

VITEEE 2026 April 30 Shift 1

Question Paper with Solutions

Conducted by VIT Vellore



General Instructions

- (i) **Duration:** The total duration of the examination is 2.5 hours (150 minutes).
- (ii) **Total Marks:** The complete paper carries a maximum of 500 marks.
- (iii) **Structure:** The paper has 4 Sections:
 - **Part 1:** 35 Multiple Choice Questions (Physics).
 - **Part 2:** 35 Multiple Choice Questions (Chemistry).
 - **Part 3:** 40 Multiple Choice Questions (Mathematics/Biology).
 - **Part 4:** 10 Multiple Choice Questions (Aptitude).
 - **Part 5:** 5 Multiple Choice Questions (English)
- (iv) **Compulsory Questions:** All 125 questions are compulsory.
- (v) Each question has four options. Only **one** option is correct.
- (vi) **Correct Answer:** +4 marks.
- (vii) **Incorrect Answer:** -1 (Negative marking).
- (viii) **Unanswered/Marked for Review:** 0 marks.

1. If $S_n = 3n^2 + 5n$ represents the sum of n terms of an A.P, find the 10th term (a_{10}).

- (A) 60
- (B) 62
- (C) 64
- (D) 66

Correct Answer: (B) 62

Solution:

Concept: If S_n represents the sum of the first n terms of a sequence, then the n^{th} term can be obtained using the relation:

$$a_n = S_n - S_{n-1}$$

This formula helps us determine a specific term by subtracting the sum of the first $n - 1$ terms from the sum of the first n terms.

Step 1: Find the value of S_{10} .

Given:

$$S_n = 3n^2 + 5n$$

Substituting $n = 10$:

$$S_{10} = 3(10)^2 + 5(10)$$

$$S_{10} = 3(100) + 50$$

$$S_{10} = 300 + 50 = 350$$

Step 2: Find the value of S_9 .

Substituting $n = 9$:

$$S_9 = 3(9)^2 + 5(9)$$

$$S_9 = 3(81) + 45$$

$$S_9 = 243 + 45 = 288$$

Step 3: Find the 10^{th} term.

$$a_{10} = S_{10} - S_9$$

$$a_{10} = 350 - 288$$

$$a_{10} = 62$$

Quick Tip: Whenever the sum of the first n terms S_n is given, the n^{th} term can be quickly obtained using $a_n = S_n - S_{n-1}$. This is one of the fastest methods to extract individual terms from a sum formula.

2. Find the distance of the point $(1, -2, 3)$ from the yz -plane.

- (A) 0
- (B) 1
- (C) 2
- (D) 3

Correct Answer: (B) 1

Solution:

Concept: The yz -plane is defined by the equation $x = 0$. The perpendicular distance of a point (x, y, z) from the yz -plane is equal to the absolute value of its x -coordinate.

$$\text{Distance} = |x|$$

Step 1: Identify the x -coordinate of the given point.

The point is:

$$(1, -2, 3)$$

Thus,

$$x = 1$$

Step 2: Apply the distance formula from the yz -plane.

$$\text{Distance} = |x|$$

$$\text{Distance} = |1| = 1$$

Hence, the distance of the point from the yz -plane is:

Quick Tip: For coordinate planes: Distance from yz -plane = $|x|$

Distance from xz -plane = $|y|$

Distance from xy -plane = $|z|$

3. Evaluate the integral $\int \frac{1}{x \log x} dx$.

- (A) $\log|x| + C$
 (B) $\log|\log x| + C$
 (C) $\frac{1}{\log x} + C$
 (D) $\frac{\log x}{x} + C$

Correct Answer: (B) $\log|\log x| + C$

Solution:

Concept: When an integral contains a function and its derivative, substitution is a useful method. If $u = f(x)$, then:

$$\int \frac{f'(x)}{f(x)} dx = \log|f(x)| + C$$

Step 1: Use substitution.

Let

$$u = \log x$$

Then

$$\frac{du}{dx} = \frac{1}{x}$$

$$du = \frac{1}{x} dx$$

Step 2: Substitute into the integral.

$$\int \frac{1}{x \log x} dx$$

$$= \int \frac{1}{u} du$$

Step 3: Integrate.

$$\int \frac{1}{u} du = \log |u| + C$$

Step 4: Substitute back $u = \log x$.

$$\log |u| + C = \log |\log x| + C$$

Hence,

$$\boxed{\log |\log x| + C}$$

Quick Tip: A very common integral result:

$$\int \frac{f'(x)}{f(x)} dx = \log |f(x)| + C$$

Recognizing this pattern makes many logarithmic integrals easy to solve.

4. Calculate the de Broglie wavelength of an electron accelerated through a potential difference of 100V.

- (A) 0.1227 Å
- (B) 1.227 Å
- (C) 12.27 Å
- (D) 0.01227 Å

Correct Answer: (B) 1.227 Å

Solution:

Concept: The de Broglie wavelength of an electron accelerated through a potential difference

V is given by the shortcut relation:

$$\lambda = \frac{12.27}{\sqrt{V}} \text{ \AA}$$

where V is in volts.

Step 1: Substitute the given potential difference.

$$V = 100$$

$$\lambda = \frac{12.27}{\sqrt{100}}$$

Step 2: Evaluate the square root.

$$\sqrt{100} = 10$$

$$\lambda = \frac{12.27}{10}$$

$$\lambda = 1.227 \text{ \AA}$$

Thus, the de Broglie wavelength is:

$$\boxed{1.227 \text{ \AA}}$$

Quick Tip: For electrons accelerated through a potential V , remember the quick formula

$$\lambda = \frac{12.27}{\sqrt{V}} \text{ \AA}$$

This shortcut avoids lengthy calculations using $\lambda = \frac{h}{p}$.

5. Find the electric flux through one face of a cube if a charge q is placed at its center.

- (A) $\frac{q}{\epsilon_0}$
- (B) $\frac{q}{2\epsilon_0}$
- (C) $\frac{q}{6\epsilon_0}$

(D) $\frac{q}{12\epsilon_0}$

Correct Answer: (C) $\frac{q}{6\epsilon_0}$

Solution:

Concept: According to Gauss's Law, the total electric flux through a closed surface is given by:

$$\Phi_{\text{total}} = \frac{q}{\epsilon_0}$$

If a charge is placed at the center of a cube, the flux distributes equally among its six identical faces.

Step 1: Write the total flux through the cube.

$$\Phi_{\text{total}} = \frac{q}{\epsilon_0}$$

Step 2: Divide the flux equally among the six faces.

$$\Phi_{\text{one face}} = \frac{1}{6} \times \frac{q}{\epsilon_0}$$

$$\Phi_{\text{one face}} = \frac{q}{6\epsilon_0}$$

Thus, the electric flux through one face is:

$$\boxed{\frac{q}{6\epsilon_0}}$$

Quick Tip: If a charge is placed at the center of a symmetric closed surface (like a cube), the total flux $\frac{q}{\epsilon_0}$ distributes equally among all identical faces.

6. A coil has a self-inductance of $2H$; find the induced EMF if the current changes from $5A$ to $2A$ in 0.1 seconds.

- (A) $30V$
- (B) $40V$
- (C) $50V$

(D) 60V

Correct Answer: (D) 60V

Solution:

Concept: The induced EMF in a coil is given by the relation:

$$e = \left| L \frac{di}{dt} \right|$$

where L is the self-inductance and $\frac{di}{dt}$ is the rate of change of current.

Step 1: Calculate the change in current.

$$di = 5 - 2 = 3A$$

Step 2: Write the time interval.

$$dt = 0.1s$$

Step 3: Substitute into the EMF formula.

$$e = L \frac{di}{dt}$$

$$e = 2 \times \frac{3}{0.1}$$

$$e = 2 \times 30$$

$$e = 60V$$

Thus, the induced EMF is:

60V

Quick Tip: Induced EMF in inductors follows

$$e = L \frac{di}{dt}$$

A faster change in current produces a larger induced EMF.

7. Identify the monomer units used in the preparation of Nylon-6,6.

- (A) Adipic acid and Hexamethylenediamine
- (B) Terephthalic acid and Ethylene glycol
- (C) Caprolactam
- (D) Styrene

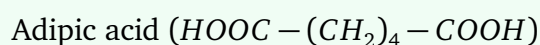
Correct Answer: (A) Adipic acid and Hexamethylenediamine

Solution:

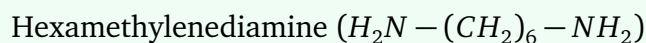
Concept: Nylon-6,6 is a condensation polymer formed by the reaction between a dicarboxylic acid and a diamine. During polymerization, molecules join together with the elimination of small molecules such as water.

Step 1: Identify the reacting monomers.

The two monomers involved are:



and



Step 2: Formation of Nylon-6,6.

These two monomers undergo condensation polymerization forming amide linkages ($-CONH-$), producing the polymer Nylon-6,6.



Thus, the monomers used are:

Adipic acid and Hexamethylenediamine

Quick Tip: Nylon naming rule:

Nylon- x, y indicates the number of carbon atoms in the diamine (x) and the dicarboxylic acid (y).

For Nylon-6,6 both monomers contain 6 carbon atoms.

8. Which of the following noble gas compounds has a square planar geometry: XeF_2 , XeF_4 , or XeF_6 ?

- (A) XeF_2
- (B) XeF_4
- (C) XeF_6
- (D) None of these

Correct Answer: (B) XeF_4

Solution:

Concept: The geometry of molecules can be predicted using VSEPR theory, which states that electron pairs around the central atom arrange themselves to minimize repulsion.

Step 1: Count the valence electrons of Xenon.

Xenon has 8 valence electrons.

Step 2: Determine bonding and lone pairs in XeF_4 .

In XeF_4 :

$$\text{Number of Xe-F bonds} = 4$$

After forming four bonds, two lone pairs remain on Xenon.

Thus,

$$\text{Total electron pairs} = 6$$

Hybridization:



Step 3: Determine the molecular geometry.

The six electron pairs arrange octahedrally, and the two lone pairs occupy opposite positions to minimize repulsion.

Therefore, the four fluorine atoms lie in one plane forming a:

Square planar geometry

Hence, the compound with square planar geometry is:



Quick Tip: For sp^3d^2 hybridization with two lone pairs (as in XeF_4), the lone pairs occupy opposite positions, leaving four atoms arranged in a square plane.

9. If 'ORANGE' is coded as 'PSBOHF', how is 'GRAPES' coded?

- (A) HSBQFT
- (B) HRBQFT
- (C) HSBQFS
- (D) GSBQFT

Correct Answer: (A) HSBQFT

Solution:

Concept: In coding–decoding problems, each letter of a word is replaced using a certain pattern or rule. Here, every letter in the word is shifted one step forward in the alphabetical order.

Step 1: Observe the pattern in the given example.

$$O \rightarrow P$$

$R \rightarrow S$

$A \rightarrow B$

$N \rightarrow O$

$G \rightarrow H$

$E \rightarrow F$

Thus, each letter is increased by +1.

Step 2: Apply the same rule to the word 'GRAPES'.

$G \rightarrow H$

$R \rightarrow S$

$A \rightarrow B$

$P \rightarrow Q$

$E \rightarrow F$

$S \rightarrow T$

Step 3: Write the coded word.

$GRAPES \rightarrow HSBQFT$

Thus, the required code is:

HSBQFT

Quick Tip: In many coding questions, letters are shifted forward or backward in the alphabet. Always check the difference between corresponding letters to identify the pattern.

10. Point out the antonym of the word 'Vague'.

- (A) Ambiguous
- (B) Uncertain
- (C) Precise
- (D) Confusing

Correct Answer: (C) Precise

Solution:

Concept: An antonym is a word that has the opposite meaning of another word.

Step 1: Understand the meaning of 'Vague'.

'Vague' means something that is unclear, uncertain, or not precisely expressed.

Step 2: Identify the opposite meaning.

The opposite of unclear or uncertain is something that is exact, definite, and clearly stated.

Step 3: Select the correct word.

'Precise' means exact, accurate, and clearly defined, which is the opposite of 'Vague'.

Therefore, the correct antonym is:

Precise

Quick Tip: Remember: **Vague** = unclear or indefinite

Precise = exact, clear, and definite