

JEE Main Online Exam 2019

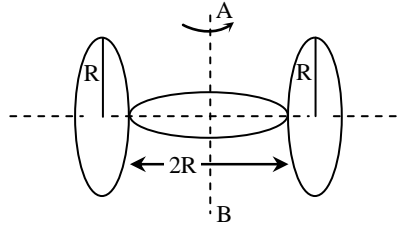
[Memory Based Paper]

Questions & Answer

11th January 2019 | Shift - II

PHYSICS

Q.1 Three discs having same mass M and radius R . Then moment of inertia about AB axis-



(1) $2MR^2$

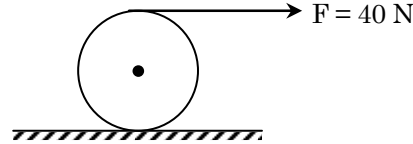
(2) $3MR^2$

(3) $\frac{5MR^2}{4}$

(4) $6MR^2$

Ans. [2]

Q.2 Solid cylinder of mass 5 kg and radius 1m. A string is wrapped over the cylinder. When 40 N force is applied on cylinder determine its angular acceleration. (floor is smooth).



(1) 16

(2) 8

(3) 24

(4) 4

Ans. [1]

Q.3 7 Capacitors each of $2\mu\text{F}$ are connected to get $\frac{6}{13} \mu\text{F}$. Select the possible combination.

(1) 3 in series and 4 in parallel

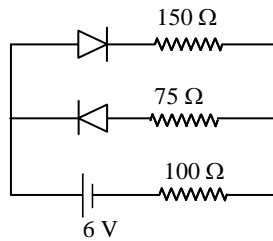
(2) 5 in series and 2 in parallel

(3) 4 in series and 3 in parallel

(4) 3 in series and 5 in parallel

Ans. [3]

Q.4 Find value of current (Resistance of forward biased diode is 50Ω)



(1) 0.01 A

(2) 0.1 A

(3) 0.02 A

(4) 0.2 A

Ans. [3]

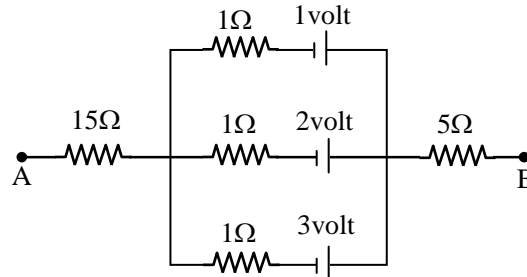
- Q.5** Two object A and B of masses 100 gm and 50 gm are at temperature 100°C and 60°C respectively are mixed then temperature of mixture is 90°C. Now A and B are at 90°C and 50°C respectively are mixed then temperature of mixture is-
- (1) 50°C (2) 60°C (3) 70°C (4) 80°C

Ans. [4]

- Q.6** At $t = 0$, $\vec{S} = 2\hat{i} + 4\hat{j}$, $\vec{V} = 2\hat{i} + 4\hat{j}$, $\vec{a} = 5\hat{i} + 4\hat{j}$. Find displacement from origin at $t = 2$ s.
- (1) 25.6 m (2) 20 m (3) 25 m (4) 28.2 m

Ans. [1]

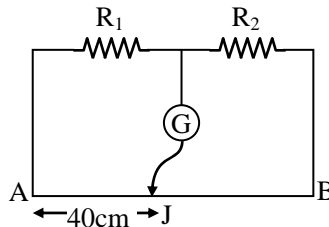
- Q.7** In the given circuit determine $V_A - V_B$.



- (1) 2 volt (2) -2 volt (3) 3 volt (4) -3 volt

Ans. [2]

- Q.8** In meter bridge R_1 and R_2 are balanced at point J which is 40 cm from A, when 10Ω resistor connected in series with R_1 then balance point shift by 10 cm towards right. How much resistor connected in parallel with $(R_1 + 10)$ so that balance point regain it previous position.



- (1) 60 Ω (2) 80 Ω (3) 120 Ω (4) 10 Ω

Ans. [1]

- Q.9** If acceleration (a), velocity (v) and force (f) are used as fundamental quantities represent young's modulus in term of these fundamental quantities

- (1) $\frac{a^2 F}{v^4}$ (2) $\frac{a F^2}{v^4}$ (3) $a^2 F v^4$ (4) $a F^2 v^4$

Ans. [1]

- Q.10** If in a H-like atom transition of an excited e^- across from M shell to N shell, then photon of wave length λ is produced. What would be the wavelength of photon if transition takes place from N shell to L shell

- (1) $\frac{20}{9}\lambda$ (2) $\frac{20}{27}\lambda$ (3) $\frac{27}{20}\lambda$ (4) $\frac{9}{20}\lambda$

Ans. [2]



Q.11 A ray of light incident on equilateral prism of refractive index $\mu = \sqrt{3}$. Find angle of incidence for minimum deviation of light.

- (1) 30° (2) 60° (3) 45° (4) 90°

Ans. [2]

Q.12 If the time period of simple pendulum on the surface of earth is T. If the same pendulum is taken at the planet whose mass and radius both are three times as compare to the earth. The time periods of oscillation is-

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

Ans. [3]

Q.13 1 mole of monoatomic gas is heated by process TV = K. If change in temperature is ΔT then determine amount of heat supply ?

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

Ans. [2]

Q.14 Ratio of temperature coefficient of linear expansion of A to B i.e. $\frac{\alpha_A}{\alpha_B} = \frac{4}{3}$. Initially length of both rod A & B is same. Initial temperature of A and B is 30°C . Now temperature of A is increased to 180°C . To what temperature B should be heated so that linear expansion in B is same as that occur in A.

- (1) 230°C (2) 200°C (3) 180°C (4) 250°C

Ans. [1]

Q.15 A thermometer in contact with boiled bath tub shows reading x_0 and with ice bath tub shows reading $\frac{x_0}{3}$. It shows a reading of $\frac{x_0}{2}$. When brought in contact of a body. What is the temperature of this body ?

- (1) 25° (2) 50° (3) 75° (4) 33°

Ans. [3]

Q.16 The maximum kinetic energy of a simple pendulum of length ℓ is oscillating with amplitude A and it's maximum kinetic energy is k_1 . Now length of pendulum is increased to 2ℓ keeping amplitude same. Then maximum kinetic energy of simple pendulum becomes k_2 . Then-

- (1) $k_2 = 2k_1$ (2) $k_1 = 2k_2$ (3) $k_1 = k_2$ (4) $k_1 = \frac{k_2}{4}$

Ans. [1]

Q.17 Power of electromagnetic wave is 2.7 mW and area of beam of electromagnetic waves is 10 cm^2 . Determine the amplitude of electric field of electromagnetic wave.

- (1) $\sqrt{6} \times 10^5$ (2) $\sqrt{3} \times 10^5$ (3) $\sqrt{12} \times 10^5$ (4) $\sqrt{5} \times 10^5$

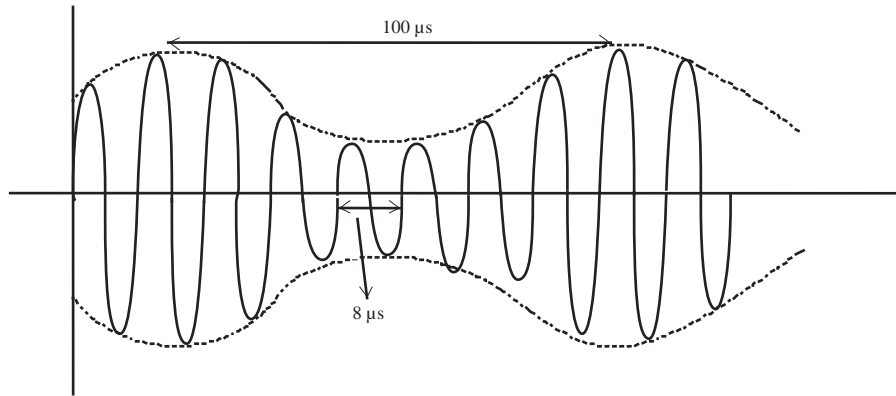
Ans. [1]

Q.18 A long thin solenoid of cross section of equilateral triangle is given. Now the dimensions of solenoid are made three time then, how many times of self inductance of solenoid becomes as compare to previous one (number of turn per unit length remain same)

- (1) 3 (2) 9 (3) 27 (4) $9\sqrt{3}$

Ans. [3]

Q.19 A modulated signal is shown in the figure given below.



Which of the following equations represent the above signal correctly.

- (1) $[a + \sin(2.5\pi \times 10^6 t)] \sin(0.25 \pi \times 10^6 t)$ (2) $[a + \sin(2\pi \times 10^6 t)] \sin(0.25 \pi \times 10^6 t)$
(3) $[a + \sin(2\pi \times 10^4 t)] \sin(0.25 \pi \times 10^6 t)$ (4) $[a + \sin(0.25\pi \times 10^6 t)] \sin(2\pi \times 10^4 t)$

Ans. [3]

Q.20 In photoelectric experiment first light of wavelength 400 nm is used and then 300 nm is used. By what amount the stopping potential is changed.

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

Ans. [1]

Q.21 A simple pendulum is executing S.H.M. with angular frequency 10 rad/s. Now the rigid support is made to oscillate with amplitude 10^{-2} m and angular frequency 1rad/s along vertical line. Find the maximum relative percentage change in angular frequency of simple pendulum ?

- (1) 1 (2) 2 (3) $\frac{1}{2}$ (4) $\frac{1}{20}$

Ans. [4]

Q.22 A particle is moving under the action of a force $F = kt$. Where t represents time t & k is same constant. If at $t = 0$ linear momentum of the particle is p then find the time after which linear momentum of particle will become 3p.

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

Ans. [2]



Q.23 A point mass 'm' having charge 'q' is taken from (0, 0) to (1, 1) along a straight line in the presence of electric field $\vec{E} = 2\hat{i} + 3\hat{j}$ and magnetic field $\vec{B} = 3\hat{i} + 4\hat{j}$ with constant velocity. Calculate the total work by external agent.

- (1) $-5q$ J (2) $+5q$ J (3) $+10q$ J (4) $-10q$ J

Ans. [1]

Q.24 In YDSE, A light of wavelength $\lambda = 5303 \text{ \AA}$ used. Distance between slits $d = 4.3 \mu\text{m}$ and distance between slits and screen is $19.4 \mu\text{m}$, then find distance between first maxima and second minima above screen center of screen.

- (1) $2.38 \mu\text{m}$ (2) $11.9 \mu\text{m}$ (3) $1.19 \mu\text{m}$ (4) $23.8 \mu\text{m}$

Ans. [3]

Q.25 When A cubical paramagnetic block of side 1 cm placed in a magnetic field of magnetic intensity $H = 60 \times 10^3 \text{ A/m}$. Then magnetic dipole moment of block becomes $2 \times 10^{-3} \text{ Am}^2$. Find magnetic susceptibility of material.

- (1) $\frac{1}{20}$ (2) $\frac{1}{30}$ (3) $\frac{1}{40}$ (4) $\frac{1}{50}$

Ans. [2]

Q.26 If a dipole of dipole moment 10 C-m is placed in a uniform electric field of 1000 V/m . Find the potential energy of dipole, if it makes angle 45° with electric field.

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

Ans. [3]