



PHYSICS

BOOKS - CHHAYA PHYSICS (BENGALI ENGLISH)

QUESTION PAPERS OF JEE MAIN -2018

Question

1. It is found if a neutron suffers an elastic collinear collision with deuterium at rest ,

fractional loss of its energy is p_d , while for its similar collision with carbon nucleus at rest , fractional loss of energy is P_c . The values of p_d and p_c are respectively

A. 0, 0

B. 0, 1

C. 0.89, 0.28

D. 0.28, 0.29

Answer:



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2. The mass of a hydrogen molecules is 3.32×10^{-27} Kg . If wall of area 2cm^2 at an angle of 45° to the normal , and rebound elastically with a speed of 10^3m/s , then the pressure on the wall is nearly

A. $2.35 \times 10^2 \text{N/m}^2$

B. $4.70 \times 10^2 \text{N/m}^2$

C. $2.35 \times 10^3 \text{N/m}^2$

D. $4.70 \times 10^3 \text{N/m}^2$

Answer:



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3. Two batteries with emf 12 V and 13 V are connected in parallel across a load resistor of 10Ω . The internal resistances of the two batteries are 1Ω and 2Ω respectively The voltage across the load lies between

A. 11.4 and 11.5V

B. 11.7V and 11.8V

C. $11.6V$ and $11.7V$

D. $11.5V$ and $11.6V$

Answer:



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4. A particle is moving in a circular path of radius a under the action of an attractive

potential $U = -\frac{k}{2r^2}$. Its total energy is

A. zero

B. $-\frac{3}{2} \frac{k}{a^2}$

C. $-\frac{k}{4a^2}$

D. $\frac{k}{2a^2}$

Answer:



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5. IF the series limit frequency of the Lyman series is V_L then the series limit frequency of the pfund series is

A. $\frac{v_L}{16}$

B. $\frac{v_L}{25}$

C. $25v_L$

D. $16v_L$

Answer:



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6. Unpolarised light of intensity I passes through an ideal polariser A. Another identical polariser B is placed behind A. The intensity of

light beyond B is placed between A and B . The intensity beyond B is now found to be $\frac{I}{8}$ the angle between polariser A and C is

A. 45°

B. 60°

C. 0°

D. 30°

Answer:



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7. An electron from various excited states of hydrogen atom emit radiation to come to the ground state . Let λ_n, λ_g be the de Broglie wavelength of the electron in the n - th state and the ground state respectively .Let Λ_n be the wavelength of the emitted photon in the transition from the n - th state to the ground state . for large n , (A, B are constants)

A. $\Lambda_n \approx A + B\lambda_n^2$

B. $\Lambda_n^2 \approx \lambda$

C. $\Lambda_n \approx A + \frac{B}{\lambda_n^2}$

$$D. \Lambda_n \approx A + B\lambda_n$$

Answer:



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8. An electron, a proton and an alpha particle having the same kinetic energy are moving in circular orbits of radii r_e, r_p, r_a respectively in a uniform magnetic field B . The relation between r_e, r_p, r_a is

$$A. r_e > r_p < r_a$$

B. $r_e < r_a < r_p$

C. $r_e > r_p = r_a$

D. $r_e < r_p = r_a$

Answer:



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9. A parallel plate capacitor of capacitance 90 pF is connected to a battery of emf 20 V . If a dielectric material of dielectric constant

$k = \frac{5}{3}$ is inserted between the plates , the magnitude of the induced charge will be

A. $2.4nC$

B. $0.9nC$

C. $1.2nC$

D. $0.2nC$

Answer:



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10. For an RLC circuit driven with voltage of amplitude v_m and frequency $\omega_0 \frac{1}{\sqrt{LC}}$ the current exhibits resonance the quality factor . Q given by

A. $\frac{R}{(\omega_0 C)}$

B. $\frac{CR}{\omega_0}$

C. $\frac{\omega_0 L}{R}$

D. $\frac{\omega_0 R}{L}$

Answer:



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11. A telephonic communication services is working at carrier frequency of 10GHz . Only 10 % of its is utilized for transmission. How many telephonic channels can be transmitted simultaneously if each channel requires a bandwidth of 5 kHz ?

A. 2×10^5

B. 2×10^6

C. 2×10^3

$$D. 2 \times 10^4$$

Answer:



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12. A granite rod of 60 cm length is clamped at its middle point and is set into longitudinal vibrations. The density of granite is $2.7 \times 10^3 \text{ Kg/m}^3$ and its Young's modulus is $9.27 \times 10^{10} \text{ Pa}$. What will be fundamental frequency of the longitudinal vibrations ?

A. 10 kHz

B. 7.5kHz

C. 5kHz

D. 2.5kHz

Answer:



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13. Seven identical circular planer discs , each of mass M and radius R are welded symmetrically as shown . The moment of inertia of the

arrangement about the axis normal to the plane and passing through the point P is

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A. $\frac{73}{2}MR^2$

B. $\frac{181}{2}MR^2$

C. $\frac{19}{2}MR^2$

D. $\frac{55}{2}Mr^2$

Answer:



14. Three concentric metal shells A , B and C of respective radii a , b , and c ($a < b < c$) have surface charge densities $+\rho$, ρ and $+\rho$ respectively . The potential of shell B is

A. $\frac{\rho}{\epsilon_0} \left[\frac{b^2 - c^2}{b} + a \right]$

B. $\frac{\rho}{\epsilon_0} \left[\frac{b^2 - c^2}{c} + a \right]$

C. $\frac{\rho}{\epsilon_0} \left[\frac{a^2 - b^2}{a} + c \right]$

D. $\frac{\rho}{\epsilon_0} \left[\frac{a^2 - b^2}{b} + c \right]$

Answer:



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15. In a potentiometer experiment .
It is found that no current passes through the galvanometer when the terminals of the cell are connected across 52 cm of the potentiometer wire , if the cell shunted by a resistance across 40 cm of the wire . find the internal resistance of the cell .

A. 2Ω

B. 2.5Ω

C. 1Ω

D. 1.5Ω

Answer:



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16. The angular width of the central maximum in a single slit diffraction pattern is 60° . The width of the slit is $1\mu m$. The slit is illuminated

by monochromatic plane waves . If another slit of same width is made near it young's fringes can be observed in a screen placed at a distance 50 cm from the slits , if slits , if the observed fringe width is 1 cm , what is slit separation distance (i . e, distance between the sentres of each slit)

A. $75\mu m$

B. $100\mu m$

C. $25\mu m$

D. $50\mu m$

Answer:



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17. A silver atom in a solid oscillates in simple harmonic motion in some direction with a frequency of 10^{12} s^{-1} what is the force constant of the bonds connecting one atom with the other ? (mole wt . Of silver = 108 and avogadro number = $6.02 \times 10^{23} \text{ g} \cdot \text{mol}^{-1}$)

A. $2.2 \text{ N} / \text{m}$

B. $5.5N/m$

C. $6.4N/m$

D. $7.1N/m$

Answer:



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18. In a collinear collision a particle with an initial speed V_0 strikes a stationary particle of the same mass . If the final total kinetic energy is 50 % greater than the original kinetic

energy , the magnitude of the relative velocity between the two particles , after collision is

A. $\frac{v_0}{2}$

B. $\frac{v_0}{\sqrt{2}}$

C. $\frac{v_0}{4}$

D. $\sqrt{2}v_0$

Answer:



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19. The dipole moment of a circular loop carrying a current I , is m and the magnetic field at the centre of the loop is B_1 . When the dipole moment is doubled by keeping the current constant, the magnetic field at the centre of the loop is B_2 . the ratio B_1 / B_2 is

A. $\sqrt{2}$

B. $\frac{1}{\sqrt{2}}$

C. 2

D. $\sqrt{3}$

Answer:



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20. The density of a material in the shape of a cube is determined by measuring three sides of the cube and its mass . If the relative errors in measuring the mass and length are respectively 1.5% and 1% , the maximum error in determining the density is

A. 4.5%

B. 6 %

C. 2.5 %

D. 3.5 %

Answer:



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21. On interchanging the resistance , the balance point of a metre bridge shifts to the left by 10 cm . The resistance of their series combination is $1K\Omega$. How much was the

resistance on the slot before interchanging
the resistances ?

A. 550Ω

B. 910Ω

C. 990Ω

D. 505Ω

Answer:



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22. In an ac circuit , the instantaneous emf and current are given by

$$e = 100 \sin 30t : i = 20 \sin\left(30t - \frac{\pi}{4}\right).$$

in one cycle of ac , the average power consumed by the circuit and the wattless current are respectively

A. $\frac{50}{\sqrt{2}}, 0$

B. 50, 0

C. 50, 10

D. $\frac{1000}{\sqrt{2}}, 10$

Answer:



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23. Two moles of an ideal monatomic gas occupies a volume V at $27^{\circ}C$. The gas expands adiabatically to a volume $2V$. Calculate (a) the final temperature of the gas and (b) change in its internal energy.

A. $189K$ $- 2.7KJ$

B. $195K$ $2.7KJ$

C. $189K$ $2.7KJ$

D. $195K$ $- 2.7KJ$

Answer:



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24. A particle is moving with a uniform with with a uniform speed in a circular orbit of radius R in a central force inversely proportional to the n th power of R . If the period of roation of the partikel is T . Then

A. $T \propto R^{(n+1)/2}$

B. $T \propto R^{n/2}$

C. $T \propto R^{3/2}$ for any n

D. $T \propto R^{\frac{n}{2}+1}$

Answer:



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