

VITEEE 2025 Apr 25 Shift 1 Question Paper with Solutions

1. The work done by a conservative force in a closed path is:

- (A) Positive
- (B) Negative
- (C) Zero
- (D) Infinite

Correct Answer: (C)

Solution: For a conservative force, work done depends only on initial and final positions. In a closed path, these positions are the same, hence work done is zero.

Quick Tip

Work done by conservative forces over a closed loop is always zero.

2. A particle moves with uniform acceleration along a straight line. The average velocity over an interval is equal to the instantaneous velocity at:

- (A) The beginning of the interval
- (B) The end of the interval
- (C) The midpoint of the interval
- (D) Any point in the interval

Correct Answer: (C)

Solution: For uniform acceleration,

$$v_{\text{avg}} = \frac{u + v}{2}$$

This equals the instantaneous velocity at the midpoint of the time interval.

Quick Tip

For uniform acceleration, average velocity equals velocity at mid-time.

3. The unit of electric field intensity is:

- (A) N/C
- (B) J/C
- (C) V/m
- (D) Both A and C

Correct Answer: (D)

Solution: Electric field can be expressed as force per charge (N/C) or potential gradient (V/m). Both units are equivalent.

Quick Tip

$1 \text{ N/C} = 1 \text{ V/m}$.

4. In a p-n junction diode, the reverse saturation current doubles for every rise in temperature of:

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

Correct Answer: (B)

Solution: For semiconductor diodes, reverse saturation current approximately doubles for every 10°C rise in temperature.

Quick Tip

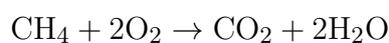
Reverse current in diodes is highly temperature dependent.

5. The number of moles of oxygen required for complete combustion of 2 moles of methane is:

- (A) 2
- (B) 4
- (C) 6
- (D) 8

Correct Answer: (B)

Solution:



1 mole of methane needs 2 moles of oxygen. So, 2 moles need 4 moles of oxygen.

Quick Tip

Always balance the chemical equation first.

6. Which gas is known as laughing gas?

- (A) NO
- (B) N₂O
- (C) NO₂
- (D) N₂O₅

Correct Answer: (B)

Solution: Nitrous oxide (N₂O) produces a laughing sensation when inhaled.

Quick Tip

N₂O is also used as an anesthetic.

7. The shape of PCl₅ molecule is:

- (A) Trigonal planar
- (B) Trigonal bipyramidal
- (C) Tetrahedral
- (D) Octahedral

Correct Answer: (B)

Solution: Phosphorus in PCl_5 has five bond pairs and no lone pair, giving a trigonal bipyramidal geometry.

Quick Tip

Five bond pairs around central atom give trigonal bipyramidal shape.

8. According to Le Chatelier's principle, increasing pressure favours the reaction that:

- (A) Produces more moles of gas
- (B) Produces fewer moles of gas
- (C) Has no change in moles
- (D) Is exothermic

Correct Answer: (B)

Solution: Increasing pressure shifts equilibrium towards the side with fewer moles of gas to reduce pressure.

Quick Tip

Pressure affects equilibrium only for gaseous reactions.

9. The solution of the equation $\sin x + \cos x = 0$ in $[0, 2\pi]$ is:

- (A) $\pi/4, 5\pi/4$
- (B) $3\pi/4, 7\pi/4$
- (C) $\pi/2, 3\pi/2$
- (D) $\pi/4, 7\pi/4$

Correct Answer: (B)

Solution:

$$\sin x = -\cos x \Rightarrow \tan x = -1$$

$$x = \frac{3\pi}{4}, \frac{7\pi}{4}$$

Quick Tip

Use $\tan x = \frac{\sin x}{\cos x}$ to simplify.

10. The value of $\lim_{x \rightarrow 0} \frac{\sin 3x}{x}$ is:

- (A) 1
- (B) 3
- (C) 0
- (D) ∞

Correct Answer: (B)

Solution:

$$\lim_{x \rightarrow 0} \frac{\sin 3x}{x} = 3 \lim_{x \rightarrow 0} \frac{\sin 3x}{3x} = 3$$

Quick Tip

$$\lim_{x \rightarrow 0} \frac{\sin x}{x} = 1.$$

11. If the matrix $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ has determinant k , then the determinant of its adjoint is:

- (A) k
- (B) k^2
- (C) $1/k$
- (D) $-k$

Correct Answer: (A)

Solution: For an $n \times n$ matrix,

$$\det(\text{adj } A) = (\det A)^{n-1}$$

Here $n = 2$, so $\det(\text{adj } A) = k$.

Quick Tip

For 2×2 matrices, determinant of adjoint equals determinant.

12. The probability of getting exactly 2 heads in 4 tosses of a fair coin is:

- (A) $3/8$
- (B) $1/4$
- (C) $3/16$
- (D) $1/2$

Correct Answer: (A)

Solution:

$$P = \frac{\binom{4}{2}}{2^4} = \frac{6}{16} = \frac{3}{8}$$

Quick Tip

Use combinations for fixed number of outcomes.

13. A man is 4 times as old as his son. After 5 years, he will be 3 times as old as his son.

The present age of the son is:

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

Correct Answer: (B)

Solution: Let son's age = x . Man's age = $4x$.

$$4x + 5 = 3(x + 5) \Rightarrow x = 10$$

Quick Tip

Translate word problems into equations.

14. Complete the series: 7, 10, 16, 25, 37, ?

- (A) 46
- (B) 50
- (C) 52
- (D) 55

Correct Answer: (C)

Solution: Differences: 3, 6, 9, 12. Next difference = 15.

$$37 + 15 = 52$$

Quick Tip

Check differences to identify number patterns.
