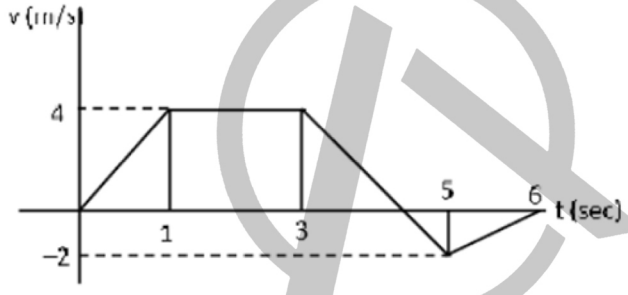
Name : **JEE - PHYSICS** **Time :**
Code : **Date :**

Physics Paper
Shift 2

1. Velocity time graph of a particle is shown in figure. Find displacement of the particle.

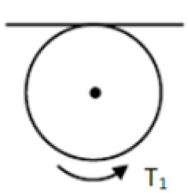


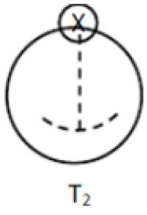
(1) 7 (2) 11 (3) 5 (4) 15

2. A light of 4 eV incident on metal surface of work function ϕ_1 eV. Another light of 2.5 eV incident on another metal surface of work function ϕ_2 eV. Find the ratio of maximum velocity of photo electrons $\left(\frac{v_1}{v_2}\right)$.

(1) $\sqrt{\frac{4+\phi_1}{2.5-\phi_2}}$ (2) $\sqrt{\frac{4-\phi_1}{2.5-\phi_2}}$ (3) $\sqrt{\frac{3-\phi_1}{2.5+\phi_2}}$ (4) $\sqrt{\frac{6+\phi_1}{2.5-\phi_2}}$

3. A ring-1 oscillate with period T_1 about tangential axis in the plane of ring and an another ring-2 oscillate with period T_2 about tangential axis perpendicular to plane of ring $\frac{T_1}{T_2}=?$





(1) $\sqrt{\frac{3}{4}}$ (2) $\sqrt{\frac{5}{8}}$ (3) $\sqrt{\frac{8}{5}}$ (4) $\sqrt{\frac{4}{3}}$

4. A car is moving towards a fixed wall. It blows horn of frequency of 440 Hz. The frequency of reflected sound observed by the driver is 480 Hz then find the speed of car in km/hr. (Speed of sound is 350 m/sec) :
(1) 64.78 km/hr (2) 26,78 km/hr (3) 54.78 km/hr (4) 47.78 km/hr

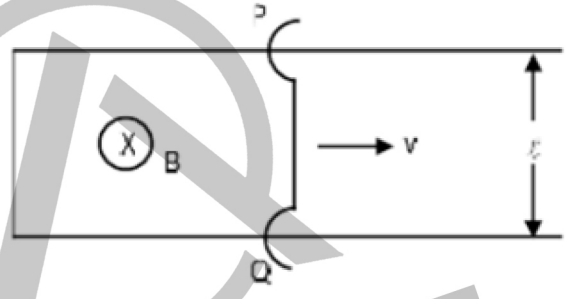
5. Given that $x = \frac{1}{\sqrt{\varepsilon_0 \mu_0}}$, $y = \frac{E}{B}$ & $z = \frac{1}{RC}$. Which of the following in correct.

(1) dimension of x and z will be same
(2) dimension of y and z will be same
(3) dimension of x and y will be same
(4) dimension of x, y and z is different

6. There are two rods of length ℓ_1 and ℓ_2 and coefficient of linear expensions are α_1 and α_2 respectively. Find equivalent coefficient of thermal expansion for their combination in series.

(1) $\frac{\alpha_1 + \alpha_2}{2}$ (2) $\frac{\alpha_1 \ell_1 + \alpha_2 \ell_2}{\alpha_1 + \alpha_2}$ (3) $\frac{\alpha_1 \ell_1 + \alpha_2 \ell_2}{\ell_1 + \ell_2}$ (4) $\sqrt{\alpha_1 \alpha_2}$

7. A rod having length ℓ and resistance R is moving with velocity v on a π shape conductor. Find the current in the rod.



(1) $\frac{1}{2}\frac{B v \ell}{R}$ (2) $\frac{2Bv\ell}{R}$ (3) $\frac{3Bv\ell}{R}$ (4) $\frac{Bv\ell}{R}$

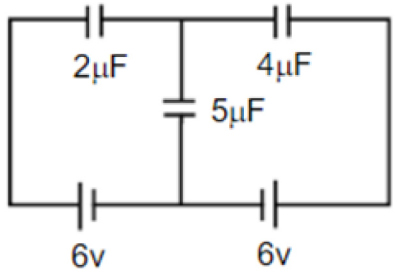
8. There are two bodies A and B of same mass. A is placed near equator of earth and B is placed at a height 'h' above the pole of earth. If both the bodies weighs equally. Find 'h' in terms of radius 'R' of earth, angular speed 'ω' of earth and 'g' acceleration due to gravity close to earth.

(1) $\frac{R\omega^2}{2g}$ (2) $\frac{R^2\omega^2}{2g}$ (3) $\frac{gR}{\omega^2}$ (4) $\frac{g}{\omega^2}$

9. Radioactive nucleus A decays into B with half-life 10 sec. A also convert into C with half-life 100 sec. Find half-life of A for both emission.

(1) 6 sec (2) 9 sec (3) 3 sec (4) 2 sec

10. Find charge on 5μF.



(1) $\frac{120}{11}\mu C$ (2) $\frac{150}{11}\mu C$ (3) $\frac{180}{11}\mu C$ (4) $\frac{90}{11}\mu C$

11. An ideal diatomic gas is taken through an adiabatic process in which density increases to 32 times. If pressure increases to 'n' times. Find n.
(1) 4 (2) 8 (3) 64 (4) 128

12. A body of mass 2 kg at rest is supplied constant power 1 J/sec., the distance travelled by the body after 6 sec, is :
(1) $2\sqrt{6}$m (2) $4\sqrt{6}$m (3) $2\sqrt{3}$m (4) $6\sqrt{3}$m

13. A dielectric having dielectric constant K = 4 is filled in a capacitor having plate length ℓ and width b. Now length of capacitor is increased by ℓ_1 for which energy stored becomes half of initial value. ℓ_1 should be :
(1) 2ℓ (2) 6ℓ (3) 8ℓ (4) 4ℓ

14. There is prism of refractive index 1.5 and prism angle 2°. Find minimum deviation caused by this prism.
(1) 1° (2) 2° (3) 1/3° (4) 1/2°

15. There is an iron core solenoid of turn density 10 turns/cm and volume 10^{-3} m^3. It carries a current of 0.5 A and relative permeability of iron core is $\mu_r = 1000$. The magnetic moment of this solenoid is approximately (in A-m^2)
(1) 5×10^2 (2) 5×10^3 (3) 5×10^4 (4) 5×10^5

16. A ball is dropped from a height h. If falls on the liquid surface. Its velocity does not change when it enters in the liquid, find height h in terms of r = radius of ball, σ = density of liquid, ρ = density of ball, η = coefficient of viscosity and g = acceleration due to gravity :
(1) $\frac{2}{81}\frac{r^4 g(\rho-\sigma)^2}{\eta^2}$ (2) $\frac{2}{50}\frac{r^4 g(\rho-\sigma)^2}{\eta^2}$ (3) $\frac{2}{25}\frac{r^4 g(\rho-\sigma)^2}{\eta^2}$ (4) $\frac{2}{90}\frac{r^4 g(\rho-\sigma)^2}{\eta^2}$ s

17. A rocket moving in free space has varying mass due to fuel exhausted

$$\frac{dm(t)}{dt} = -bv^2(t)$$

where m(t) = instantaneous mass
b = constant
v(t) = instantaneous velocity
If gases are ejected with velocity u, with respect to rocket, instantaneous acceleration of rocket should be

(1) $\frac{ubv^2(t)}{m(t)}$ (2) $\frac{ubv^2(t)}{2m(t)}$ (3) $\frac{ubv(t)}{m(t)}$ (4) $\frac{ub}{m(t)}$