

VITEEE 2025 Apr 27 Shift 1 Question Paper with Solutions

1. A body is projected with velocity 20 m/s at an angle of 30° to the horizontal. The maximum height reached by the body is ($g = 10 \text{ m/s}^2$):

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

Correct Answer: (B) 10 m

Solution: Step 1: Vertical component of velocity

$$u_y = 20 \sin 30^\circ = 10 \text{ m/s}$$

Step 2: Maximum height,

$$H = \frac{u_y^2}{2g} = \frac{10^2}{2 \times 10} = 5 \text{ m}$$

Quick Tip

Maximum height depends only on vertical velocity component.

2. Two capacitors of capacitance $2 \mu\text{F}$ and $4 \mu\text{F}$ are connected in series. The equivalent capacitance is:

- (A) $6 \mu\text{F}$
- (B) $1.33 \mu\text{F}$
- (C) $8 \mu\text{F}$
- (D) $2 \mu\text{F}$

Correct Answer: (B) $1.33 \mu\text{F}$

Solution: For series combination,

$$\frac{1}{C} = \frac{1}{2} + \frac{1}{4} = \frac{3}{4} \Rightarrow C = \frac{4}{3} = 1.33 \mu\text{F}$$

Quick Tip

Series capacitors reduce overall capacitance.

3. In Young's double-slit experiment, the fringe width is 0.6 mm. If the distance between the slits and screen is doubled, and the separation between slits is halved, the new fringe width will be:

- (A) 0.3 mm
- (B) 1.2 mm
- (C) 2.4 mm
- (D) 4.8 mm

Correct Answer: (C) 2.4 mm

Solution: Fringe width,

$$\beta \propto \frac{D}{d}$$

Doubling D and halving d increases β by factor 4.

$$\beta' = 4 \times 0.6 = 2.4 \text{ mm}$$

Quick Tip

Fringe width increases with screen distance and decreases with slit separation.

4. The dimensional formula for magnetic flux is:

- (A) $[ML^2T^{-2}A^{-1}]$
- (B) $[MLT^{-2}A^{-1}]$
- (C) $[ML^2T^{-1}A^{-2}]$
- (D) $[ML^2T^{-2}A]$

Correct Answer: (A)

Solution: Magnetic flux $\Phi = BA$.

$$[B] = \frac{F}{IA} = \frac{MLT^{-2}}{AT} \Rightarrow [\Phi] = ML^2T^{-2}A^{-1}$$

Quick Tip

Magnetic flux = magnetic field \times area.

5. The IUPAC name of $\text{CH}_3\text{-CH(OH)-COOH}$ is:

- (A) 2-Hydroxypropanoic acid
- (B) 2-Hydroxyethanoic acid
- (C) 3-Hydroxypropanoic acid
- (D) Ethanoic acid

Correct Answer: (A)

Solution: The parent chain has three carbons with OH on second carbon.

Quick Tip

Number the chain giving priority to COOH group.

6. Which of the following has the highest boiling point?

- (A) Ethane
- (B) Ethene
- (C) Ethyne
- (D) Methane

Correct Answer: (C)

Solution: Ethyne has strongest intermolecular attractions due to linear structure.

Quick Tip

Higher molecular interaction means higher boiling point.

7. In the reaction: $2H_2O_2 \rightarrow 2H_2O + O_2$, the rate of disappearance of H_2O_2 is 0.2 mol/L/s .

The rate of appearance of O_2 is:

- (A) 0.1 mol/L/s
- (B) 0.2 mol/L/s
- (C) 0.4 mol/L/s
- (D) 0.05 mol/L/s

Correct Answer: (A)

Solution: From stoichiometry,

$$\text{Rate of } O_2 = \frac{1}{2} \times 0.2 = 0.1 \text{ mol/L/s}$$

Quick Tip

Use coefficients to relate reaction rates.

8. The hybridization of carbon in diamond is:

- (A) sp
- (B) sp^2
- (C) sp^3
- (D) dsp^2

Correct Answer: (C)

Solution: Each carbon atom forms four sigma bonds in tetrahedral geometry.

Quick Tip

Tetrahedral geometry implies sp^3 hybridization.

9. The value of $\int_0^{\pi/2} \sin^2 x \, dx$ is:

- (A) $\pi/4$
- (B) $\pi/2$
- (C) 1
- (D) π

Correct Answer: (A)

Solution:

$$\int_0^{\pi/2} \sin^2 x \, dx = \frac{\pi}{4}$$

Quick Tip

Use identity $\sin^2 x = \frac{1 - \cos 2x}{2}$.

10. If $A = \{1, 2, 3\}$, $B = \{3, 4\}$, then $A \cup B$ is:

- (A) $\{1, 2\}$
- (B) $\{3\}$
- (C) $\{1, 2, 3, 4\}$
- (D) $\{1, 2, 3\}$

Correct Answer: (C)

Solution: Union contains all distinct elements of both sets.

Quick Tip

Union combines all unique elements.

11. If the day after tomorrow is Wednesday, what day is today?

- (A) Monday
- (B) Tuesday

- (C) Sunday
- (D) Saturday

Correct Answer: (A)

Solution: Day after tomorrow = Wednesday Tomorrow = Tuesday Today = Monday

Quick Tip

Work backward step by step in day problems.

12. Choose the correct synonym for “Eloquent”:

- (A) Silent
- (B) Articulate
- (C) Clumsy
- (D) Dull

Correct Answer: (B)

Solution: Eloquent means fluent and expressive in speech.

Quick Tip

Synonyms convey similar meanings.
