PHYSICS

BOOKS - TS EAMCET PREVIOUS YEAR PAPERS

TS EAMCET ENGINEERING ENTRANCE EXAM QUESTION PAPER (2018)

Physics

1. Choose the incorrect statement from the following

A. Strong nuclear force is a short range force

B. Weak nuclear force is weakest among gravitational, electromagnetic, weak and strong nuclear forces

C. Electromagnetic force is a long range force

D. Gravitational force acts on all objects

Answer: B

Watch Video Solution

2. If V_0 is the volume of a standard unit cell of germanium crystal containing N_0 atoms, then the expression for the mass m of a volume V in terms of V_0, N_0, M_{mol} and N_A is [here, M is the molar mass of germanium and N_A is the Avogadro's constant]

A. $M\frac{V}{V_0}\frac{N_A}{N_0}$

B. $\frac{N_A}{N_0}\frac{V_0}{V}M$

C. $M\frac{V}{V_0}\frac{N_0}{N_A}$

D. $M\frac{V_0}{V}\frac{N_0}{N_A}$

Answer: C

Watch Video Solution

3. A stone is dropped from a height of 100 m, while another one is projected vertically upwards from the ground with a velocity of 25 m/s at the same time. The time in seconds after which they will have the same height is (acceleration due to gravity, $g = 10ms^{-2}$)

A. 4

B. 5

C. 6

D. 7

Answer: A

Watch Video Solution

4. A car starts from rest and moves with a constant acceleration of $5m/s^2$ for 10 s before the driver applies the brake. It then decelerates for 5 s before coming to rest, then the average speed of the car over the entire journey of the car is

A. 23 m/s

B. 30 m/s

C. 33 m/s

D. 25 m/s

Answer: D

Watch Video Solution

5. A particle moves in a circle with speed v varying with time as v(t) = 2t. The total acceleration of the particle after it completes 2 rounds of cycle is

A. 16π

B. $2\sqrt{1+64\pi^2}$

C. $2\sqrt{1+49\pi^2}$

D. 14π

Answer: B

Watch Video Solution

6. A small object is thrown at an angle 45° to the horizontal with an initial velocity v_0 The velocity is averaged for first $\sqrt{2}$ s and the magnitude of average velocity comes out to be same as that of initial velocity, i.e. $|v_0|$. The magnitude $|v_0|$ will be take, $g = 10m/s^2$)

A. $3m / s$

B. $3\sqrt{2}$m/s

C. 4m/s

D. 5m/s

Answer: D

Watch Video Solution

7. Consider a wheel rotating around a fixed axis. If the rotation angle θ varies with time as $\theta = at^2$ then the total acceleration of a point

A on the rim of the wheel is (v being the tangential velocity)

A. $\frac{v}{t}\sqrt{1+4a^2t^4}$

B. $\frac{v}{t}$

C. $\frac{v}{t}(1+4a^2t^4)$

D. $\sqrt{1+4a^2t^4}$

Answer: A

Watch Video Solution

8. A block of mass 4 m travelling at a velocity v_1 in x-direction on a frictionless horizontal plane makes a head-on collision with another block of mass 2 m travelling in opposite direction with a velocity v_2 . After collision, both the blocks travel as a single block along x-direction with a final velocity $5v_2$. The ratio of velocities i $\frac{v_1}{v_2}$ is

A. 2

B. 3

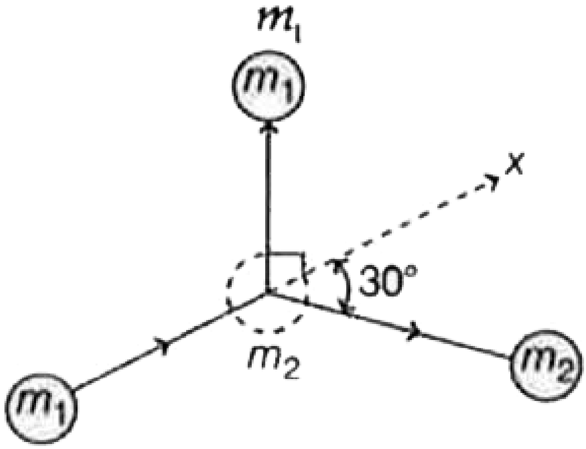
C. 5

D. 8

Answer: D

Watch Video Solution

9. A particle of mass m, moving along the X-axis collides with a stationary particle of mass m_2 and deviates by an angle 30° to the X-axis as shown in the figure. If the percentage change in kinetic energy of the combined system of these two particles reduces by 50%, then the ratio of the masses $\frac{m_2}{m_1}$ is



A. 8

B. 6

C. $\frac{8}{7}$

D. $\frac{1}{6}$

Answer: A

Watch Video Solution

10. Collision takes place between two solid spheres denoted as 1 and 2. The initial velocities of the spheres are u_1 = 3 m/s and u_2 = 1.5 m/s and the final velocities are v_1 = 2.5 m/s and v_2 = 3.5 m/s. The coefficient of restitution between the materials of the spheres is nearly

A. 0.67

B. 0.78

C. 0.83

D. 0.96

Answer: A

Watch Video Solution

11. A 30 kg boy stands at the far edge of a floating plank, whose near edge is against the shore of a river. The plank is 10 m long and weighs 10 kg. If the boy walks to the neat edge of the plank, how far from the shore does the plank move

A. 7m

B. 8m

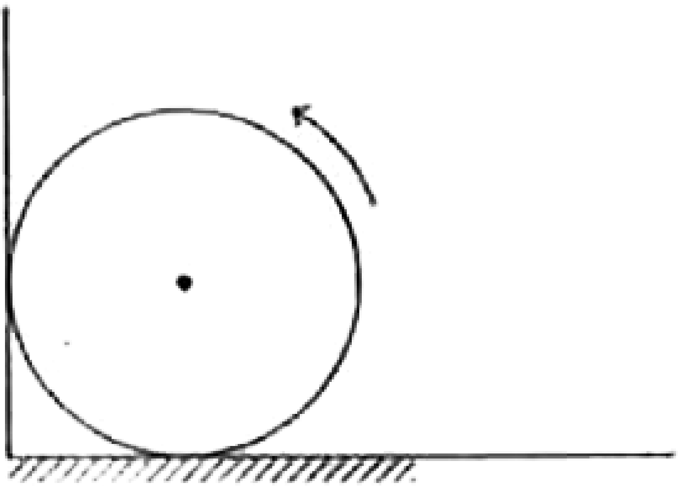
C. 7.5m

D. 15m

Answer: C

Watch Video Solution

12. A uniform cylinder of radius 1 m, mass 1 kg spins about its axis with an angular velocity 20 rad/s. At certain moment, the cylinder is placed into a corner as shown in the figure. The coefficient of friction between the horizontal wall and the cylinder is μ , whereas the vertical wall is frictionless. If the number of rounds made by the cylinder is 5 before it stops, then the value of μ is (acceleration due to gravity, $g = 10m / s^2$)



A. $\frac{3}{\pi}$

B. $\frac{2}{\pi}$

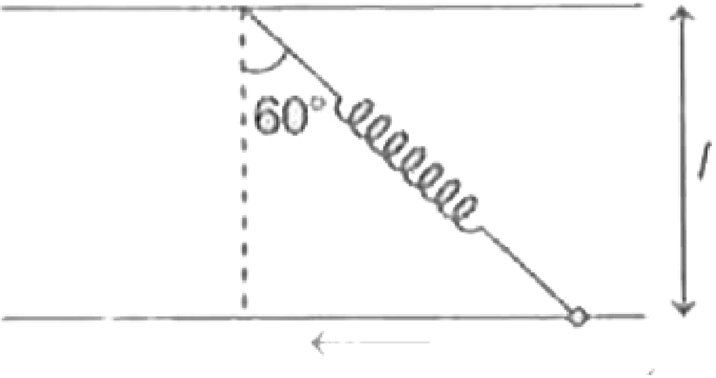
C. $\frac{1}{\pi}$

D. $\frac{0.4}{\pi}$

Answer: C

Watch Video Solution

13. A spring has a natural length l with one end fixed to the ceiling. The other end is fitted with a smooth ring which can slide on a horizontal rod fixed at distance l below the ceiling. Initially, the spring makes an angle of 60° with the vertical, when system is released from rest. Find the angle of the spring with the vertical, when the velocity of the ring reaches half of the maximum velocity, which the ring can attain during the motion.



A. 30°

B. $\cos^{-1}\left(\frac{2}{2+\sqrt{3}}\right)$

C. $\cos^{-1}\left(\frac{\sqrt{3}-1}{2}\right)$

D. 45°

Answer:

Watch Video Solution

14. From the pole of the earth, a body of mass m is imparted a velocity v_0 directed vertically up. If Mis the mass of the earth, R its radius and g is the free-fall acceleration on its surface, then the height It to which the body will ascent is (neglect air resistance)

A. $\frac{Rv_0^2}{(2gR - v_0^2)}$

B. $\frac{Rv_0^2}{2gR}$

C. R

D. $\dfrac{Rv_0^2}{(2gR + v_0^2)}$

Answer: A

Watch Video Solution

15. Young's modulus experiment is performed on a steel wire of 1 m length and 8 mm diameter. The mass required to be added in the experiment to produce 5 mm elongation of the wire is $\left(Y_{steel} = 2 \times 10^9 Nm^{-2}. g = 10m/s^2\right)$

A. 25 kg

B. 50 kg

C. 250 kg

D. 500 kg

Answer: B

Watch Video Solution

16. What is the rate at which a trapped bubble of 2 mm diameter rises slightly through a solution of density $13.6 \times 10^{3} kg / m^{3}$ and coefficient of viscosity 1.5 centipoise ? Assume, the density of air is negligible and $g = 10m / s^2$.

A. 20 m/s

B. 2 m/s

C. 0.2 m/s

D. 0.02 m/s

Answer: A

Watch Video Solution

17. An electric heater with constant heat supply rate is used to convert a certain amount of liquid ammonia to saturated vapour at high pressure. The heater takes 14 minutes to bring the liquid at $15^\circ C$ to the boiling point of $50^\circ C$ and 92 minutes to convert the liquid at the boiling point wholly to vapour. If the specific heat capacity of liquid ammonia is 4.9 kJ/kg K, the latent heat of vaporisation of ammonia in kJ/kg is

A. 557

B. 981

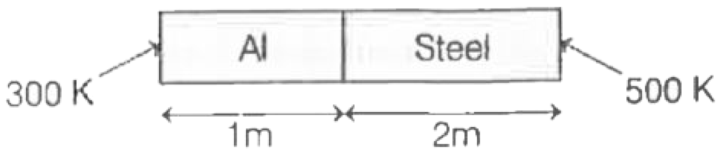
C. 1127

D. 2250

Answer: C

Watch Video Solution

18. An aluminium rod of length 1 m and a steel rod of length 2 m both having same cross-sectional area, are soldered together end-to-end. The thermal conductivity of aluminium rod and steel rod is $200 J s^{-1} m K^{-1}$ and $50 J s^{-1} m^{-1} K^{-1}$ respectively. The temperatures of the free ends are maintained at 300 K and 500 K. What is the temperature of the junction?



A. 322K

B. 350K

C. 367K

D. 400K

Answer: A

Watch Video Solution

19. One mole of the ideal gas through the process $p = p_0\left[1 - \alpha\left(\frac{V}{V_0}\right)^3\right]$, where p and V are pressure and volume p_0, V_0 and α are constant . If the maximum attainable temperature of the gas is $\left(\frac{3}{4}\right)\frac{p_0V_0}{R}$, then the value of α is

A. 2

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

C. $\frac{1}{4}$

D. 4

Answer: C

Watch Video Solution

20. A gas mixture contains n_1 moles of a monoatomic gas and n_2 moles of gas of rigid diatomic molecules. Each molecule in monoatomic and diatomic gas has 3 and 5 degrees of freedom respectively. If the adiabatic exponent $\frac{C_p}{C_v}$ for this gas mixture is 1.5, then the ratio $\frac{n_1}{n_2}$ will be

A. 1

B. 1.5

C. 2

D. 2.5

Answer: A

Watch Video Solution

21. A wire of length 50 cm and weighing 10 gm is attached to a spring at one end and to a fixed wall at the other end. The spring has a spring constant of 50 N/m and is stretched by 1 cm. If a wave pulse is produced on the string near the wall, then how much time will it take to reach the spring?

A. 0.1 s

B. 0.2 s

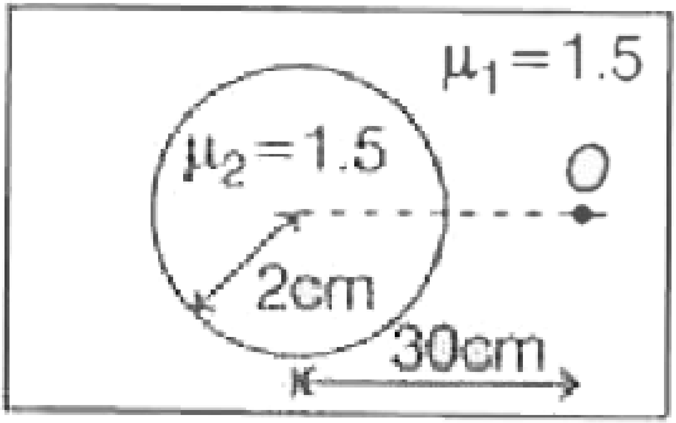
C. 0.3 s

D. 0.4 s

Answer: A

Watch Video Solution

22. Consider a point object situated at a distance of 30 cm from the centre of sphere of radius 2 cm and refractive index 1.5 as shown in the figure. If the refractive index of the region surrounding this sphere is 1.4, then the position of the image due to refraction by sphere with respect to the centre is



A. 30cm

B. 45cm

C. ∞

D. 28cm

Answer: A

View Text Solution

23. At what distance from a biconvex lens of the focal length F, must be placed an object for the distance between the object and its real image to be minimum ?

A. 2F

B. F

C. $\frac{F}{2}$

D. `4F

Answer: A

Watch Video Solution

24. In an experiment, light passing through two slits separated by a distance of 0.3 mm is projected on to a screen placed at 1 m from the plane of slits. It is observed that the distance between the central fringe and the adjacent bright fringe is 1.9 mm. The wavelength of light in nm is

A. 450

B. 495

C. 530

D. 570

Answer: D

Watch Video Solution

25. A solid sphere of radius r_1 =1 cm carries charge distributed uniformly over it with density $\rho_1 = -3C/cm^3$. It is surrounded by a concentric spherical shell of radius $r_2 = 2cm$ carrying uniform charge density $\rho_2 = \frac{1}{2} C / cm^2$. If E_d denotes the magnitude of the electric field at distance d from the common centre of the spheres, then

A. $E_d = \frac{1}{3\varepsilon_0 d^2} d \leq 1cm$

B. $\frac{1}{\varepsilon_0 d^2} d \leq 1cm$

C. $E_d = \frac{d}{3\varepsilon_0} d \leq 1cm$

D. $E_d = \frac{d}{\varepsilon_0}, d \leq 1cm$

Answer: D

Watch Video Solution

26. Two isolated, concentric, conducting spherical shells have radii R and 2R and uniform charges q and 2q respectively. If V_1 and V_2 are potentials at points located at distances 3R and $\frac{R}{2}$, respectively, from the centre of shells. Then the ratio of $\left(\frac{V_2}{V_1}\right)$ will be

A. 2

B. 1

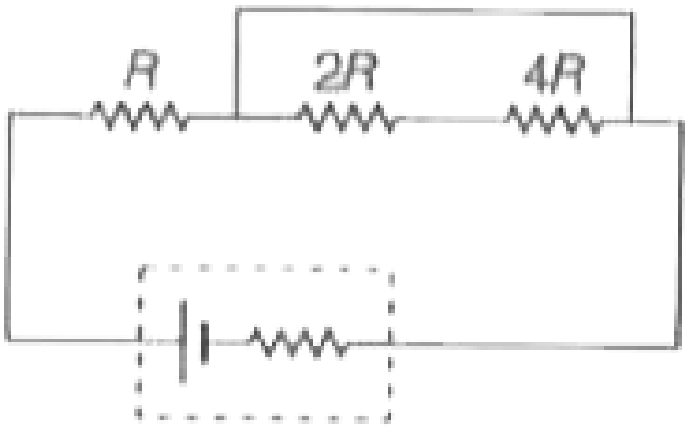
C. $\frac{1}{2}$

D. 0

Answer: A

Watch Video Solution

27. A battery with internal resistance of 4Ω is connected to a circuit consisting three resistances, R, 2R and 4R (see following figure). If the power generated in the circuit is highest, then the magnitude of R must be



A. 4Ω

B. 7Ω

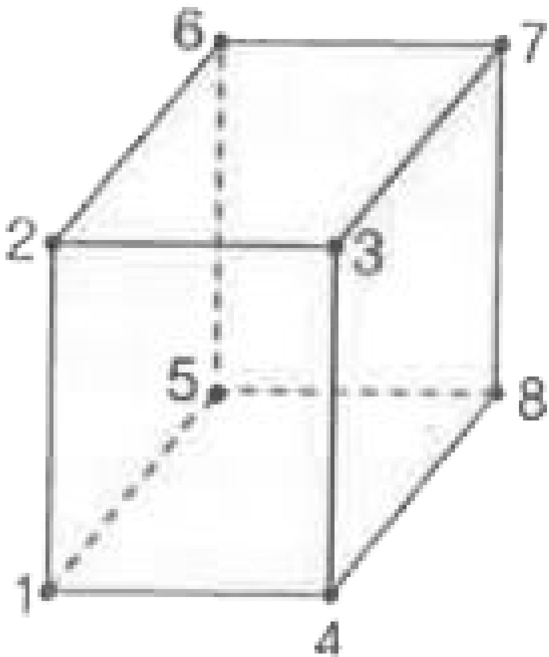
C. 10Ω

D. 14Ω

Answer: B

Watch Video Solution

28. If the resistance of each edge of a cube shaped wire frame as shown in figure below is R, then the resistance between points 1 and 7 is



A. $\frac{5R}{6}$

B. $\frac{R}{6}$

C. $5R$

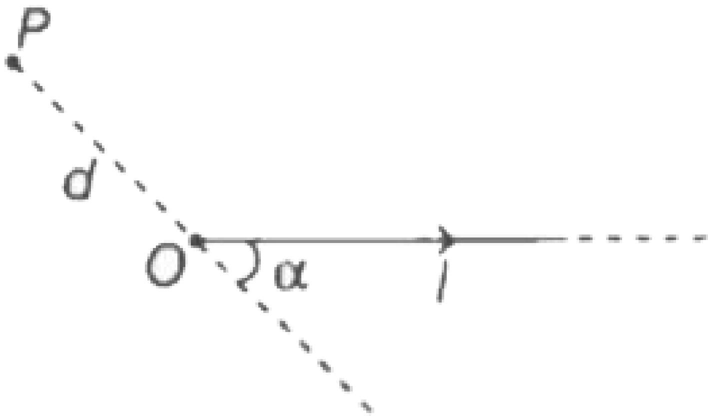
D. $\frac{6}{5}R$

Answer: A

Watch Video Solution

29. A steady current I flows through a wire with one end at O and the other end extending upto infinity as shown in the figure.

The magnetic field at a point P, located at a distance d from O is



A. $\frac{\mu_0 I}{4\pi d \cos\alpha}(1-\sin\alpha)$

B. $\frac{\mu_0 I}{2\pi d \cos\alpha}(1-\sin\alpha)$

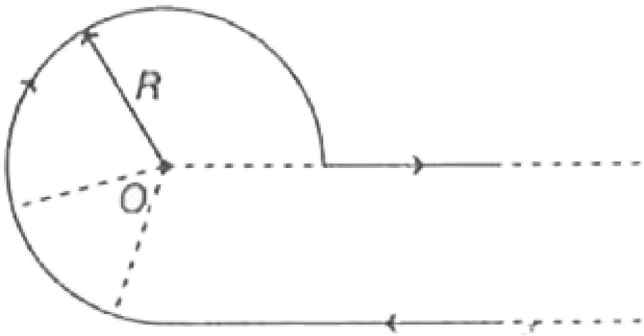
C. $\frac{\mu_0 I}{4\pi d}$

D. $\frac{\mu_0 I}{4\pi d \sin\alpha}(1-\sin\alpha)$

Answer: D

Watch Video Solution

30. The magnetic induction at point O of the given infinitely long current carrying wire shown in the figure below is



A. $\dfrac{\mu_0 I}{4\pi R}\left(1-\dfrac{3\pi}{2}\right)$

B. $\dfrac{\mu_0 I}{2\pi R(1+\pi)}$

C. $\frac{\mu_0 I}{4\pi R}\left[1+\frac{3\pi}{2}\right]$

D. $\frac{\mu_0 I}{4\pi R}$

Answer: C

Watch Video Solution

31. At a location, the horizontal component of the earth's magnetic field is 0.3 G in the magnetic meridian and the dip angle is 60° . The earth's magnetic field at this location in G is

A. 0.3

B. 0.6

C. 0.9

D. 1.2

Answer: B

View Text Solution

32. A rectangular loop of wire is placed in the XY-plane with its side of length 3 cm parallel to the X-axis and the side of length 4 cm parallel to the Y-axis. It is moving in the positive X-direction with the speed 10 cm/s. A magnetic field exists in the space with its direction parallel to the Z-axis. The field decreases by 2×10^{-3} T/cm along the positive X-axis and increases in time by 2×10^{-2} T/s. The induced emf in the wire is

A. $-4.8 \times 10^{-5} V$

B. $4.8 \times 10^{-5} V$

C. 0

D. $3.6 \times 10^{-5} V$

Answer: C

Watch Video Solution

33. A coil has inductance of 0.4 H and resistance of 8Ω . It is connected to an AC source with peak emf 4 V and frequency $\frac{30}{\pi}$ Hz. The average power. dissipated in the circuit is

A. 1W

B. 0.5

C. 0.3 W

D. 0.1 W

Answer: D

View Text Solution

34. A laser beam is operating at 100 mW. The amount of energy stored by 90 cm length of this laser beam will be

A. $2 \times 10^{-10} J$

B. $3 \times 10^{-10} J$

C. $8 \times 10^{-11} J$

D. $6 \times 10^{-11} J$

Answer: B

Watch Video Solution

35. A photon of energy 4 eV imparts all its energy to an electron that leaves a metal surface with 1.1 eV of kinetic energy. The work function of the metal is

A. 2.9 eV

B. 5.1 eV

C. 3.64 eV

D. 4.4 eV

Answer: A

Watch Video Solution

36. Consider an electron revolving in a circular orbit of hydrogen atom, whose quantum number is n=2 The velocity of the electron in that orbit is

A. $1.1 \times 10^{6} m / s$

B. $2.2 \times 10^{7} m / s$

C. $4.4 \times 10^{6} m / s$

D. $2.2 \times 10^{5} m / s$

Answer: A

Watch Video Solution

37. The hlaf - life of ${}_{84}^{209}P_0$ is 103 Years. The time is takes for 100 g sample of ${}_{84}^{209}P_0$ to decay to 3.125 g is

A. 3296 years

B. $103\sqrt{2}$ years

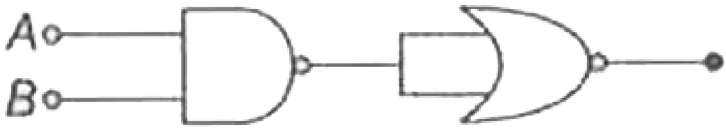
C. 1648 years

D. 515 years

Answer: D

Watch Video Solution

38. The logic operation performed by the following circuit is



A. NOR

B. AND

C. NAND

D. OR

Answer: B

Watch Video Solution

39. Which of the following statements is true?

A. A solid is an insulator or semiconductor, if its conduction band is partially filled

B. A solid is necessarily an insulator, if its conduction band is empty

C. A solid is necessarily a semiconductor, if its conduction band is empty

D. A solid is a conductor, if its conduction band is partially filled

Answer: D

Watch Video Solution

40. A transmitting and receiving antenna have height of d metres each. The maximum distance between them for satisfactory communication in Line-of-Sight mode (LOS) is 2d kilometers. If the radius of earth is 6400 km, then the yalue of d is

A. 3.2 m

B. 6.4 m

C. 12.8 m

D. 16.0 m

Answer: C

Watch Video Solution