PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET SET 28

Physics

1. The atomic number and the mass number of an atom remains unchanged when it emits

A. gamma ray

B. a neutron

C. $\beta -$ particle

D. An $\alpha -$ particle

Answer: A

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2. After absorbing a slowly moving neutrons of mass m_N (momentum ~0) a nucleus of mass M breaks into two nucleii of mass

m_1 and $5m_1(6m_1 = M + m_N)$, respectively. If the de-Broglie wavelength of the nucleus with mass m_1 is λ, then de Broglie wavelength of the other nucleus will be

A. 25λ

B. 5λ

C. $\frac{\lambda}{5}$

D. λ

Answer: D

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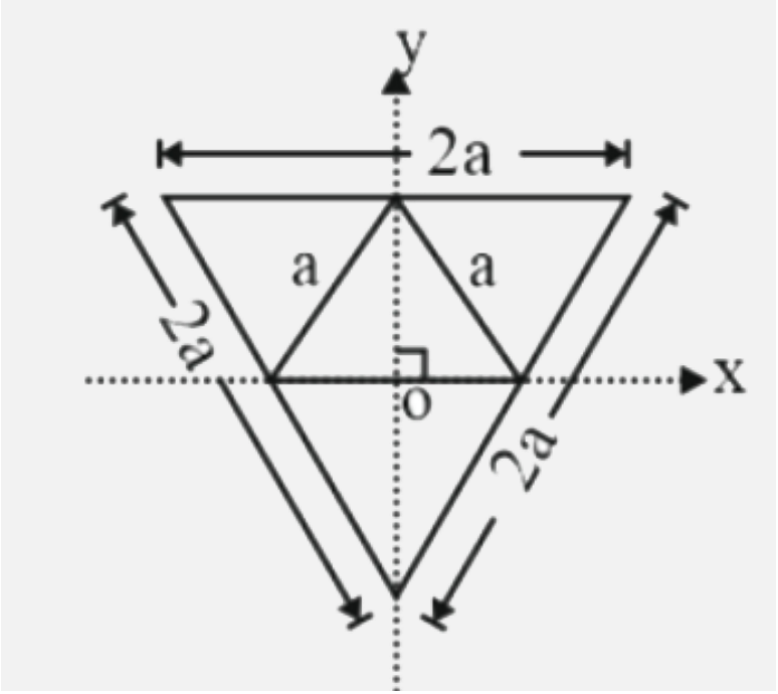
3. The y co - ordinate of the centre of mass of the system of three rods of length 2a and two rods of length a as shown in the figure is (Assume all rods to be of uniform density)



A. $\frac{9a}{8\sqrt{3}}$

B. $\frac{9a}{16\sqrt{3}}$

C. zero

D. $\frac{8a}{\sqrt{3}}$

Answer: B

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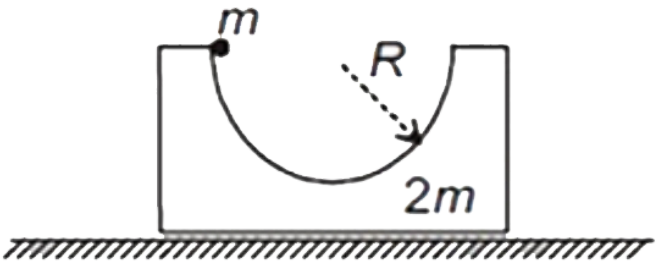
4. A small ball of mass m is released from rest from the position shown . All contact surface are smooth . The speed of the ball when it

reaches its lowest position is



A. $\sqrt{\frac{2gR}{3}}$

B. $\sqrt{\frac{4gR}{3}}$

C. $\sqrt{gR}$

D. $\sqrt{2gR}$

Answer: B

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5. Keeping the banking angle same , to increase the maximum speed with which a vehicle can travel on the curve road by $10\,\%$, the radius of curvature of the road has to be changed from 20 m to

A. 22 m

B. 40 m

C. 24.2 m

D. 14.4 m

Answer: C

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6. The magnetic susceptibility of a rod is 499. The absolute permeability of vacuum is $4\pi \times 10^{-7} H/m$. The absolute permeability of the material of the rod is

A. $\pi \times 10^{-4}$

B. $2\pi \times 10^{-4}$

C. $3\pi \times 10^{-4}$

D. $4\pi \times 10^{-4}$

Answer: B

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7. By using only two resistance coils-singly, in series, or in parallel one should be able to obtain resistances of 3, 4, 12 and 16 ohms . The separate resistances of the coil are

A. 3 and 4

B. 4 and 12

C. 12 and 16

D. 16 and 3

Answer: B

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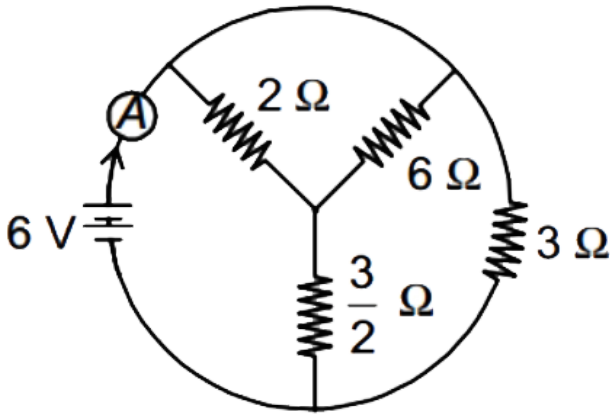
8. The reading of ammeter in the circuit shown is



A. $6A$

B. $4A$

C. $2A$

D. $1A$

Answer: B

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9. An emf of $15V$ is applied in a circuit containing $5H$ inductance and 10Ω resistance. The ratio of the currents at time $t = \infty$ and $t = 1s$ is

A. $\frac{e^2}{e^2 - 1}$

B. $1 - e^{-1}$

C. e^{-1}

D. none of these

Answer: A

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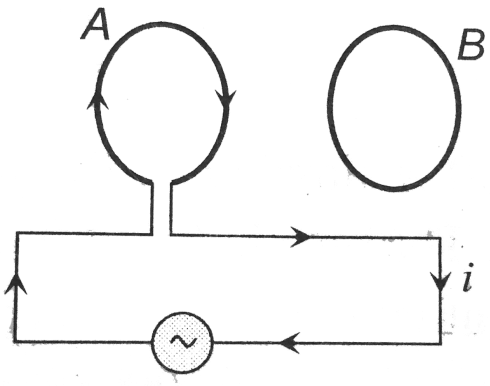
10. Two circular coils A and B are facing each other as shown in figure. The current i through A can be altered



A. there will be repulsion between A and B if i is increased

B. there will be attraction between A and B if i is increased

C. There will be neither attraction nor repulsion when i is changed

D. Attraction or repulsion between A and B depends on the direction of current. It does not depend whether the current is increased of decreased

Answer: A

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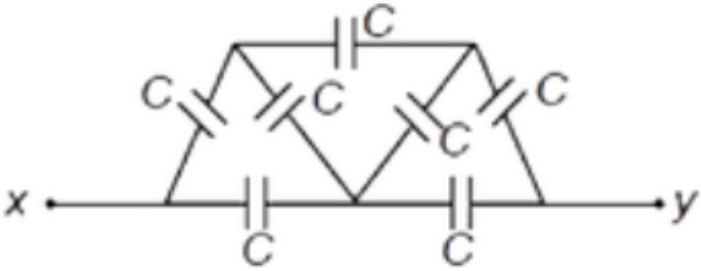
11.



Equivalent capacitance between x and y is

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

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

C. $\frac{7}{9}C$

D. $\frac{9}{7}C$

Answer: A

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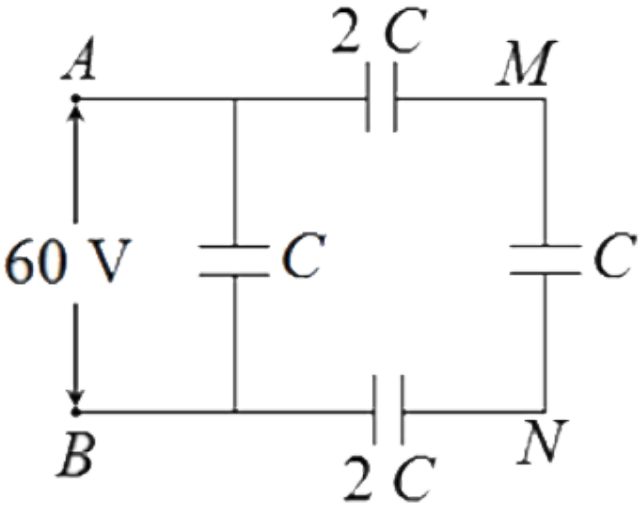
12. In the circuit shown, a potential difference of 60 V is applied across AB. The potential

difference between the points M and N is



A. 10 V

B. 15 V

C. 20 V

D. 30 V

Answer: D

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13. How high a man be able to jump on the surface of a planet of radius 320 km, but having density same as that of the earth if he jumps 5 m on the surface of the earth? (Radius of earth = 6400 km)

A. 60 m

B. 80 m

C. 100 m

D. 120 m

Answer: C

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14. A comet revolves around the sun in an eliptical orbit. When it is closest to the sun at a distance d, its corresponding kinetic energy is k_0. If it is farthest from the sun at distance

3d then the corresponding kinetic energy will be

A. $\frac{k_0}{9}$

B. $\frac{8k_0}{9}$

C. $\frac{k_0}{4}$

D. $\frac{4k_0}{9}$

Answer: A

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15. A sphere and a cube of same material and same total surface area are placed in the same evaculated space turn by turn after they are heated to the same temperature. Find the ratio of their initial rates of cooling in the enclosure.

A. $\sqrt{\frac{\pi}{6}} : 1$

B. $\sqrt{\frac{\pi}{3}} : 1$

C. $\frac{\pi}{\sqrt{6}} : 1$

D. $\frac{\pi}{\sqrt{3}} : 1$

Answer: A

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16. Pressure versus temperature graph of an ideal gas is as shown in figure. Density of the gas at point A is ρ_0 . Density at point B will be

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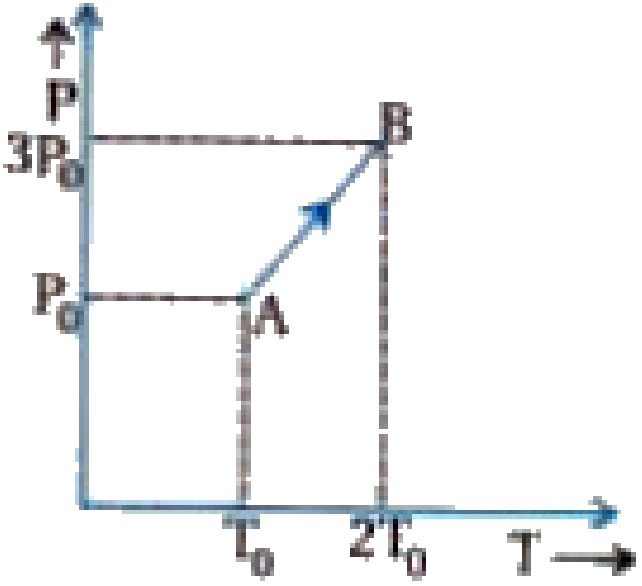

A. $\frac{3}{4}\rho_0$

B. $\frac{3}{2}\rho_0$

C. $\frac{4}{2}\rho_0$

D. $2\rho_0$

Answer: B

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17. A vessel of volume $20L$ contains a mixture o hydrogen and helium at temperature of $27^{\circ}C$ and pressure $2.0atm$ The mass of the mixture is $5g$. Assuming the gases to be ideal, the ratio of the mass of hydrogen to heat of helium in the given mixture will be

A. $1:2$

B. $2:3$

C. $2:1$

D. $2:5$

Answer: D

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18. During an adiabatic process, the pressure of a gas is found to be proportional to the cube of its absolute temperature. The ratio C_P / C_V for the gas is

A. $\frac{3}{2}$

B. $\frac{4}{3}$

C. 2

D. $\frac{5}{3}$

Answer: A

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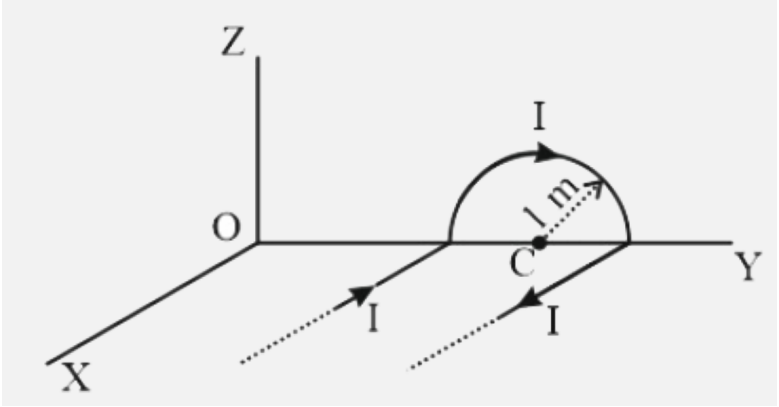
19. A long wire bent as shown in the figure carries current $I = 10A$. If the radius of the semicircular portion is 1 m, the magnetic

induction $(\text{in } \mu T)$ at the centre C is



A. $\pi^2 + 4$

B. $\sqrt{\pi^2 + 4}$

C. $\pi^2 - 4$

D. $\sqrt{\pi^2 - 4}$

Answer: B

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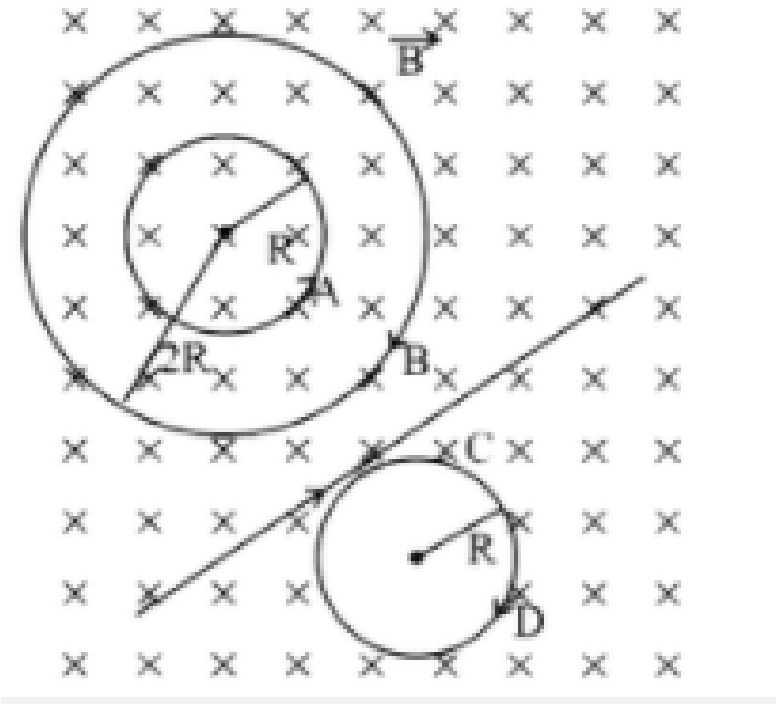
20. Four particles A, B, and C and D of masses m_A, m_B, m_B and m_D respectively, follow the paths shown in the figure, in a uniform magnetic field. Each particle moving with same speed. Q_A, Q_B, Q_C and Q_D are the specific charge of particles A, B, C and D respectively (assume that the motion of each particle is in the same plane perpendicular to the magnetic

field).



A. $Q_A < Q_B < Q_C < Q_D$

B. $Q_B < Q_D < Q_C < Q_A$

C. charge on the particle B and particle D is

of the same nature

D. work done by magnetic force on the particle C is minimum as compared to other particles

Answer: C

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21. A particle starts from rest and traverses a distance l with uniform acceleration, then moves uniformly over a further distance 2l and finally comes to rest after moving a further

distance 3l under uniform retardation. Assuming entire motion to be rectilinear motion the ratio of average speed over the journey to the maximum speed on its ways is

A. $\frac{4}{5}$

B. $\frac{3}{5}$

C. $\frac{2}{5}$

D. $\frac{1}{5}$

Answer: B

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22. A car A is moving with speed $40\ \mathrm{km\ h^{-1}}$ along a straight line 30° north of east and another car B is moving with same speed along a straight line 30° south of east. The relative velocity of car A as observed from the car B is

A. $40\ \mathrm{km\ h^{-1}}$ north - east

B. $40\ \mathrm{km\ h^{-1}}$ south

C. $40\ \mathrm{km\ h^{-1}}$ north

D. $40\ \mathrm{km\ h^{-1}}$ south - east

Answer: C

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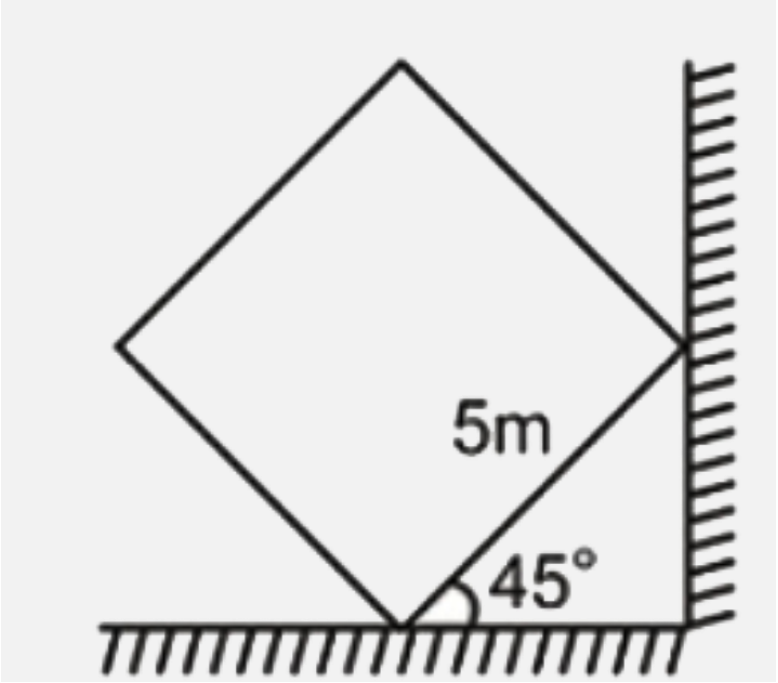
23. A symmetrical uniform solid cube of side 5 m is placed on horizontal surface beside a vertical wall, one side of the cube is making an angle 45° with the floor as shown. If coefficient of friction μ is the same for both wall and floor, the minimum value of μ so that

cube does not slip



A. $\mu = 1$

B. $\mu = 0$

C. $\mu = \frac{1}{3}$

D. Impossible to balance for any value of μ

Answer: B

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24. Two deuterons undergo nuclear fusion to form a Helium nucleus. Energy released in this process is : (given binding energy per nucleon for deuteron = 1.1 MeV and for helium = 7.0 MeV)

A. 23.6 MeV

B. 30.2 MeV

C. 25.8 MeV

D. 32.4 MeV

Answer: A

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25. The half - life of^{215} At is $100\mu, s$. The time taken for the radioactivity of a sample of^{215} At to dacay to $1/16^{th}$ of its initialy value is

A. $400\mu s$

B. $6.3\mu s$

C. $40\mu s$

D. $300\mu s$

Answer: A

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26. An object of mass 1 kg executes simple harmonic oscillations along the x - axis with a frequency of $\frac{2}{\pi}Hz$. At the position x = 1 m, the object has a kinetic energy of 24 J and

potential energy is 8J. The amplitude of the oscillation is

A. $\frac{3}{2}m$

B. 2m

C. 4m

D. 8m

Answer: B

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27. A child swinging on a swing in sitting position, stands up, then the time period of the swing will.

A. increase

B. remain same

C. decrease

D. increase if the child is long and decrease if the child is short

Answer: C

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28. In the photoelectric effect, the maximum speed of electrons is found to be $6 \times 10^5 ms^{-1}$. The wavelength used is 4000Å. The work function of the metal is

A. 2.2 eV

B. 2.076 eV

C. 2.3 eV

D. 2.4 eV

Answer: B

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29. A beam of white light is incident normally on a plane surface absorbing 70% of the light and reflecting the rest. If the incident beam of light is power P, find the force exerted by it on the surface.

A. $\frac{IA}{c}(1-\eta)$

B. $\frac{IA}{c}(\eta+1)$

C. $\frac{IA}{c}(2\eta - 1)$

D. $\frac{IA}{c}(2 - \eta)$

Answer: D

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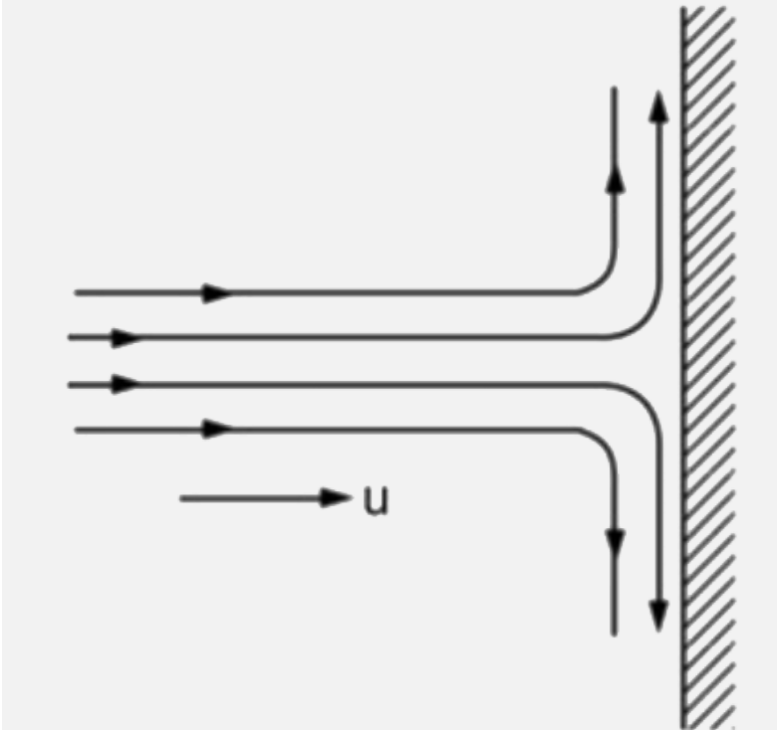
30. A stream of water of density ρ, cross sectional area A, and speed u strikes a wall that is perpendicular to the direction of the stream, as shown in the figure below. The water then flows sideways across the wall. The

force exerted by the stream on the wall is



A. $\rho u^2 A$

B. $\rho u A / 2$

C. $3\rho u^2 A$

D. $u^2 A / \rho$

Answer: A

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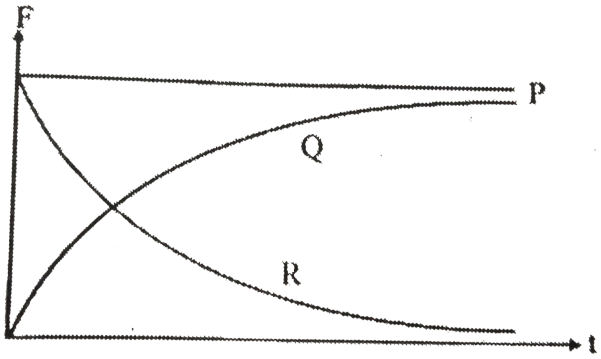
31. A spherical ball is dropped in a long column of viscous liquid. Which of the following graphs represent the variation of



(I) gravitational force with time

(ii) viscous force with time

(iii) net force acting on the ball with time

A. Q, R, P

B. R, Q, P

C. P, Q, R

D. R, P, Q

Answer: C

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32. A concave mirror used for face viewing has focal length of $0.4m$. The distance at which you hold the mirror from your face in order to see your image upright with a magnification of 5 is _____ (in m).

A. 1.60 m

B. 0.16 m

C. 0.32 m

D. 0.24 m

Answer: C

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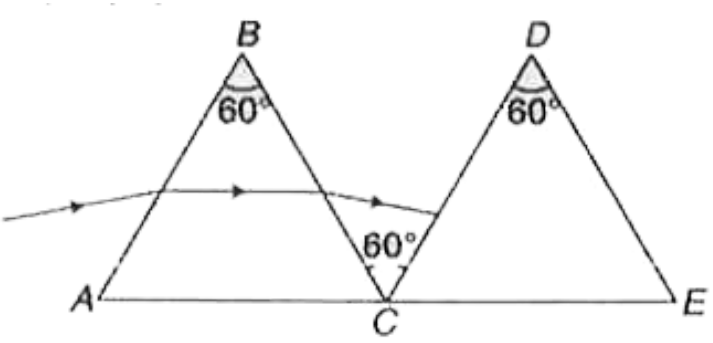
33. एक प्रकाश किरण प्रिज्म abc पर (अपवर्तनांक $= \sqrt{3}$) चित्रानुसार आपतित हो रही है |



(a) प्रिज्म abc द्वारा प्रकाश किरण का विचलन न्यूनतम होने के लिए आपतन कोण का मान ज्ञात कीजिए |

(b) दूसरे प्रिज्म (DCE) को किस कोण से घुमाया जाए, कि अंतिम किरण में नेट न्यूनतम विचलन प्राप्त हो सके?

A. 60°

B. 45°

C. 90°

D. 30°

Answer: A

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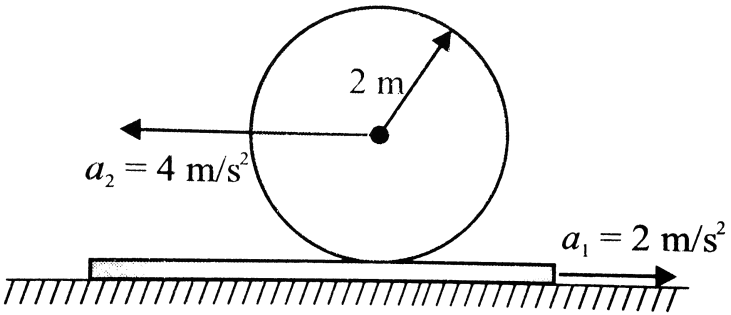
34. In Fig a sphere of radius $2m$ rolls on a plank. The accelerations of the sphere and the

plank are indicated. The value of α is



A. $2\,\text{rad s}^{-2}$

B. $4\,\text{rad s}^{-2}$

C. $3\,\text{rad s}^{-2}$

D. $1\,\text{rad s}^{-2}$

Answer: C

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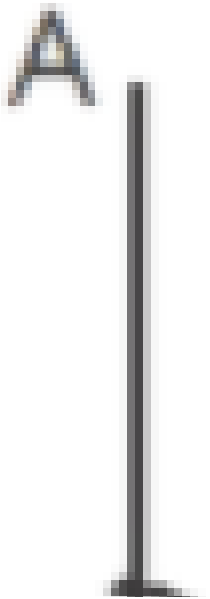
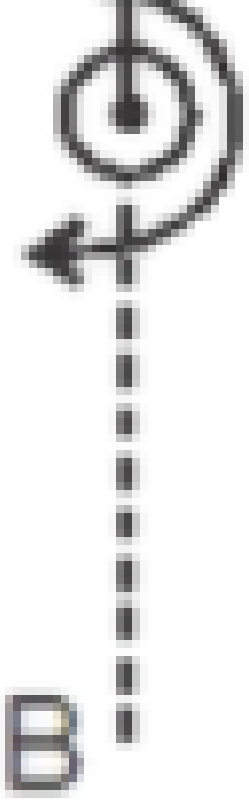
35. A uniform rod is rotating about a horizontal axis as shown. The rod is hinged at one of the ends. The rod is released from a vertical position by slightly pushing it. As the rod moves from A to B





A. both the direction and magnitude of angular momentum about the axis change

B. the direction of $\vec{L}$ changes but magnidude does

C. the direction of $\vec{L}$ does not change but magnitude does

D. neither the direction nor the magnitude changes

Answer: C

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36. The temperature dependence of resistance of Cu and undoped Si in the temperature range $300 - 400K,$ is best described by :

A. linear increase for $Cu,$ exponential decrease for Si

B. linear decrease for Cu, linear decrease for Si

C. linear increase for Cu, linear increase for Si

D. linear increase for Cu exponential increase for Si

Answer: A

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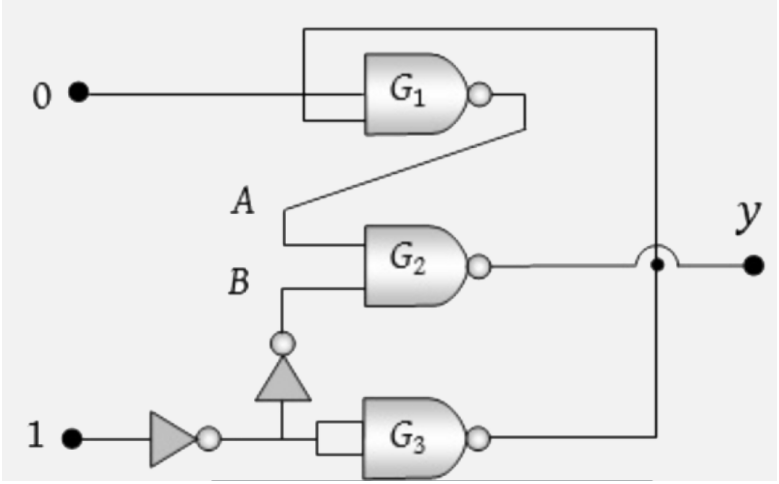
37. In the circuit shown in the following figure, the value of Y is



A. 0

B. 1

C. fluctuates between 0 and 1

D. indeterminate as the circuit cannot be realized

Answer: A

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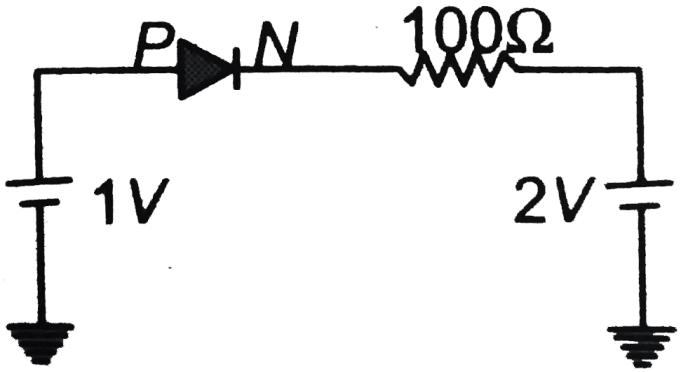
38. The current through an ideal PN-junction shown in the following circuit diagram will be



A. zero

B. 1 mA

C. 10 mA

D. 30 mA

Answer: A

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39. The R.M.S. speed of oxygen molecules at temperature T (in kelvin) is $\mathrm{v\ m\ s^{-1}}$. As the temperature becomes 4T and the oxygen gas dissociates into atomic oxygen, then the speed of atomic oxygen

A. remains the same

B. becomes 2v

C. becomes $\sqrt{2}v$

D. becomes $2\sqrt{2}v$

Answer: D

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40. Obtain the relation between degrees of freedom of a gas and ratio of two principal specific heats of the gas.

A. $\frac{2}{f}+1$

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

C. $1+\frac{1}{f}$

D. $1-\frac{1}{f}$

Answer: A

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41. If the force is given by $F=at+bt^2$ with t is time. The dimensions of a and b are

A. $[MLT^{-4}], [MLT^{-2}]$

B. $[MLT^{-3}], [MLT^{-4}]$

C. $[ML^2T^{-3}], [ML^2T^{-2}]$

D. $[ML^2T^{-3}], [ML^2T^{-4}]$

Answer: B

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42. In the Young's double slit experiment, the intensities at two points P_1 and P_2 on the screen are respectively I_1 and I_2 If P_1 is

located at the centre of a bright fringe and P_2 is located at a distance equal to a quarter of fringe width from P_1 then $\frac{I_1}{I_2}$ is

A. 2

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

C. 4

D. 16

Answer: A

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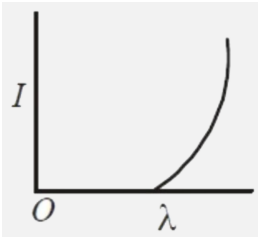
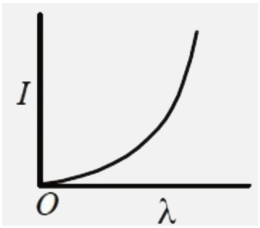
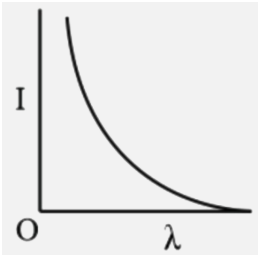
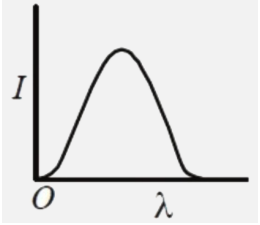
43. The anode voltage of photocellis kept fixed. The wavelength λ of the light falling on the cathode is gradually changed. The plate current I of the photocell varies as follows:

A. 

B. 

C. 

D. 

Answer: C

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44. The wavelength of H_α line in the hydrogen spectrum is found to be 6563Å in the laboratory. If the velocity of the milky way is $1.05 \times 10^6 ms^{-1}$, then the wavelength of H_α line in the spectrum of milky way will be

A. 6457Å

B. 6586Å

C. 7123Å

D. 7349Å

Answer: B

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45. The speed v reached by a car of mass m in travelling a distance x, driven with constant power P, is given by

A. $v = \frac{3xP}{m}$

B. $v = \left(\frac{3xP}{m}\right)^{1/2}$

C. $v = \left(\frac{3xP}{m}\right)^{1/3}$

D. $v = \left(\frac{3xP}{m}\right)^{2}$

Answer: C

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