uses the QWERTY base.

 Quick Tip

Other layouts exist (like Dvorak or Colemak), but QWERTY is the undisputed standard worldwide for English.

30. Alta Vista is a:

- (A) Virus
- (B) Vista theme
- (C) Windows OS
- (D) Search Engine

Correct Answer: (D) Search Engine

Solution:

Step 1: Understanding the Concept:

Identifying historical Internet services and companies.

Step 2: Key Formula or Approach:

Fact Recall: Recognize the brand name "AltaVista".

Step 3: Detailed Explanation:

AltaVista was an early, highly popular web search engine established in 1995.

It was one of the most widely used search engines before Google rose to dominance. It was eventually acquired by Yahoo! and shut down in 2013.

It is not an operating system, a virus, or related to the Windows Vista UI theme.

Step 4: Final Answer:

Alta Vista is a search engine.

 Quick Tip

Older computing exams frequently test historical tech pioneers like AltaVista, Netscape (Browser), and ARPANET (Early Internet).

31. The forces acting at a point are called as:

- (A) Collinear forces
- (B) Coplanar forces
- (C) Concurrent forces
- (D) Unit forces

Correct Answer: (C) Concurrent forces

Solution:

Step 1: Understanding the Concept:

In mechanics, forces are categorized by how their lines of action interact geometrically.

Step 2: Key Formula or Approach:

Definition Matching: Identify the term for forces intersecting at a single point.

Step 3: Detailed Explanation:

- Collinear forces act along the exact same line.
- Coplanar forces act in the same flat two-dimensional plane.
- Concurrent forces are forces whose lines of action all intersect at a common single point.

Step 4: Final Answer:

They are called concurrent forces.

 Quick Tip

"Concurrent" literal meaning is "meeting at a point". This makes finding the resultant force much easier since there is no rotational moment around that intersection point.

32. What is the distance between the focus and the pole of the mirror known as?

- (A) Centre of Curvature
- (B) Focal length
- (C) Mirror number
- (D) Radius of curvature

Correct Answer: (B) Focal length

Solution:

Step 1: Understanding the Concept:

In optics, spherical mirrors have specific geometrical terms defining their reflective properties.

Step 2: Key Formula or Approach:

Fact Recall: Define the terminology for distances in spherical mirrors. Note: "minor us" is a typographical error in the paper for "mirror is".

Step 3: Detailed Explanation:

The pole (P) is the midpoint of the spherical mirror.

The principal focus (F) is the point where light rays parallel to the principal axis converge after reflection.

The linear distance between the pole and the principal focus is defined as the focal length (f).

Step 4: Final Answer:

This distance is known as focal length.

💡 Quick Tip

The radius of curvature (R) is the distance from the pole to the center of curvature (C). The relationship is $f = R/2$.

33. What can be the maximum number of electrons in a shell, if the principal quantum number is n ?

- (A) n
- (B) n^2
- (C) $2n^2$
- (D) $3n^3$

Correct Answer: (C) $2n^2$

Solution:**Step 1: Understanding the Concept:**

Atomic structure and the distribution of electrons in energy levels (shells).

Step 2: Key Formula or Approach:

Formula: Maximum electrons = $2n^2$.

Step 3: Detailed Explanation:

According to the Bohr-Bury scheme of atomic structure, the maximum number of electrons that can be accommodated in a given energy level (shell) is dictated by the principal quantum number n .

The mathematical formula defining this limit is $2n^2$.

For example:

1st shell ($K, n = 1$): $2(1)^2 = 2$ electrons.

2nd shell ($L, n = 2$): $2(2)^2 = 8$ electrons.

3rd shell ($M, n = 3$): $2(3)^2 = 18$ electrons.

Step 4: Final Answer:

The maximum number is $2n^2$.

💡 Quick Tip

Remember that n^2 gives the number of *orbitals* in a shell, and since each orbital holds 2 electrons (Pauli exclusion principle), the total electrons is $2 \times n^2$.

34. What will be the number of neutrons in an atom having atomic number 35 and mass number 80?

- (A) 35
- (B) 45
- (C) 55
- (D) 80

Correct Answer: (B) 45

Solution:

Step 1: Understanding the Concept:

An atom's mass number is the sum of its protons and neutrons. The atomic number specifies the number of protons.

Step 2: Key Formula or Approach:

Formula: Number of Neutrons = Mass Number(A) – Atomic Number(Z).

Step 3: Detailed Explanation:

Given:

Atomic number (Z , number of protons) = 35

Mass number (A , protons + neutrons) = 80

Using the formula:

$$\text{Neutrons} = 80 - 35 = 45$$

Step 4: Final Answer:

The number of neutrons is 45.

💡 Quick Tip

This specific atom corresponds to Bromine ($^{80}_{35}\text{Br}$). The atomic mass is always the larger number of the two.

35. Who can be associated with the theory of evolution?

- (A) Charles Darwin
- (B) Mendel
- (C) Stanley Miller
- (D) Harold Urey

Correct Answer: (A) Charles Darwin

Solution:

Step 1: Understanding the Concept:

Identify the historical figure foundational to modern evolutionary biology.

Step 2: Key Formula or Approach:

Fact Recall: Match the scientist to their major scientific contribution.

Step 3: Detailed Explanation:

Charles Darwin is famous for proposing the theory of evolution by natural selection in his book "On the Origin of Species" (1859).

Gregor Mendel is associated with the laws of genetics and inheritance.

Stanley Miller and Harold Urey are famous for the Miller-Urey experiment simulating the chemical origin of life on early Earth.

Step 4: Final Answer:

Charles Darwin is associated with the theory of evolution.

💡 Quick Tip

Darwin = Evolution (Natural Selection). Mendel = Genetics (Pea plants).

36. Which of the following hormones is known to be helpful in coping with stress?

- (A) Serotonin
- (B) Calcitonin
- (C) Melatonin
- (D) Testosterone

Correct Answer: (A) Serotonin

Solution:

Step 1: Understanding the Concept:

Hormones and neurotransmitters regulate bodily functions, including mood and stress responses.

Step 2: Key Formula or Approach:

Biological Fact Recall: Identify the functions of the listed hormones.

Step 3: Detailed Explanation:

Serotonin is a key neurotransmitter and hormone that stabilizes our mood, feelings of well-being, and happiness. It helps the body cope with stress and anxiety.

Calcitonin regulates blood calcium levels.

Melatonin regulates the sleep-wake cycle.

Testosterone is the primary male sex hormone.

(Note: While Cortisol is the primary "stress hormone" released during stress, Serotonin is the one listed that helps "cope" with or mitigate stress).

Step 4: Final Answer:

Serotonin is known to be helpful in coping with stress.

 Quick Tip

Serotonin is often called the "happy chemical" because it contributes to wellbeing and happiness.

37. Washing soda is used:

1. for removing permanent hardness of water
2. for disinfecting drinking water
3. as a cleaning agent for domestic purpose

Which of the above is/are correct?

- (A) Only 1 and 2
(B) Only I and 3
(C) Only 2 and 3
(D) All of the above

Correct Answer: (B) Only I and 3

Solution:

Step 1: Understanding the Concept:

Chemical properties and common applications of Sodium Carbonate (Washing Soda).

Step 2: Key Formula or Approach:

Logical Deduction: Evaluate the validity of each statement independently.

Step 3: Detailed Explanation:

Statement 1: True. Washing soda (Na_2CO_3) reacts with calcium and magnesium ions in hard water, precipitating them out and thus removing permanent hardness.

Statement 2: False. Bleaching powder (CaOCl_2) or chlorine is used for disinfecting drinking water, not washing soda.

Statement 3: True. It is widely used as a cleansing agent for domestic purposes like washing clothes.

Therefore, statements 1 and 3 are correct. The option matches as "Only I and 3" (with a typo 'I' instead of '1' in the original paper).

Step 4: Final Answer:

Statements 1 and 3 are correct.

 Quick Tip

Chemical formula for Washing Soda is $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$. Never confuse it with Baking Soda (NaHCO_3).

38. The apparent weight of a man in a lift is less than the real weight when

- (A) the lift is going up with an acceleration
- (B) the lift is going down with uniform speed
- (C) the lift is going up with uniform speed
- (D) the lift is going down with an acceleration

Correct Answer: (D) the lift is going down with an acceleration

Solution:

Step 1: Understanding the Concept:

Apparent weight is the normal force (R) exerted by the floor of the lift on the man.

Step 2: Key Formula or Approach:

Newton's Second Law: $\sum F = ma \implies mg - R = ma$ (when moving downward).

Step 3: Detailed Explanation:

Let real weight be $W = mg$, and apparent weight be R .

When the lift accelerates downwards with acceleration a , the net force equation is:

$$mg - R = ma$$

$$R = mg - ma = m(g - a)$$

Since $R < mg$, the apparent weight is less than the real weight.

If the lift goes up with acceleration, $R - mg = ma \implies R = m(g + a)$ (apparent weight is greater).

If it moves with uniform speed, $a = 0 \implies R = mg$ (apparent weight equals real weight).

Step 4: Final Answer:

The apparent weight is less when the lift goes down with acceleration.

 Quick Tip

Lift accelerating UP $\rightarrow$ You feel HEAVIER. Lift accelerating DOWN $\rightarrow$ You feel LIGHTER.

39. What is the unit for momentum?

- (A) newton second
- (B) joule second
- (C) erg second
- (D) pascal second

Correct Answer: (A) newton second

Solution:

Step 1: Understanding the Concept:

Momentum is defined as the product of mass and velocity.

Step 2: Key Formula or Approach:

Formula: $p = mv$ and Impulse-Momentum Theorem: $\Delta p = F \times \Delta t$.

Step 3: Detailed Explanation:

The standard SI unit derived from $p = mv$ is $\text{kg} \cdot \text{m/s}$.

Using Newton's Second Law, Force $F = \frac{\Delta p}{\Delta t}$, which means $\Delta p = F \times \Delta t$.

The unit of Force is Newton (N), and the unit of time is second (s).

Therefore, another equivalent unit for momentum is the newton second ($N \cdot s$).

Step 4: Final Answer:

The unit for momentum is newton second.

💡 Quick Tip

1 $N \cdot s$ is exactly equal to 1 $\text{kg} \cdot \text{m/s}$. They represent the exact same physical dimension.

40. Which of these indicates the splitting of different colours of light in a prism?

- (A) Reflection of light
- (B) Dispersion of light
- (C) Diffraction of light
- (D) Refraction of light

Correct Answer: (B) Dispersion of light

Solution:

Step 1: Understanding the Concept:

When white light passes through a glass prism, it separates into its constituent spectral colors (VIBGYOR).

Step 2: Key Formula or Approach:

Fact Recall: Identify the specific optical phenomenon responsible for this splitting.

Step 3: Detailed Explanation:

The phenomenon of the splitting of white light into its component colors is called Dispersion. It occurs because different colors of light travel at slightly different speeds inside the glass prism, causing them to bend (refract) at different angles.

While refraction causes the bending, the *splitting* itself is specifically termed dispersion.

Step 4: Final Answer:

This splitting is indicated by the dispersion of light.

 Quick Tip

Rainbows are a natural example of dispersion, occurring when water droplets in the atmosphere act like tiny prisms.

41. Which among the following plays a role in production of alcohol in beer?

- (A) Bacteria
- (B) Protozoan
- (C) Virus
- (D) Yeast

Correct Answer: (D) Yeast

Solution:

Step 1: Understanding the Concept:

The brewing process relies on a biological mechanism called fermentation to convert sugars into alcohol.

Step 2: Key Formula or Approach:

Fact Recall: Identify the microorganism responsible for alcoholic fermentation.

Step 3: Detailed Explanation:

Yeast, specifically *Saccharomyces cerevisiae**, is a single-celled fungus used in the production of beer.

During fermentation, yeast consumes the sugars present in the malted grain and converts them into ethanol (alcohol) and carbon dioxide gas.

Bacteria (except for certain sour beers), protozoans, and viruses are not the primary agents for alcohol production.

Step 4: Final Answer:

Yeast plays the role in the production of alcohol.

 Quick Tip

Yeast undergoes anaerobic respiration (fermentation) to produce Ethanol + CO_2 .

42. What is the name of eye drops designed to improve age-related near-vision problems that are recently approved by the US Food and Drug Administration?

- (A) Vuity
- (B) Vision
- (C) Corneas
- (D) Eye power

Correct Answer: (A) Vuity

Solution:**Step 1: Understanding the Concept:**

Current affairs and recent medical advancements regarding vision correction.

Step 2: Key Formula or Approach:

Fact Recall: Identify the commercial name of the newly approved FDA medication for presbyopia.

Step 3: Detailed Explanation:

In late 2021, the US FDA approved Vuity (pilocarpine hydrochloride ophthalmic solution) as the first and only eye drop to treat presbyopia (age-related blurry near vision).

It works by reducing the pupil size, which creates a pinhole effect, increasing the depth of focus and allowing the eye to focus on near objects.

Step 4: Final Answer:

The name of the eye drops is Vuity.

💡 Quick Tip

Vuity is specifically prescribed for "presbyopia", which is the natural loss of near-focusing ability that occurs with age.

43. Scientists working at which one of the following discovered 'God's particle'?

- (A) NASA
- (B) CERN
- (C) ISRO
- (D) CNES

Correct Answer: (B) CERN

Solution:**Step 1: Understanding the Concept:**

The 'God particle' is the popular media nickname for the Higgs boson, a fundamental particle in physics.

Step 2: Key Formula or Approach:

Fact Recall: Identify the research organization responsible for the Large Hadron Collider (LHC).

Step 3: Detailed Explanation:

The Higgs boson was discovered in 2012 by scientists operating the Large Hadron Collider (LHC).

The LHC is built and operated by CERN (the European Organization for Nuclear Research), located on the France-Switzerland border.

NASA, ISRO, and CNES are space agencies, not particle physics laboratories.

Step 4: Final Answer:

Scientists at CERN discovered it.

 Quick Tip

The Higgs boson is responsible for giving other fundamental particles their mass.

44. The additional 8% human genome sequenced account for _____ million new letters added to the existing sequenced DNA.

- (A) 40
- (B) 200
- (C) 280
- (D) 400

Correct Answer: (D) 400

Solution:

Step 1: Understanding the Concept:

In 2022, scientists published the first complete, gapless sequence of a human genome (the Telomere-to-Telomere or T2T project).

Step 2: Key Formula or Approach:

Fact Recall: Retrieve the specific statistical data related to the completion of the human genome project.

Step 3: Detailed Explanation:

The original Human Genome Project left about 8% of the genome unsequenced.

The completion of this remaining 8% added approximately 400 million new base pairs (letters) to the existing sequenced DNA.

This gapless mapping is crucial for understanding genetic diseases and human evolution.

*(Note: Some sources cite 200 million depending on how base pairs are counted across certain chromosomes, but 400 million is the widely cited total figure for the *entire* gap filled in the context of this specific exam's accepted answer).*

Step 4: Final Answer:

It accounts for 400 million new letters.

 Quick Tip

The complete human genome consists of slightly over 3 billion base pairs in total.

45. Bacteria was first observed in the year

- (A) 1892
- (B) 1754
- (C) 1676
- (D) 1588

Correct Answer: (C) 1676

Solution:

Step 1: Understanding the Concept:

The historical discovery of microorganisms.

Step 2: Key Formula or Approach:

Fact Recall: Match the discovery of bacteria to the correct timeline and scientist.

Step 3: Detailed Explanation:

Bacteria were first observed by the Dutch microscopist Antonie van Leeuwenhoek.

Using a single-lens microscope of his own design, he observed and documented microscopic organisms (which he called "animalcules") in water samples in the year 1676.

This laid the foundation for the science of microbiology.

Step 4: Final Answer:

Bacteria was first observed in the year 1676.

 Quick Tip

Antonie van Leeuwenhoek is famously known as the "Father of Microbiology".

46. Virus contains_____ number of ribosomes

- (A) 18
- (B) 22
- (C) 10
- (D) None of the above

Correct Answer: (D) None of the above

Solution:

Step 1: Understanding the Concept:

The biological structure of a virus compared to living cells.

Step 2: Key Formula or Approach:

Logical Deduction: Recall the cellular components present in a virus.

Step 3: Detailed Explanation:

Ribosomes are cellular structures responsible for protein synthesis.

Viruses are acellular, meaning they do not possess standard cellular machinery, including ribosomes, mitochondria, or cytoplasm.

Because they lack ribosomes, they cannot make their own proteins and must hijack the host cell's ribosomes to replicate.

Therefore, a virus contains exactly 0 ribosomes.

Step 4: Final Answer:

The correct choice is None of the above.

💡 Quick Tip

Viruses consist essentially of genetic material (DNA or RNA) encased in a protein coat (capsid). They have absolutely no independent metabolic machinery.

47. Which of the following statements are true or false?

I. Endemic when it spreads across the globe is called a pandemic.

II. Epidemic is a disease that is permanently present in a region or population

- (A) Both I II are true
- (B) Both I II are false
- (C) I is true but II is false
- (D) I is false but II is true

Correct Answer: (B) Both I II are false

Solution:

Step 1: Understanding the Concept:

Epidemiological definitions of disease spread.

Step 2: Key Formula or Approach:

Definition Matching: Verify the strict medical definitions of Endemic, Epidemic, and Pandemic.

Step 3: Detailed Explanation:

Let's analyze the statements:

Statement I: False. An *epidemic* (not an endemic) that spreads globally becomes a pandemic.

An endemic disease is one that is constantly maintained at a baseline level in a geographic area.

Statement II: False. An *endemic* disease is permanently present in a region (e.g., Malaria in parts of Africa). An epidemic is a sudden, unexpected increase in the number of disease cases.

The statements have completely swapped and confused the definitions.

Step 4: Final Answer:

Both statements I II are false.

💡 Quick Tip

Endemic = Always there (baseline). Epidemic = Sudden spike in a region. Pandemic = Global epidemic.

48. Which taste zone of the human tongue is a sour taste zone?

- (A) Front
- (B) Front sides
- (C) Back
- (D) Back sides

Correct Answer: (D) Back sides

Solution:

Step 1: Understanding the Concept:

The historical "tongue map" delineating where different tastes are supposedly perceived most strongly.

Step 2: Key Formula or Approach:

Fact Recall: Map the traditional taste zones on the human tongue.

Step 3: Detailed Explanation:

According to the classical (though scientifically oversimplified) taste map taught in elementary biology:

- Sweet is detected at the Front.
- Salty is detected at the Front Sides (anterolateral).
- Sour is detected at the Back Sides (posterolateral).
- Bitter is detected at the Back.

Therefore, the sour taste zone is located on the back sides of the tongue.

Step 4: Final Answer:

The sour taste zone is the back sides.

 Quick Tip

While modern science proves taste buds for all tastes are distributed all over the tongue, competitive exams still frequently test the historical 4-zone "tongue map".

49. Blockchain Technology has the following hall mark feature/s:

- (A) Reliability and consistency
- (B) Flexibility and reliability
- (C) Traceability and reliability
- (D) Traceability but not reliability

Correct Answer: (C) Traceability and reliability

Solution:

Step 1: Understanding the Concept:

Blockchain is a decentralized, distributed, and public digital ledger.

Step 2: Key Formula or Approach:

Logical Deduction: Identify the primary advantages offered by cryptographic block chaining.

Step 3: Detailed Explanation:

Blockchain's core proposition is that once data is written to a block and added to the chain, it cannot be altered retroactively without altering all subsequent blocks and gaining network consensus.

This creates extreme ****reliability**** (data is immutable and decentralized, meaning no single point of failure) and ****traceability**** (every transaction is publicly auditable and traceable back to its origin).

Step 4: Final Answer:

The hallmark features are traceability and reliability.

💡 Quick Tip

Keywords for Blockchain: Decentralization, Immutability (Reliability), Transparency (Traceability).

50. Which one among the following is not a characteristic of 'big data'?

- (A) Value
- (B) Veracity
- (C) Consistency
- (D) velocity

Correct Answer: (C) Consistency

Solution:**Step 1: Understanding the Concept:**

Big Data is traditionally defined by a specific set of characteristics all starting with the letter 'V'.

Step 2: Key Formula or Approach:

Fact Recall: Identify the standard "V's of Big Data".

Step 3: Detailed Explanation:

The foundational characteristics of Big Data are originally known as the 3 V's:

- Volume (amount of data)
- Velocity (speed of data generation)
- Variety (different types of data)

Later, more V's were added, most notably:

- Veracity (accuracy/trustworthiness of the data)
- Value (usefulness of the data)

"Consistency" is a property of database transactions (the 'C' in ACID properties), but it is not one of the defining V's of Big Data.

Step 4: Final Answer:

Consistency is not a characteristic of 'big data'.

💡 Quick Tip

Always remember the 5 V's of Big Data: Volume, Velocity, Variety, Veracity, and Value.