VITEEE 2025 Apr 20 Shift 1 Question Paper

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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

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5. The standard reduction potential of Zn^{2+}/Zn is -0.76 V and Cu^{2+}/Cu is $+0.34$ V. The EMF of the cell Zn — Zn^{2+} —— Cu^{2+} — 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 $N_2 + 3H_2 \rightleftharpoons 2NH_3$, $\Delta H = -92$ 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 $[Ni(CN)_4]^{2-}$ and $[NiCl_4]^{2-}$ 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
