

VITEEE 2025 Memory Based Question Paper PDF (April 20, 2025) (Shift 1)

1. A uniform rod of length L and mass M is pivoted at one end and displaced by a small angle θ from vertical. The time period of small oscillations is:

- (A) $2\pi\sqrt{\frac{L}{g}}$
(B) $2\pi\sqrt{\frac{2L}{3g}}$
(C) $2\pi\sqrt{\frac{3L}{2g}}$
(D) $2\pi\sqrt{\frac{L}{2g}}$
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2. A charged particle enters a uniform magnetic field perpendicular to its velocity. If the field is suddenly doubled, the radius of its path becomes:

- (A) Half
(B) Double
(C) Four times
(D) Remains same
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3. In a series LCR circuit at resonance, the voltage across the inductor is 100 V and across the capacitor is 100 V. The voltage across the resistor is:

- (A) 0 V
(B) 100 V
(C) 200 V
(D) 141 V
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4. The de Broglie wavelength of an electron accelerated through 100 V is approximately:

- (A) 1.23 Å
(B) 12.3 Å
(C) 0.123 Å

(D) 123 Å

5. The standard reduction potential of Zn^{2+}/Zn is -0.76 V and Cu^{2+}/Cu is $+0.34\text{ V}$. The EMF of the cell $\text{Zn} \mid \text{Zn}^{2+} \parallel \text{Cu}^{2+} \mid \text{Cu}$ is:

- (A) 1.10 V
 - (B) -1.10 V
 - (C) 0.42 V
 - (D) -0.42 V
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6. For the reaction $\text{N}_2 + 3\text{H}_2 \rightleftharpoons 2\text{NH}_3$, $\Delta H = -92\text{ kJ/mol}$. The equilibrium constant K_p will increase with:

- (A) Increase in temperature
 - (B) Decrease in temperature
 - (C) Increase in pressure
 - (D) Addition of catalyst
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7. The coordination number and geometry of $[\text{Ni}(\text{CN})_4]^{2-}$ and $[\text{NiCl}_4]^{2-}$ are respectively:

- (A) 4, square planar and 4, tetrahedral
 - (B) 4, tetrahedral and 4, square planar
 - (C) 6, octahedral and 6, octahedral
 - (D) 4, square planar and 6, octahedral
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8. The rate constant for a first-order reaction is 0.0693 min^{-1} . The time required for 75% completion of the reaction is:

- (A) 10 min
 - (B) 20 min
 - (C) 30 min
 - (D) 40 min
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9. If the roots of the equation $x^3 - 6x^2 + 11x - 6 = 0$ are in A.P., the common difference is:

- (A) 1
 - (B) 2
 - (C) -1
 - (D) ± 1
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10. The value of $\int_{-\infty}^{\infty} e^{-x^2} dx$ is:

- (A) $\sqrt{\pi}$
 - (B) π
 - (C) $1/\sqrt{\pi}$
 - (D) $2\sqrt{\pi}$
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11. The angle between the planes $2x - y + z = 6$ and $x + y + 2z = 7$ is:

- (A) 0°
 - (B) 90°
 - (C) 60°
 - (D) 30°
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12. In a coding system, if CAT = 48, DOG = 72, then BIRD = ?

- (A) 72
 - (B) 96
 - (C) 120
 - (D) 144
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