MHT CET 2026 April 26 Shift 2

Question Paper with Solutions (Memory Based)

Conducted by CET Cell, Maharashtra

General Instructions

(i) **Duration:** The total duration of the examination is 3 hours (180 minutes).

(ii) **Total Marks:** The complete paper carries a maximum of 200 marks.

(iii) **Structure:** The paper has 3 Sections:

- **Section A:** 50 Multiple Choice Questions (Physics)
- **Section B:** 50 Multiple Choice Questions (Chemistry)
- **Section C:** 100 Multiple Choice Questions (Biology)

(iv) **Compulsory Questions:** All 200 questions are compulsory.

(v) Each question has four options. Only **one** option is correct.

(vi) **Right Answer:** Physics (+1 marks), Chemistry (+1 marks) and Biology(+1 marks).

(vii) **Incorrect Answer:** (No Negative marking).

(viii) **Unanswered/Marked for Review:** 0 marks.

1. Which animal shows the most primitive nervous system?

(A) Earthworm

(B) Hydra

(C) Cockroach

(D) Planaria

Correct Answer: (B) Hydra

Solution:

Concept: The complexity of the nervous system increases as we move from simple organisms to more advanced animals in the animal kingdom.

- **Hydra (Phylum: Cnidaria)** possesses the most primitive type of nervous system called a **nerve net**. It consists of scattered nerve cells without a central brain.
- **Planaria (Phylum: Platyhelminthes)** has a more advanced **ladder-like nervous system** with two longitudinal nerve cords.
- **Earthworm (Phylum: Annelida)** has a **well-developed central nervous system** consisting of a brain and ventral nerve cord.
- **Cockroach (Phylum: Arthropoda)** has an even more developed nervous system with a brain and a chain of ganglia.

Thus, among the given options, **Hydra has the most primitive nervous system**. It lacks a centralized brain and instead has a simple network of nerve cells spread throughout the body.

Step 1: Identify the organism with the simplest nervous system.

Hydra possesses a **nerve net system**, which is the earliest and simplest form of nervous organization found in animals.

Step 2: Compare with other organisms.

- Planaria → Ladder-like nervous system
- Earthworm → Centralized nervous system with brain
- Cockroach → Highly organized ganglionic nervous system

Therefore, the animal with the **most primitive nervous system is Hydra**.

Quick Tip: **Evolution of Nervous System (Simple to Complex):**

Nerve Net (Cnidaria – Hydra) → Ladder-like Nervous System (Platyhelminthes – Planaria) → Ventral Nerve Cord (Annelida – Earthworm) → Ganglionic Nervous System (Arthropoda – Cockroach)

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2. The specific site of sperm production within the human male reproductive system is:

(A) Vas deferens

(B) Epididymis

(C) Seminiferous Tubules

(D) Prostate gland

Correct Answer: (C) Seminiferous Tubules

Solution:

Concept: The human male reproductive system consists of several specialized structures, each performing a distinct function. **Spermatogenesis** (the production of sperm) occurs in a highly organized manner within specific regions of the testes.

- **Seminiferous Tubules:** These are tightly coiled structures present inside the testes and are the **primary site of sperm production**. They contain germ cells and Sertoli cells that support sperm development.
- **Epididymis:** It is responsible for **maturation and storage of sperm**, not their production.
- **Vas deferens:** It functions as a **transport duct** carrying sperm from epididymis to urethra.
- **Prostate gland:** It secretes **seminal fluid** that nourishes and protects sperm.

Step 1: Identify where spermatogenesis occurs.
Spermatogenesis takes place in the **seminiferous tubules** of the testes, where germ cells divide and differentiate into mature sperm cells.
Step 2: Eliminate incorrect options.

- Vas deferens $\rightarrow$ only transports sperm
- Epididymis $\rightarrow$ maturation and storage
- Prostate gland $\rightarrow$ secretion of fluid

Thus, the correct answer is **Seminiferous Tubules**.

Quick Tip: **Key Functions:** Testes (Seminiferous Tubules) → Sperm Production

Epididymis → Sperm Maturation

Vas Deferens → Sperm Transport

Prostate Gland → Seminal Fluid Secretion

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3. An interaction where one species is harmed while the other remains unaffected (0, −) is:

(A) Commensalism

(B) Parasitism

(C) Amensalism

(D) Mutualism

Correct Answer: (C) Amensalism

Solution:

Concept: Ecological interactions describe relationships between species in an ecosystem. These interactions are categorized based on their effects on the organisms involved.

- **Amensalism (0, −):** One species is harmed, while the other is neither benefited nor harmed.
- **Commensalism (+, 0):** One species benefits, the other remains unaffected.
- **Parasitism (+, −):** One species benefits while the other is harmed.
- **Mutualism (+, +):** Both species benefit.

Step 1: Understand the notation (0, −).

The notation indicates:

- First organism → no effect (0)
- Second organism → harmed (−)

Step 2: Match with ecological interaction.

This type of interaction corresponds to **Amensalism**, where one organism releases substances or creates conditions harmful to another without being affected itself.

Step 3: Example for clarity.

A classic example is **Penicillium** fungus producing antibiotics that inhibit bacterial growth, while the fungus itself is unaffected.

Thus, the correct answer is **Amensalism**.

Quick Tip: **Ecological Interaction Summary:**

Mutualism → (+, +) both benefit

Commensalism → (+, 0) one benefits, other unaffected

Parasitism → (+, −) one benefits, other harmed

Amensalism → (0, −) one harmed, other unaffected

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4. Which of the following serves as the monomer for the synthetic polymer Nylon 6?

(A) Adipic acid

(B) Caprolactam

(C) Hexamethylenediamine

(D) Ethylene glycol

Correct Answer: (B) Caprolactam

Solution:

Concept:

Synthetic polymers are large macromolecules formed by the repeated linking of smaller units called **monomers**. Nylon is a widely used synthetic polymer belonging to the class of **polyamides**. Different types of nylon are formed depending on the monomers used.

- **Nylon-6** is produced from a single monomer called **caprolactam**.
- Caprolactam undergoes **ring-opening polymerization** to form long chains of polyamide.
- The repeating unit of Nylon-6 contains an **amide linkage (-CONH-)** which provides strength and durability.

Other related polymers include:

- **Nylon-6,6**: formed from **hexamethylenediamine** and **adipic acid**.
- **Polyesters**: formed using compounds like **ethylene glycol**.

Step 1: Identify the monomer used in Nylon-6 synthesis.

Nylon-6 is produced by the polymerization of **caprolactam**. The cyclic caprolactam molecule opens and links with other molecules forming a long polyamide chain.

Step 2: Eliminate the other options.

- Adipic acid → Used in Nylon-6,6 synthesis.
- Hexamethylenediamine → Also used in Nylon-6,6 synthesis.
- Ethylene glycol → Used in polyester formation (e.g., PET).

Therefore, the correct monomer for **Nylon-6** is **Caprolactam**.

Quick Tip: **Important Nylon Polymers:**

Nylon-6 → Monomer: Caprolactam

Nylon-6,6 → Monomers: Hexamethylenediamine + Adipic Acid

Remember: Nylon-6 is made from a **single monomer**, while Nylon-6,6 is made from **two different monomers**.

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5. A carrier daughter (X^NX^c) of a colour blind father marries a normal male (X^NY). What is the probability of a colour blind son?

(A) 0%

(B) 25%

(C) 50%

(D) 75%

Correct Answer: (B) 25%

Solution:

Concept:

Colour blindness is an example of an **X-linked recessive genetic disorder**. The gene responsible for colour vision is located on the **X chromosome**.

- Males have **XY chromosomes**. Since they possess only one X chromosome, a single recessive allele can express the disorder.

- Females have **XX chromosomes**. They must inherit two recessive alleles to express colour blindness.

A **carrier female** has one normal allele and one recessive allele but does not show the disorder.

Given:

- Carrier female: $X^N X^c$
- Normal male: $X^N Y$

Step 1: Determine the possible gametes.

Female gametes:

$$X^N,\ X^c$$

Male gametes:

$$X^N,\ Y$$

Step 2: Construct the Punnett square for the cross.

	X^N	Y
X^N	$X^N X^N$	$X^N Y$
X^c	$X^N X^c$	$X^c Y$

Step 3: Interpret the offspring.

- $X^N X^N \rightarrow$ Normal daughter
- $X^N X^c \rightarrow$ Carrier daughter
- $X^N Y \rightarrow$ Normal son
- $X^c Y \rightarrow$ Colour blind son

Out of the four possible offspring combinations, only **one** results in a colour blind son.

$$\text{Probability} = \frac{1}{4} = 25\%$$

Thus, the probability of a **colour blind son is 25%**.

Quick Tip: **X-linked recessive disorders mostly affect males** because males possess only one X chromosome.

Examples include: Colour blindness, Haemophilia, and Duchenne muscular dystrophy.

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6. The moment of inertia of a uniform thin rod of mass M and length L about an axis passing through its center and perpendicular to its length is:

(A) $ML^2/3$

(B) $ML^2/12$

(C) $ML^2/2$

(D) $ML^2/6$

Correct Answer: (B) $ML^2/12$

Solution:

Concept:

The **moment of inertia** is the rotational analogue of mass in linear motion. It represents the resistance of a body to rotational acceleration about a given axis. For a rigid body, it depends on both the **mass of the body** and the **distribution of that mass relative to the axis of rotation**.

Mathematically, the moment of inertia is defined as:

$$I = \sum m_i r_i^2$$

or for a continuous body,

$$I = \int r^2 \, dm$$

where r is the perpendicular distance of the mass element from the axis of rotation.

For a **uniform thin rod**, the mass is evenly distributed along its length.

Step 1: Consider a small element of the rod.

Let a small element of length dx at a distance x from the center have mass

$$dm = \frac{M}{L} dx$$

because the mass per unit length is constant.

Step 2: Apply the definition of moment of inertia.

$$I = \int x^2 dm$$

Substituting dm,

$$I = \int x^2 \left(\frac{M}{L}\right) dx$$

The limits of integration are from $-L/2$ to $L/2$ since the axis passes through the center.

$$I = \frac{M}{L} \int_{-L/2}^{L/2} x^2 dx$$

Step 3: Evaluate the integral.

$$I = \frac{M}{L} \left[\frac{x^3}{3}\right]_{-L/2}^{L/2}$$

$$I = \frac{M}{L} \left(\frac{L^3}{24} + \frac{L^3}{24}\right)$$

$$I = \frac{ML^2}{12}$$

Thus, the moment of inertia of a uniform thin rod about an axis through its center and perpendicular to its length is:

$$I = \frac{ML^2}{12}$$

Quick Tip: **Important Standard Results for Moment of Inertia of a Rod:**

About center (perpendicular to rod): $I = \frac{ML^2}{12}$

About one end (perpendicular to rod): $I = \frac{ML^2}{3}$

These results are commonly used in rotational dynamics problems.

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7. In a stationary wave, the distance between a node and the adjacent antinode is:

(A) λ

(B) $\lambda/2$

(C) $\lambda/4$

(D) 2λ

Correct Answer: (C) $\lambda/4$

Solution:

Concept:

A **stationary wave (standing wave)** is produced when two waves of the same frequency, amplitude, and wavelength travel in opposite directions and interfere with each other.

In a stationary wave, two important points are formed:

- **Node:** A point where the displacement of the medium is always zero.
- **Antinode:** A point where the displacement of the medium is maximum.

The arrangement of nodes and antinodes follows a regular pattern along the medium.

Step 1: Understand the spacing in a stationary wave.

The distance between two successive nodes is:

$$\frac{\lambda}{2}$$

Similarly, the distance between two successive antinodes is also:

$$\frac{\lambda}{2}$$

Step 2: Determine the distance between a node and the nearest antinode.

Since a node lies midway between two antinodes,

$$\text{Distance between node and adjacent antinode} = \frac{\lambda}{4}$$

Thus, the required distance is:

$$\boxed{\frac{\lambda}{4}}$$

Quick Tip: **Stationary Wave Distances:**

Node to node $= \lambda/2$

Antinode to antinode $= \lambda/2$

Node to adjacent antinode $= \lambda/4$

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8. To convert a galvanometer into a voltmeter, one must connect a:

(A) Low resistance in series

(B) High resistance in series

(C) Low resistance in parallel

(D) High resistance in parallel

Correct Answer: (B) High resistance in series

Solution:

Concept:

A **galvanometer** is a sensitive instrument used to detect very small electric currents. However, it cannot directly measure large potential differences.

To convert a galvanometer into a **voltmeter**, it must be modified so that only a small current passes through it while measuring a potential difference across a circuit.

This is achieved by connecting a **high resistance in series** with the galvanometer.

Step 1: Understand the function of a voltmeter.

A voltmeter measures the **potential difference** between two points and must draw **very little current** from the circuit.

Step 2: Introduce a high resistance.

By connecting a large resistance R in series with the galvanometer resistance G, the total resistance becomes very high.

$$V = I(G + R)$$

Because the resistance is large, the current flowing through the instrument becomes very small, allowing safe measurement of voltage.

Step 3: Reason for series connection.

- Series connection increases total resistance.

- It limits the current flowing through the galvanometer.
- Thus, the device can measure potential difference without damage.

Therefore, a galvanometer is converted into a voltmeter by connecting a **high resistance in series**.

Quick Tip: **Instrument Conversion:**
Galvanometer $\rightarrow$ Voltmeter : High resistance in series
Galvanometer $\rightarrow$ Ammeter : Low resistance (shunt) in parallel

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9. If the temperature of the source in a Carnot engine is increased while the sink temperature remains constant, the efficiency will:

(A) Increase
(B) Decrease
(C) Remain the same
(D) Become zero

Correct Answer: (A) Increase

Solution:

Concept:
A **Carnot engine** is an ideal heat engine that operates between two heat reservoirs: a hot reservoir (source) at temperature T_H and a cold reservoir (sink) at temperature T_C. The efficiency of a Carnot engine depends only on the temperatures of these reservoirs.
The efficiency of a Carnot engine is given by the formula:

$$\eta = 1 - \frac{T_C}{T_H}$$

where T_H = temperature of the hot reservoir (source)
T_C = temperature of the cold reservoir (sink)
Temperatures must be expressed in **Kelvin scale**.
Step 1: Observe the efficiency formula.

$$\eta = 1 - \frac{T_C}{T_H}$$

If the sink temperature T_C remains constant and the source temperature T_H increases, the fraction $\frac{T_C}{T_H}$ becomes smaller.

Step 2: Effect on efficiency.

As $\frac{T_C}{T_H}$ decreases, the value of $1 - \frac{T_C}{T_H}$ increases. Therefore, the efficiency η increases.

Step 3: Physical interpretation.

A higher source temperature means the engine receives heat at a higher thermal energy level, allowing more of that energy to be converted into useful work before being rejected to the sink.

Thus, increasing the temperature of the source while keeping the sink temperature constant **increases the efficiency of the Carnot engine**.

Quick Tip: **Important Points about Carnot Engine:**

Efficiency depends only on reservoir temperatures.

Higher source temperature ⇒ higher efficiency.

Lower sink temperature ⇒ higher efficiency.

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10. The work done in rotating an electric dipole of dipole moment p in a uniform electric field E from $\theta = 0°$ to $\theta = 180°$ is:

(A) pE

(B) $2pE$

(C) Zero

(D) $-2pE$

Correct Answer: (B) $2pE$

Solution:

Concept:

An **electric dipole** consists of two equal and opposite charges separated by a small distance. The dipole moment is defined as:

$$p = q \times 2a$$

where q is the magnitude of each charge and $2a$ is the separation between them.

When a dipole is placed in a **uniform electric field**, it experiences a torque that tends to align the dipole with the direction of the field.

The **potential energy** of an electric dipole in a uniform electric field is given by:

$$U = -pE\cos\theta$$

where $p =$ dipole moment

$E =$ electric field strength

$\theta =$ angle between dipole moment and electric field.

Step 1: Find the initial potential energy.

At $\theta = 0°$,

$$U_i = -pE\cos 0°$$

$$U_i = -pE$$

Step 2: Find the final potential energy.

At $\theta = 180°$,

$$U_f = -pE\cos 180°$$

Since $\cos 180° = -1$,

$$U_f = +pE$$

Step 3: Calculate work done.

The work done in rotating the dipole equals the change in potential energy.

$$W = U_f - U_i$$

$$W = pE - (-pE)$$

$$W = 2pE$$

Therefore, the work required to rotate the dipole from 0° to 180° is:

$$\boxed{2pE}$$

Quick Tip: **Electric Dipole Energy Relation:**

Potential Energy of Dipole: $U = -pE\cos\theta$

Minimum energy occurs at $\theta = 0°$ (stable equilibrium).

Maximum energy occurs at $\theta = 180°$ (unstable equilibrium).

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11. Which of the following is the monomer of the polymer Nylon 6?

(A) Adipic acid

(B) Caprolactam

(C) Ethylene glycol

(D) Vinyl chloride

Correct Answer: (B) Caprolactam

Solution:

Concept:

Polymers are large macromolecules formed by the repeated linking of smaller molecules called **monomers**. Synthetic polymers such as nylon belong to the class of **polyamides**, which contain repeating amide linkages ($-CONH-$) in their structure.

- **Nylon-6** is produced by the polymerization of a single monomer called **caprolactam**.
- The polymerization occurs through a **ring-opening polymerization** reaction.
- During this process, the cyclic caprolactam molecule opens and forms long chains of polyamide units.

Different types of nylon are produced using different monomers:

- **Nylon-6**: Monomer is caprolactam.

- **Nylon-6,6**: Produced from hexamethylenediamine and adipic acid.

Step 1: Identify the polymer mentioned in the question.

The polymer specified is **Nylon-6**.

Step 2: Recall its monomer.

Nylon-6 is synthesized from the cyclic compound **caprolactam** through ring-opening polymerization.

Step 3: Eliminate incorrect options.

- Adipic acid → Used in Nylon-6,6 synthesis.
- Ethylene glycol → Used in polyester formation (e.g., PET).
- Vinyl chloride → Monomer of PVC (Polyvinyl chloride).

Hence, the correct monomer for Nylon-6 is **Caprolactam**.

Quick Tip: **Important Polymer–Monomer Pairs:**

Nylon-6 → Caprolactam

Nylon-6,6 → Hexamethylenediamine + Adipic Acid

PVC → Vinyl chloride

PET → Ethylene glycol + Terephthalic acid

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12. The number of atoms per unit cell in a Body-Centered Cubic (BCC) structure is:

(A) 1

(B) 2

(C) 4

(D) 6

Correct Answer: (B) 2

Solution:

Concept:

Crystalline solids consist of repeating three-dimensional arrangements of atoms called **unit cells**. The number of atoms present in a unit cell depends on how atoms are shared between

neighboring cells.

In a **Body-Centered Cubic (BCC)** structure:

- One atom is present at each of the **eight corners** of the cube.
- One atom is present at the **center of the cube**.

Step 1: Contribution of corner atoms.

Each corner atom is shared by **eight different unit cells**.

Therefore, contribution of each corner atom to one unit cell:

$$\frac{1}{8}$$

Total contribution from eight corner atoms:

$$8 \times \frac{1}{8} = 1$$

Step 2: Contribution of body-centered atom.

The atom present at the center of the cube belongs entirely to that unit cell.

Contribution:

$$1$$

Step 3: Total atoms in BCC unit cell.

$$1 + 1 = 2$$

Thus, the number of atoms per unit cell in a **BCC structure is 2**.

Quick Tip: **Atoms per Unit Cell in Common Crystal Structures:**

Simple Cubic (SC) $\rightarrow$ 1 atom

Body-Centered Cubic (BCC) $\rightarrow$ 2 atoms

Face-Centered Cubic (FCC) $\rightarrow$ 4 atoms

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13. Lucas reagent, used to distinguish between primary, secondary, and tertiary alcohols, is a mixture of:

(A) Conc. HCl + anhydrous $ZnCl_2$

(B) Conc. HNO_3 + $AgNO_3$

(C) Pd + $BaSO_4$

(D) NH_4OH + $AgNO_3$

Correct Answer: (A) Conc. HCl + anhydrous $ZnCl_2$

Solution:

Concept:

Lucas reagent is commonly used in organic chemistry to distinguish between **primary, secondary, and tertiary alcohols**. The reagent is a mixture of:

$$\text{Concentrated HCl} + \text{Anhydrous } ZnCl_2$$

In this test, alcohols react with hydrogen chloride in the presence of zinc chloride to form **alkyl chlorides**. The rate of formation of turbidity indicates the class of alcohol.

Step 1: Role of $ZnCl_2$.

Anhydrous $ZnCl_2$ acts as a **Lewis acid catalyst**. It activates the alcohol group and facilitates substitution by chloride ion.

Step 2: Observation for different alcohols.

- **Tertiary alcohols** react immediately, producing turbidity quickly.
- **Secondary alcohols** react slowly and produce turbidity after a few minutes.
- **Primary alcohols** react very slowly or show no turbidity at room temperature.

Step 3: Eliminate other options.

- Conc. HNO_3 + $AgNO_3$ $\rightarrow$ Not used in Lucas test.
- Pd + $BaSO_4$ $\rightarrow$ Used in Rosenmund reduction.
- NH_4OH + $AgNO_3$ $\rightarrow$ Tollen's reagent for aldehydes.

Therefore, Lucas reagent is a mixture of **concentrated HCl and anhydrous $ZnCl_2$**.

Quick Tip: **Lucas Test Summary:**

Tertiary alcohol → Immediate turbidity

Secondary alcohol → Turbidity after few minutes

Primary alcohol → No turbidity at room temperature

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14. What is the product formed when chlorobenzene undergoes nitration with concentrated HNO_3 and H_2SO_4?

(A) Nitrobenzene

(B) 1,3-Dinitrobenzene

(C) o- and p-Nitrochlorobenzene

(D) Chlorobenzene sulfonic acid

Correct Answer: (C) o- and p-Nitrochlorobenzene

Solution:

Concept:

Nitration of aromatic compounds is an example of an **electrophilic aromatic substitution reaction**. In this reaction, a nitro group ($-NO_2$) is introduced into the benzene ring.

The nitrating mixture consists of:

$$\text{Conc. } HNO_3 + \text{Conc. } H_2SO_4$$

Sulfuric acid acts as a catalyst and helps generate the **nitronium ion** (NO_2^+), which is the active electrophile.

$$HNO_3 + H_2SO_4 \rightarrow NO_2^+ + HSO_4^- + H_2O$$

Step 1: Understand the directing effect of chlorine.

Chlorine is an **ortho-para directing group**. Although it is slightly deactivating due to its electron-withdrawing inductive effect ($-I$), it donates electron density to the ring through resonance ($+R$ effect).

Therefore, substitution occurs mainly at:

- **Ortho position**

- **Para position**

Step 2: Formation of nitration products.

When chlorobenzene reacts with the nitrating mixture, the nitro group enters mainly at the ortho and para positions relative to chlorine.

The products formed are:

o-Nitrochlorobenzene and p-Nitrochlorobenzene

Step 3: Reason for two products.

Because both ortho and para positions are activated by the chlorine substituent, a mixture of ortho and para substituted products is formed.

Thus, the nitration of chlorobenzene produces **o- and p-nitrochlorobenzene**.

Quick Tip: **Important Directing Effects in Aromatic Substitution:**

Halogens ($-Cl$, $-Br$, $-I$) are **ortho-para directing** but **deactivating**.

Examples: Chlorobenzene nitration → o- and p-nitrochlorobenzene.

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15. Which transition element among the following shows the highest number of oxidation states?

(A) Scandium (Sc)

(B) Iron (Fe)

(C) Manganese (Mn)

(D) Zinc (Zn)

Correct Answer: (C) Manganese (Mn)

Solution:

Concept:

Transition elements show variable oxidation states because both their ns **and** $(n-1)d$ **electrons** can participate in bonding. This allows them to exhibit multiple oxidation numbers.

Among transition elements, the number of oxidation states generally increases toward the middle of the transition series.

Step 1: Electronic configuration of manganese.

Manganese ($Z = 25$) has the electronic configuration:

$$[Ar]\,3d^5\,4s^2$$

Because it has five d electrons and two s electrons, a total of **seven electrons** can potentially participate in bonding.

Step 2: Possible oxidation states.

Manganese commonly shows the following oxidation states:

$$+2,\ +3,\ +4,\ +5,\ +6,\ +7$$

Examples include:

- Mn^{2+} in $MnCl_2$
- Mn^{4+} in MnO_2
- Mn^{7+} in $KMnO_4$

Step 3: Compare with other options.

- Scandium $\rightarrow$ Mainly shows +3 oxidation state.
- Iron $\rightarrow$ Commonly +2 and +3.
- Zinc $\rightarrow$ Only +2 oxidation state (due to fully filled $3d^{10}$ configuration).

Therefore, among the given elements, **manganese shows the highest number of oxidation states**.

Quick Tip: **Transition Metal with Maximum Oxidation States:**

Manganese (Mn) can exhibit oxidation states from **+2 to +7**.

The highest oxidation state in the first transition series is **+7** (seen in $KMnO_4$).

