



JEE Main Online Exam 2019

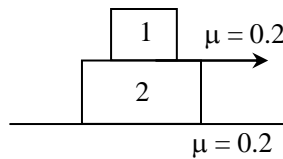
Questions & Solutions

10th April 2019 | Shift - II

(Memory Based)

PHYSICS

Q.1 Two block arrange as shown then find force (F) so that both travel in combined form -



- (1) 6 N (2) 12 N (3) 10 N (4) 3 N

Ans. [2]

Q.2 When a source travel towards stationary observer with velocity 50 m/s it observe frequency of 1000 Hz find frequency received which in move along with same velocity -

- (1) 750 Hz (2) 1250 Hz (3) 800 Hz (4) 1000 Hz

Ans. [1]

Q.3 A particle projected with velocity 2 m/s at an angle 15° from inclined plane of inclination 30°. Find range on inclined plane -

- (1) $\frac{11}{30}$ m (2) $\frac{15}{17}$ m (3) $\frac{11}{40}$ m (4) $\frac{11}{20}$ m

Ans. [1]

Q.4 A cube of side 50 cm is submersed in water such that 30% remain inside. Find minimum mass should placed on that cube so that cube completely immerse -

- (1) $\frac{175}{2}$ (2) $\frac{151}{2}$ (3) $\frac{200}{3}$ (4) $\frac{100}{3}$

Ans. [1]

Q.5 Position vector of a particle is $\vec{r} = 2t\hat{i} - 3t^2\hat{j}$, mass is 2kg find angular momentum at t = 2 second -

- (1) $-48\hat{k}$ (2) $48\hat{k}$ (3) $24\hat{k}$ (4) $-24\hat{k}$

Ans. [1]



Q.6 A charged particle $q = 1 \mu\text{C}$ is fixed at point P. Another charge $1 \mu\text{C}$ having mass $5\mu \text{ gm}$ is released from distance 1 cm. Find out its velocity at distance 9 cm -

- (1) $5 \times 10^4 \text{ m/s}$ (2) $9 \times 10^4 \text{ m/s}$ (3) $2 \times 10^4 \text{ m/s}$ (4) $25 \times 10^5 \text{ m/s}$

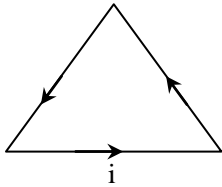
Ans. [3]

Q.7 Given that $x = 5yz^2$ where x = capacitance and z = magnetic field. Dimension of y will be

- (1) $M^1L^2T^4A^{-4}$ (2) $M^1L^3T^4A^4$ (3) $M^1L^1T^4A^{-4}$ (4) $M^{-3}L^{-2}T^8A^4$

Ans. [4]

Q.8



current i flows in coil of equivalent triangular shape. Side of triangle is 'a'. Magnetic field at center will be -

- (1) $\frac{9\mu_0 i}{\pi a}$ (2) $\frac{5\mu_0 i}{\pi a}$ (3) $\frac{9\mu_0 i}{2\pi a}$ (4) 0

Ans. [3]

Q.9 Power of light source is 2 watt, wavelength is 500 nm. Number of photons per sec is about -

- (1) 2×10^{18} (2) 3×10^{14} (3) 4×10^{16} (4) 5×10^{18}

Ans. [4]

Q.10 Pressure of n mole ideal gas is given as $P = P_0 \left[1 - \frac{1}{2} \left(\frac{V_0}{V} \right)^2 \right]$. Temperature change when volume of gas is

changed from $V_1 = V_0$ to $V_2 = 2V_0$.

- (1) $\frac{3 P_0 V_0}{2 nR}$ (2) $\frac{5 P_0 V_0}{4nR}$ (3) $\frac{7 P_0 V_0}{4nR}$ (4) $\frac{9 P_0 V_0}{4nR}$

Ans. [2]

Q.11 Two radioactive substance X and Y having equal nuclei at $t = 0$. The decay constant of X and Y are 5λ and λ respectively the time after which ratio of nuclei of X and Y equal to $\frac{1}{e^2}$ will be -

- (1) $\frac{1}{\lambda}$ (2) $\frac{1}{2\lambda}$ (3) $\frac{1}{3\lambda}$ (4) $\frac{1}{5\lambda}$

Ans. [2]

Q.12 A satellite is moving around a planet at height 20km, radius of planet is $3.2 \times 10^6 \text{ m}$ and mass is half the mass of earth. Then how many revolution is complete is 24hr.

- (1) $\frac{1}{2}$ (2) 1 (3) 2 (4) 4

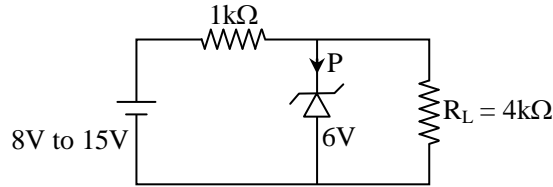
Ans. [3]

Q.13 Water from a tap emerges vertically downwards with initial speed 1 m/s. The cross section of tap is 1cm^2 . Assume the steady flow. Find out the cross sectional area of stream 15cm below the tap

- (1) $5.0 \times 10^{-4} \text{ m}^2$ (2) $1 \times 10^{-5} \text{ m}^2$ (3) $5 \times 10^{-5} \text{ m}^2$ (4) $2 \times 10^{-5} \text{ m}^2$

Ans. [3]

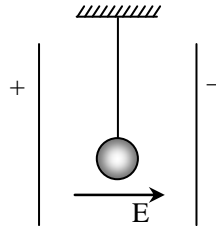
Q.14 Zener diode is connected with a battery whose emf varies from 8V to 15V, breakdown voltage of zener diode is 6V. The change in current through zener diode will be -



- (1) 0.5 mA, 3 mA (2) 2.5 mA, 3 mA (3) 4 mA, 10 mA (4) 3.5 mA, 5.5 mA

Ans. [1]

Q.15 A pendulum is placed between two conducting plates as shown charge on pendulum is +q electric field is E. Then time period of pendulum -



- (1) $T = 2\pi \sqrt{\frac{\ell}{\left(\frac{qE}{m}\right)^2 + g^2}}$ (2) $T = 2\pi \sqrt{\frac{\ell}{E^2 + g^2}}$ (3) $T = 2\pi \sqrt{\frac{\ell}{qE + q}}$ (4) $T = 2\pi \sqrt{\frac{\ell}{E + g}}$

Ans. [1]

Q.16 Inductor coil of 10 mH and resistor of 0.1 ohm are connected in series with an AC voltage source with internal resistance $r = 0.4\Omega$. Find out the time when the current in the coil becomes 80% of saturation current?

- (1) 0.016 sec (2) 0.012 sec (3) 0.004 sec (4) 0.006 sec

Ans. [1]

Q.17 A solid sphere is broken into two parts of mass $\frac{7M}{8}$ and $\frac{M}{8}$ respectively. The radius of sphere was R. Now

$\frac{7M}{8}$ part is molded into a solid sphere then find out the ratio of their moments of inertia about axis passing through their centre -

- (1) 160 (2) 170 (3) 140 (4) 150

Ans. [3]

Q.18 Ratio of width of two slits is 4 : 1 in YDSE experiment. Find out the ratio of maximum and minimum intensities in fringe pattern ?

- (1) $\frac{25}{9}$ (2) $\frac{16}{1}$ (3) $\frac{25}{1}$ (4) $\frac{9}{1}$

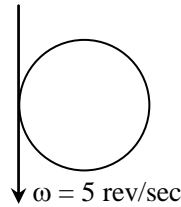
Ans. [4]

Q.19 Two points inside water has pressure $P_1 = 5.05 \times 10^5$ Pa and $P_2 = 8.08 \times 10^5$ Pa respectively. If density of water is $\rho = 10^3$ kg/m³ then what is the height difference between these two points ?

- (1) 30 m (2) 40 m (3) 50 m (4) 60 m

Ans. [1]

Q.20 A disc of mass 5 gram and radius $r = 1$ cm rotated about the given axis with 5 rev/sec. Then find out the torque required if initially disc was at rest it took $t = 6$ sec for the disc to gain the velocity -



- (1) 32.7×10^{-7} (2) 5×10^{-8} (3) 8.02×10^{-6} (4) 25×10^{-4}

Ans. [1]

Q.21 If Q heat is supplied to change temperature by ΔT of a system at constant volume then what amount of heat is required at constant pressure for the system to change temperature by same amount ? If gas is diatomic -

- (1) $\frac{5}{3}$ (2) $\frac{7}{5}$ (3) $\frac{4}{3}$ (4) $\frac{9}{2}$

Ans. [2]

Q.22 When a particle moving with velocity 1 m/s penetrates in a fixed wooden block average force exerted by block is 2.5×10^{-2} N. Find speed by which block comes out mass of block is 20 gm -

- (1) $\frac{1}{\sqrt{2}}$ (2) $\frac{1}{\sqrt{3}}$ (3) $\frac{1}{\sqrt{4}}$ (4) $\frac{1}{\sqrt{5}}$

Ans. [1]

Q.23 Spherical shell of inner radius a and outer radius b is made of uniform density ρ . Find resistance between inner and outer surface -

- (1) $\frac{\rho}{4\pi} \left(\frac{1}{a} - \frac{1}{b} \right)$ (2) $\frac{\rho}{3\pi} \left(\frac{1}{a} - \frac{1}{b} \right)$ (3) $\frac{\rho}{2\pi} \left(\frac{1}{a} - \frac{1}{b} \right)$ (4) $\frac{\rho}{2\pi} \left(\frac{1}{b} - \frac{1}{a} \right)$

Ans. [1]



Q.24 Breaking stress of a cylindrical wire is 376 MPa. If force of 400 N is applied on wire maximum diameter at which wire does not break -

- (1) 1.1 mm (2) 2.7 m (3) 3.3 m (4) 4.4 m

Ans. [1]

Q.25 Find net stress if a brass rod of length 1 m and area 1 mm^2 whose Young module is $120 \times 10^6 \text{ N/m}^2$ and steel rod of length 1 m area 1 mm^2 ($y = 60 \times 10^6 \text{ N/m}^2$ extension is system is 0.2 mm -

- (1) $2 \times 10^6 \text{ N/m}^2$ (2) $4 \times 10^6 \text{ N/m}^2$ (3) $16 \times 10^6 \text{ N/m}^2$ (4) $5 \times 10^6 \text{ N/m}^2$

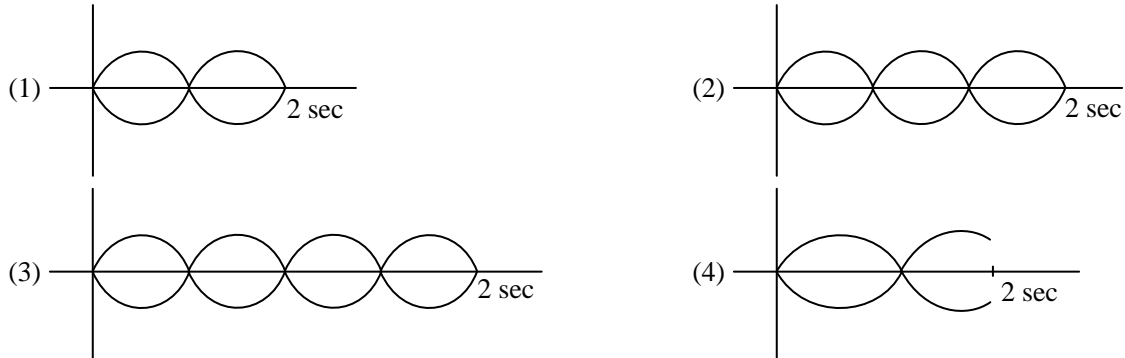
Ans. [3]

Q.26 Li^{+2} is initially in ground state, when radiation of wavelength λ_0 incident on it. If emits 6 different wavelength during de-excitation. Find wavelength λ_0 -

- (1) 970 Å (2) 1000 Å (3) 1500 Å (4) 2000 Å

Ans. [1]

Q.27 Two sound sources of different frequencies 9 Hz and 11 Hz are sounded together then select correct alternative for superposition of these waves -



Ans. [3]