VITEEE 2025 Apr 26 Shift 2 Question Paper with Solutions

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1. A body weighs 50 N on the surface of Earth. Its weight at a height equal to the radius of Earth from the surface is:

(A) 12.5 N

(B) 25 N

(C) 50 N

(D) 100 N

Correct Answer: (A)

Solution: At height $h = R$, distance from Earth's centre $= 2R$.

$$W' = W\left(\frac{R}{2R}\right)^2 = \frac{W}{4} = \frac{50}{4} = 12.5 \text{ N}$$

Quick Tip

Weight varies inversely as the square of distance from Earth's centre.

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2. A sound wave has frequency 500 Hz and wavelength 0.68 m. The speed of sound is:

(A) 340 m/s

(B) 350 m/s

(C) 330 m/s

(D) 360 m/s

Correct Answer: (A)

Solution:

$$v = f\lambda = 500 \times 0.68 = 340 \text{ m/s}$$

Quick Tip

Speed of wave = frequency × wavelength.

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3. Two point charges $+q$ and $-q$ are placed at distance $2a$ apart. The electric field intensity is zero at a point on the axis at distance x from the midpoint. Then x is:

(A) a

(B) $2a$

(C) $a/\sqrt{2}$

(D) ∞

Correct Answer: (D)

Solution: For equal and opposite charges, electric fields on the axial line add in the same direction at all finite points. They cancel only at infinity.

Quick Tip

For an electric dipole, axial field is never zero at finite distance.

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4. The activity of a radioactive sample decreases to 25% of its initial value in 60 days. The half-life is:

(A) 30 days

(B) 60 days

(C) 20 days

(D) 40 days

Correct Answer: (A)

Solution: 25% = $(1/2)^2$, so 2 half-lives = 60 days.

$$T_{1/2} = 30 \text{ days}$$

Quick Tip

25% remaining means two half-lives have passed.

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5. The osmotic pressure of a 0.1 M solution of NaCl at 27°C is ($R = 0.082$ L atm mol^{-1} K^{-1}):

(A) 4.92 atm

(B) 2.46 atm

(C) 9.84 atm

(D) 0.492 atm

Correct Answer: (A)

Solution: NaCl dissociates into 2 ions, so $i = 2$.

$$\pi = iMRT = 2 \times 0.1 \times 0.082 \times 300 = 4.92 \text{ atm}$$

Quick Tip

Electrolytes require van't Hoff factor.

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6. Which of the following has the highest lattice energy?

(A) NaCl

(B) KCl

(C) MgO

(D) CsI

Correct Answer: (C)

Solution: Lattice energy increases with higher ionic charge and smaller ionic radius. MgO has 2^+ and 2^- ions.

Quick Tip

Higher charge $\rightarrow$ higher lattice energy.

7. The order of reactivity of alcohols towards dehydration is:

(A) Primary ¿ Secondary ¿ Tertiary

(B) Tertiary ¿ Secondary ¿ Primary

(C) Secondary ¿ Primary ¿ Tertiary

(D) Primary ¿ Tertiary ¿ Secondary

Correct Answer: (B)

Solution: Dehydration proceeds via carbocation stability:

$$\text{tertiary} > \text{secondary} > \text{primary}$$

Quick Tip

More stable carbocation reacts faster.

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8. The compound that gives iodoform test is:

(A) Acetaldehyde

(B) Benzaldehyde

(C) Formaldehyde

(D) Propionaldehyde

Correct Answer: (A)

Solution: Compounds containing $CH3CO-$ group give iodoform test. Acetaldehyde satisfies this condition.

Quick Tip

Iodoform test $\rightarrow$ presence of $CH3CO-$.

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9. The derivative of $\tan^{-1}\sqrt{\frac{1-\cos x}{1+\cos x}}$ with respect to x is:

(A) $1/4$

(B) $1/2$

(C) 1

(D) $-1/2$

Correct Answer: (B)

Solution:

$$\sqrt{\frac{1-\cos x}{1+\cos x}} = \tan\frac{x}{2} \Rightarrow y = \tan^{-1}\left(\tan\frac{x}{2}\right) = \frac{x}{2}$$

$$\frac{dy}{dx} = \frac{1}{2}$$

Quick Tip

Use half-angle identities to simplify.

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10. If $\sin A = \frac{3}{5}$ and $\cos B = \frac{12}{13}$, where A and B are acute angles, then $\sin(A+B)$ is:

(A) $33/65$

(B) $63/65$

(C) $56/65$

(D) $16/65$

Correct Answer: (C)

Solution:

$$\cos A = \frac{4}{5}, \quad \sin B = \frac{5}{13}$$

$$\sin(A+B) = \sin A\cos B + \cos A\sin B = \frac{36+20}{65} = \frac{56}{65}$$

Quick Tip

Use sine addition formula.

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11. The number of solutions of the equation $2|x| + |x-2| = 4$ is:

(A) 0

(B) 1

(C) 2

(D) Infinite

Correct Answer: (C)

Solution: Solving in different intervals gives two real solutions.

Quick Tip

Break modulus equations into intervals.

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12. A die is rolled 5 times. The probability of getting at least one six is:

(A) $1/6$

(B) $5/6$

(C) $(5/6)^5$

(D) $1 - (5/6)^5$

Correct Answer: (D)

Solution:

$$P(\text{at least one six}) = 1 - P(\text{no six}) = 1 - \left(\frac{5}{6}\right)^5$$

Quick Tip

Use complementary probability.

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13. If the roots of the quadratic equation $x^2 - (p+1)x + p = 0$ are equal, then p is:

(A) $1/4$

(B) $-1/4$

(C) 1

(D) -1

Correct Answer: (C)

Solution: Equal roots discriminant $= 0$:

$$(p+1)^2 - 4p = 0 \Rightarrow (p-1)^2 = 0 \Rightarrow p = 1$$

Quick Tip

Equal roots discriminant zero.

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14. A clock shows 3:00. The angle between the hour and minute hands is:

(A) 90°

(B) 60°

(C) 180°

(D) 0°

Correct Answer: (A)

Solution: At 3:00, minute hand at 12 and hour hand at 3.

$$\theta = 90^\circ$$

Quick Tip

Each hour mark = 30°.

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15. Find the missing number: 3, 8, 18, 35, ?, 98

(A) 56

(B) 60

(C) 64

(D) 70

Correct Answer: (B)

Solution: Differences:

$$5,\ 10,\ 17,\ 25,\ 38$$

Second differences:

$$5,\ 7,\ 8,\ 13$$

Hence missing term $= 35 + 25 = 60$.

Quick Tip

Check first and second differences in number series.
