PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET SET 114

Physics

1. If the radius of first Bohr orbit be a_0, then the radius of the third orbit would be-

A. 3a

B. 9a

C. 27 a

D. 81 a

Answer: B

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2. The energy levels of a hypothetical one - electron atom system are given by $E_n = \frac{16}{n^2} eV$, where $n = 1, 2, 3, \ldots\ldots$. The

wavelength of emitted photom corresponding to the transitition from first excited level to ground level is about

A. 1035 Å

B. 1220 Å

C. 3650 Å

D. 690 Å

Answer: A

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3. A particle of mass $2kg$ is initially at rest. A force starts acting on it in one direction whose magnitude changes with time. The force time graph is shown in figure. Find the velocity of the particle at the end of $10s$.

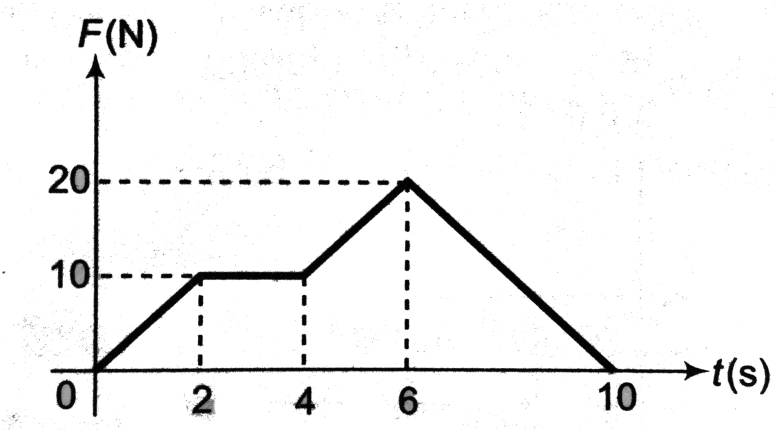

Fig. 11.29

A. $45ms^{-1}$

B. $50ms^{-1}$

C. $40ms^{-1}$

D. $60ms^{-1}$

Answer: B

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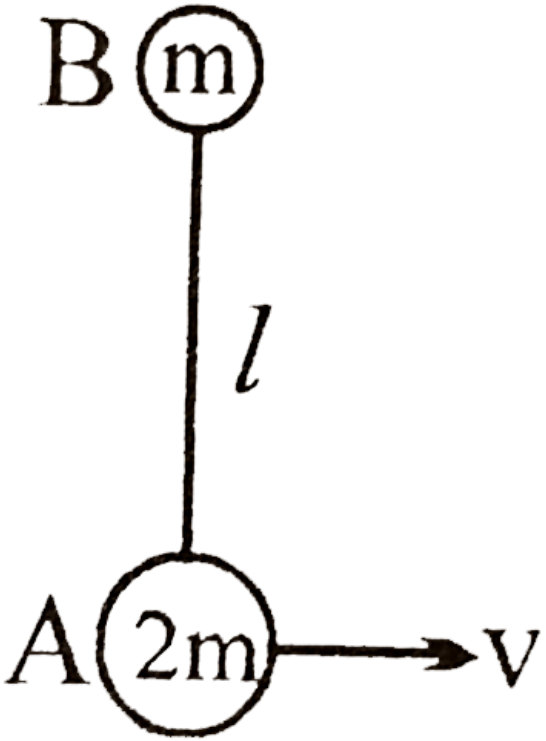
4. Two masses A and B connected with an inextensible string of length l lie on a smooth horizontal plane. A is given a velocity of vm/s along the ground perpendicular to line AB as shown in figure. Find the tension in string

during their subsequent motion



A. $\frac{2mv^2}{3l}$

B. $\frac{3mv^2}{2l}$

C. $\frac{mv^2}{2l}$

D. $\frac{4mv^2}{3l}$

Answer: A

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5. A particle performing uniform circular motion has

A. Radial velocity and radial acceleration

B. A radial velocity and transverse acceleration

C. Transverse velocity and radial acceleration

D. Transverse velocity and transverse acceleration

Answer: C

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6. The material suitable for making electromagnets should have

A. High retentivity and high coercivity

B. Low retentivity and low coercivity

C. High retentivity and low coercivity

D. Low retentivity and high coercivity

Answer: C

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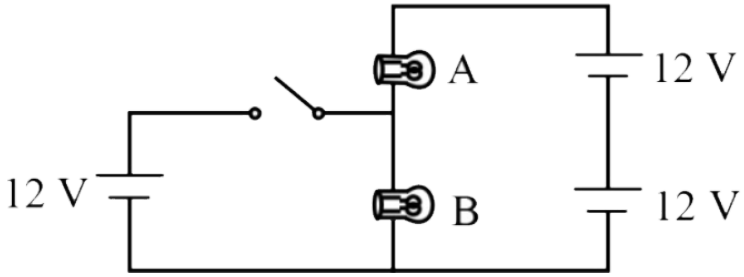
7. The light bulb A & B in the following circuits are identical. When the switch is closed



A. intensity of bulb A increase

B. intensity of bulb A decrease

C. intensity of bulb B increase

D. Nothing change

Answer: D

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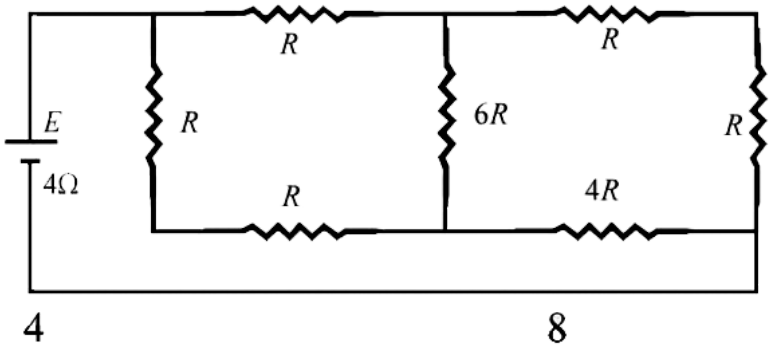
8. A battery of internal resistance 4Ω is connected to the network of resistance as shown . In order that the maximum power can be delivered to the network, the value of R in Ω should be



A. $\frac{4}{9}$

B. 2

C. $\frac{8}{3}$

D. 18

Answer: B

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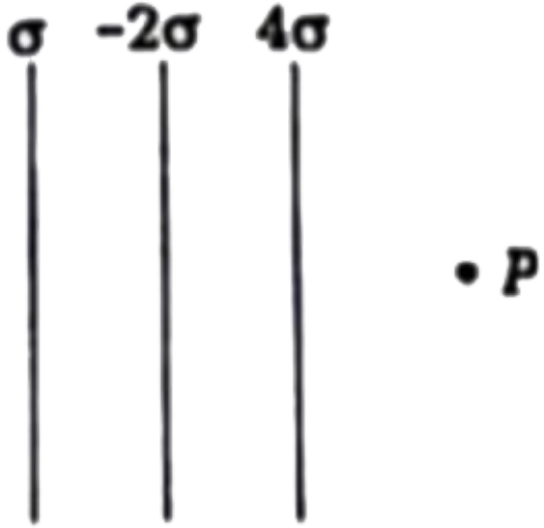
9. Three non-conducting large parallel plates have surface charge densities $\sigma, -2\sigma$ and 4σ respectively as shown in the

figure. The electric field at the point P is



A. $\frac{\sigma}{\varepsilon_0}$

B. $\frac{\sigma}{2\varepsilon_0}$

C. $\frac{3\sigma}{2\varepsilon_0}$

D. $\frac{3\sigma}{\varepsilon_0}$

Answer: C

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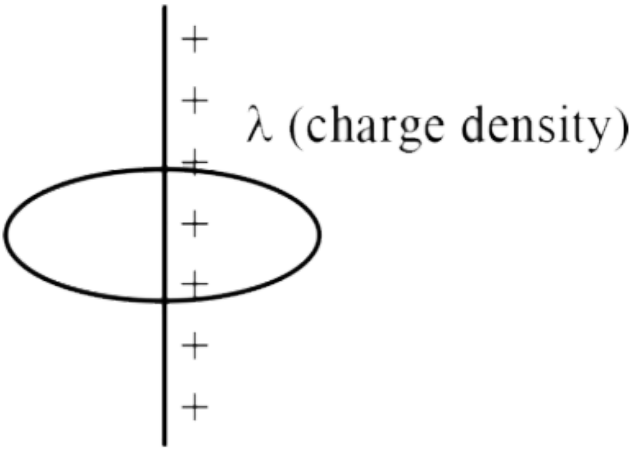
10. A very long uniformly charged rod falls with a constant velocity V through the centre of a circular loop. Then the magnitude of induced

emf in the loop is



A. $\frac{\mu_0}{2\pi}\lambda V^2$

B. $\frac{\mu_0}{2}\lambda V^2$

C. $\frac{\mu_0}{2\lambda}V$

D. zero

Answer: D

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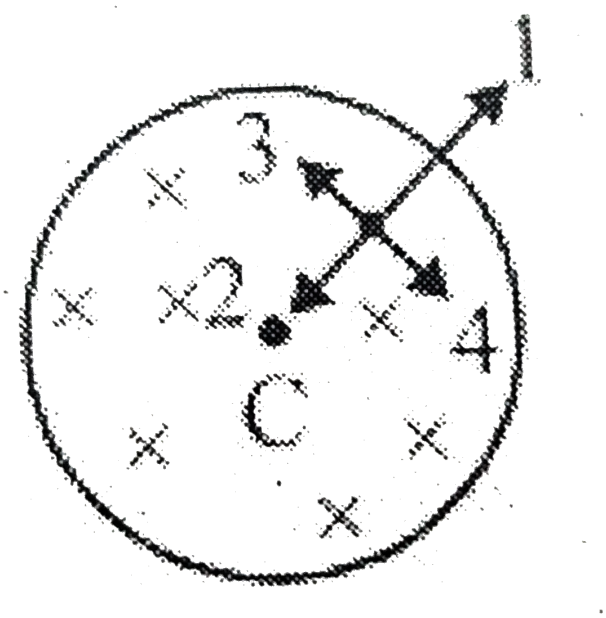
11. A uniform but time varying magnetic field exists in cylindrical region and directed into the paper. If field decreases with time and a positive charge is placed at any point inside

the region, then it moves :-



A. along 1

B. along 2

C. along 3

D. along 4

Answer: D

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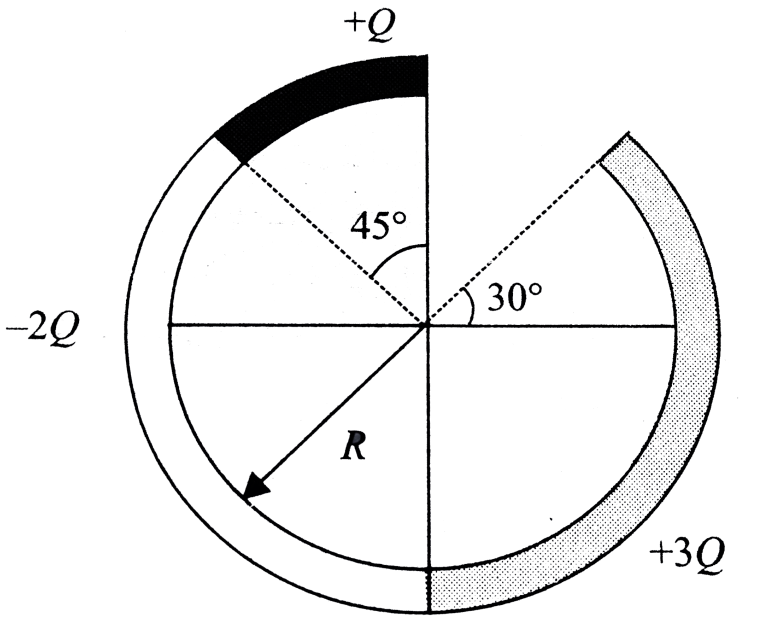
12. (Figure 3.139) shows three circular arcs, each of radius R and total charge as indicated. The net electric potential at the center of

curvature.



A. $\dfrac{Q}{2\pi\varepsilon_0 R}$

B. $\dfrac{Q}{4\pi\varepsilon_0 R}$

C. $\dfrac{2Q}{\pi\varepsilon_0 R}$

D. $\dfrac{Q}{\pi\varepsilon_0 R}$

Answer: A

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13. Average density of the earth

A. does not depend on g

B. is a complex function of g

C. is directly proportional to g

D. it inversely proportional g

Answer: C

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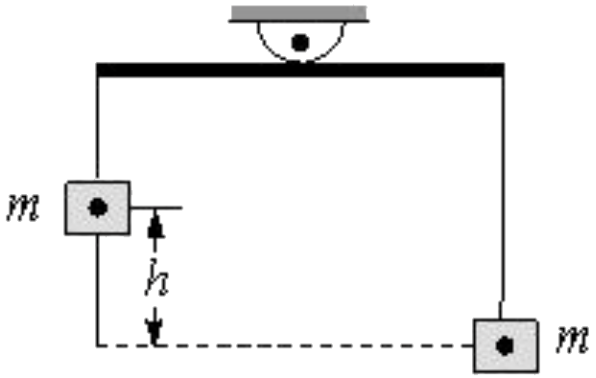
14. Two identical blocks of mass m are suspended from a beam balance whose scale pans differ in vertical height by $h(< < R)$, if R and ρ are the radius and density of the earth, then the error in weighing is



A. $\frac{2}{3}\pi\rho R^3 Gm$

B. $\frac{8}{3}\pi\rho Gmh$

C. $\frac{8}{3}\pi\rho R^3 Gm$

D. $\frac{4}{3}\pi\rho Gm^2 h$

Answer: B

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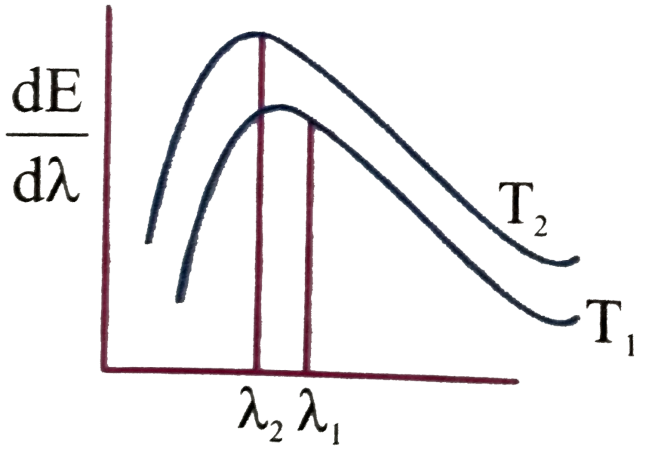
15. The spectral emissive power E_λ for a body at temperature T_1 is plotted against the wavelength and area under the curve is found

to be $9A$. At a different temperature T_2 the area is found to be A then $\lambda_1 / \lambda_2 =$



A. 3

B. $\frac{1}{3}$

C. $\frac{1}{\sqrt{3}}$

D. $\sqrt{3}$

Answer: D

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16. An engineer claims to have made an engine delivering 10 kW power with fuel consumption of $1gs^{-1}$. The calorific value of fuel is 2 k cal / g . His claim

A. is valid

B. is invalid

C. depends on engine design

D. depends on the load

Answer: B

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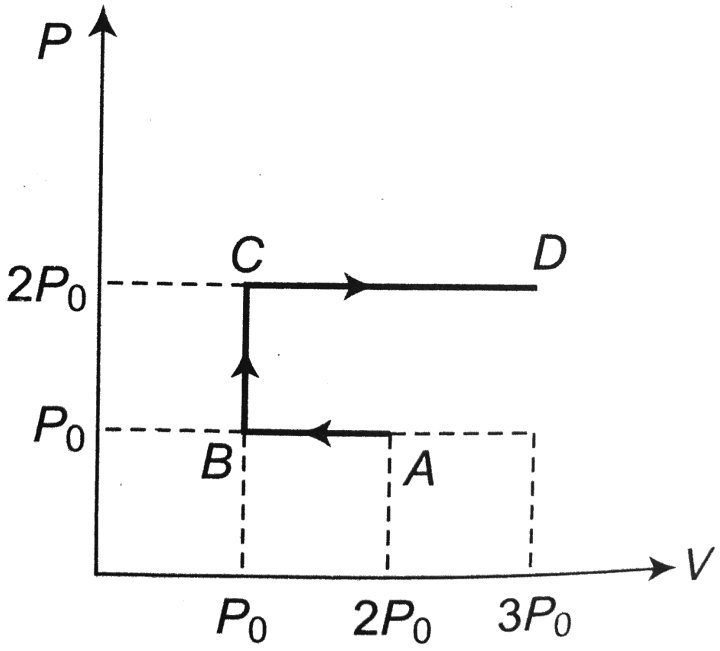
17. $P - V$ diagram of an ideal gas is as shown in figure. Work done by the gas in process

$ABCD$ is



A. $4p_0V_0$

B. $2p_0V_0$

C. $3p_0V_0$

D. p_0V_0

Answer: C

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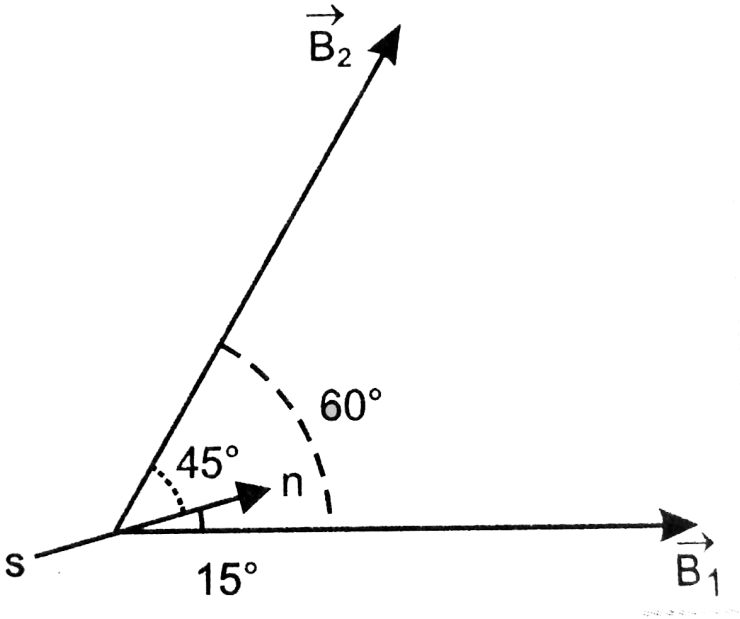
18. A magnetic dipole is under the influence of two magnetic fields. The angle between the field directions is 60° and one of the fields has a magnitude of $1 \cdot 2 \times 10^{-2}$ tesla. If the dipole comes to stable equilibrium at an angle of 15° with this field, figure, what is the

magnitude of the other field?



A. 4.4×10^{-3}

B. 4.4×10^{-4}

C. 4.8×10^{-3}

D. 4.4×10^{3}

Answer: A

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19. An electron entering field normally with a velocity $4 \times 10^7 ms^{-1}$ travels a distance of 0.10 m in an electric field of intensity $3200 Vm^{-1}$. What is the deviation from its path?

A. $1.76mm$

B. $17.6mm$

C. $176mm$

D. $0.176mm$

Answer: A

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20. A body falls freely for 10 s. Its average velocity during this journey is (Take $g = 10ms^{-2}$)

A. $100ms^{-1}$

B. $10ms^{-1}$

C. $50ms^{-1}$

D. $5ms^{-1}$

Answer: C

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21. A body is projected at time $t = 0$ from a certain point on a planet's surface with a certain velocity at a certain angle with the planet's surface (assumed horizontal). The

horizontal and vertical displacement x and y (in metre) respectively vary with time t in second as, $x = \left(10\sqrt{3}\right)t$ and $y = 10t - t^2$. The maximum height attained by the body is

A. 100 m

B. 75 m

C. 50 m

D. 25 m

Answer: D

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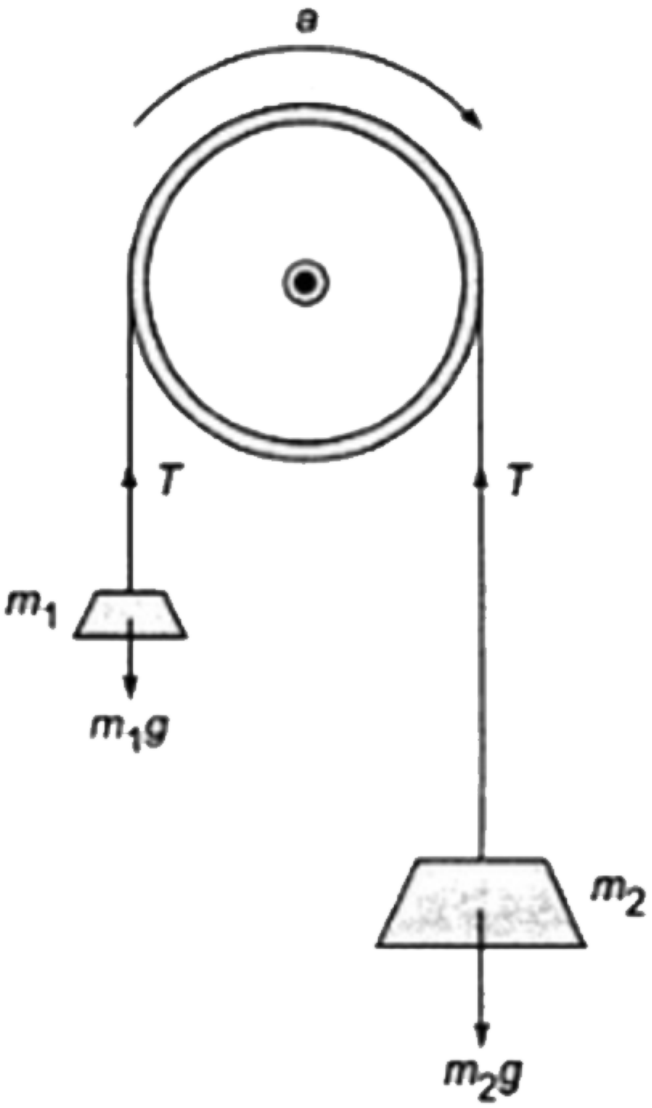
22. Two blocks of masses $m_1 = 4kg$ and $m_2 = 2kg$ are connected to the ends of a string which passes over a massless, frictionless pulley. The total downwards thrust

on the pulley is nearly



A. 27 N

B. 54 N

C. 0.8 N

D. Zero

Answer: B

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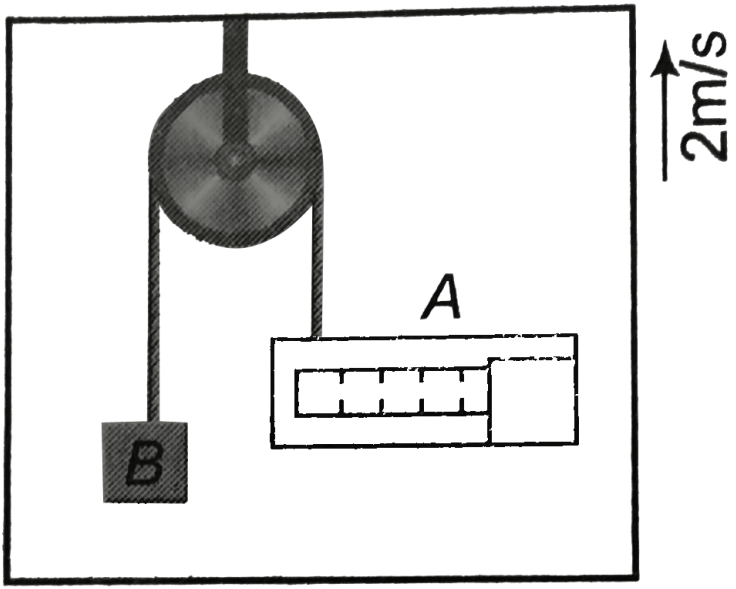
23. In the figure it is shown that the velocity of lift is $2ms^{-1}$ while string is winding on the motor shaft with velocity $2ms^{-1}$ and shaft A is moving downward with velocity $2ms^{-1}$ with

respect to lift , then find out the velocity of block B



A. $2ms^{-1}\uparrow$

B. $2ms^{-1}\downarrow$

C. $4ms^{-1}\downarrow$

D. $8ms^{-1}\uparrow$

Answer: D

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24. The activity of a radioactive sample is measures as N_0 counts per minute at $t = 0$ and N_0/e counts per minute at $t = 5\ \text{min}$. The time (in minute) at which the activity reduces to half its value is.

A. $\frac{\log_e 2}{5}$

B. $\frac{5}{\log_e 2}$

C. $5 \log_{10} 2$

D. $5 \log_e 2$

Answer: D

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25. A radioactive sample S_1 having the activity A_1 has twice the number of nucleic as another sample S_2 of activity A_2. If $A_2 = 2A_1$, then the ratio of half-life of S_1 to the half-life of S_2 is

A. 4

B. 2

C. 0.25

D. 0.75

Answer: A

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26. A point of mass m is suspended at the end of a massless wire of length l and cross-section A. If Y is the Young's modulus for the

wire, obtain the frequency of oscillation for the simple harmonic motion along the vertical line.

[Hint: If x is the displacement of mass m from the equilibrium position then $Y = \frac{stress}{stra \in} = \frac{\frac{F}{A}}{\frac{x}{l}}$ or `F = (YAx)/(l) and this force acts opposite to x. Now proceed as in example 3.

A. $\frac{1}{2\pi}\sqrt{\frac{YA}{mL}}$

B. $2\pi\sqrt{\frac{mL}{YA}}$

C. $\frac{1}{\pi}\sqrt{\frac{YA}{mL}}$

D. $\pi\sqrt{\frac{mL}{YA}}$

Answer: A

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27. Two particles are executing simple harmonic of the same amplitude (A) and frequency ω along the x-axis . Their mean position is separated by distance `X_(0) (X_(0)gtA). If the maximum separation

between them is (X_(0)+A), the phase difference between their motion is:

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

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

C. $\frac{\pi}{6}$

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

Answer: A

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28. The speed of light in vacuum is equal to

A. $\mu_0\varepsilon_0$

B. $\sqrt{\mu_0\varepsilon_0}$

C. $\frac{1}{\mu_0\varepsilon_0}$

D. $\frac{1}{\sqrt{\mu_0\varepsilon_0}}$

Answer: D

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29. Frequencies of various radiations are given as

$f_v \rightarrow$ Visible light

$f_r \rightarrow$ Radio waves

$f_{uv} \rightarrow$ Ultra Violet waves

The which of the following is true?

A. $f_{uv} = f_v < f_r$

B. $f_r < f_v < f_{uv}$

C. $f_v, f_r < f_{uv}$

D. $f_{uv}, f_r < f_v$

Answer: B

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30. An incompressible fluid flows steadily through a cylindrical pipe which has radius 2 R at point A and radius R at point B farther along the flow direction. If the velocity at point A is v, its velocity at point B is

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

B. $4V$

C. $2V$

D. V

Answer: B

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31. The stored energy per unit volume of a stretched wire is

A. Half of load $\times$ strain

B. Load $\times$ strain

C. Stress $\times$ strain

D. Half of stress $\times$ strain

Answer: D

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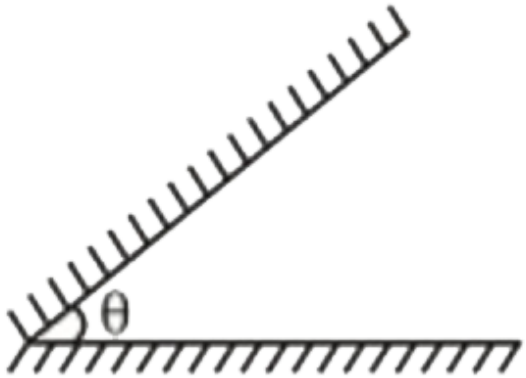
32. Two mirrors are inclined at angle θ as shown in figure. Light rays are incident parallel to one of mirrors. Light will start retracing its

path after the reflection if



A. $\theta = 45^\circ$

B. $\theta = 30^\circ$

C. $\theta = 60^\circ$

D. All three

Answer: B

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33. A ray of light travelling through rarer medium is incident at very small angle i on a glass slab and after refraction its velocity is reduced by 20%. The angle of deviation

A. $\frac{i}{8}$

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

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

D. $\frac{4i}{5}$

Answer: B

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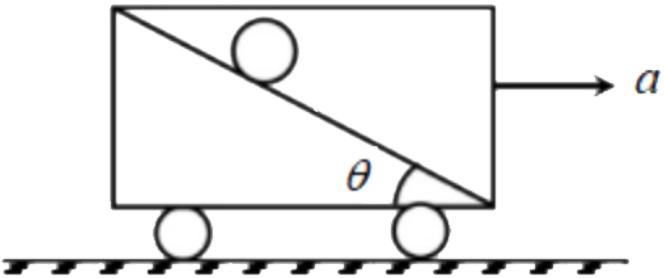
34. The figure shows a smooth inclined plane of inclination θ fixed in a car. A sphere is set in pure rolling on the incline. For what value of the acceleration of the car in the horizontal direction the sphere will continue pure

rolling?



A. $g\cos\theta$

B. $g\sin\theta$

C. $g\cot\theta$

D. $g\tan\theta$

Answer: D

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35. A disc has mass 'M' and radius 'R'. How much tangential force should be applied to the rim of the disc, so as to rotate with angular velocity 'ω' in time 't' ?

A. $\frac{MR\omega}{4t}$

B. $\frac{MR\omega}{2t}$

C. $\frac{MR\omega}{t}$

D. $MR\omega t$

Answer: B

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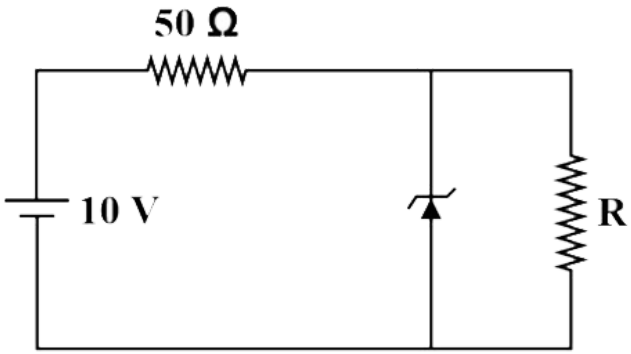
36. The 6 V Zener diode shown in the figure has negligible resistance and a knee current of 5 mA. The minimum value of R (in Ω) so that the voltage across it does not fall below 6 V is



A. 40

B. 60

C. 80

D. 120

Answer: C

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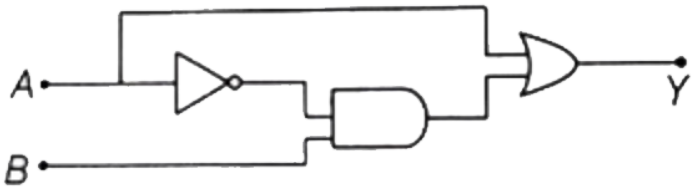
37. The circuit is equivalent to



A. AND gate

B. OR gate

C. NOT gate

D. NAND gate

Answer: B

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38. A metal ball of surface area $200cm^2$ and temperature $527^\circ C$ is surrounded by a vessel at $27^\circ C$. If the emissivity of the metal is 0.4, then the rate of loss of heat from the ball is $\left(\sigma = 5.67 \times 10^{-8} J/m^2 - s - k^4\right)$

A. $108W$

B. $168W$

C. $182W$

D. $192W$

Answer: C

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39. Energy per unit volume represents

A. Pressure

B. Force

C. Thrust

D. Work

Answer: A

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40. In Young's double experiment , in air interference pattern second minimum is observed exactly in front of one slit. The distance between the two coherent source is 'd' and the distance between source and screen 'D'. The wavelength of light source used is

A. $\frac{d^2}{D}$

B. $\frac{d^2}{2D}$

C. $\frac{d^2}{3D}$

D. $\frac{d^2}{4D}$

Answer: C

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41. With a monochromatic light, the fringe-width obtained in a Young's double slit experiment is 0.133 cm. The whole set- up is immersed in water of refractive index 1.33, then the new fringe-width is

A. Does not change

B. 1.0 mm

C. 2.0 mm

D. 2.69 mm

Answer: B

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42. A closed organ pipe of length L is in resonance with a tuning fork. If a hole is made

in the pipe at a distance $\frac{L}{4}$ from closed - end, it will be in resonance again, when:

A. Tuning fork is replaced by another of high frequency

B. Tuning fork is replaced by another of lower frequency.

C. It will be resonance with same tuning fork

D. Now the pipe will never resonate with any tuning fork.

Answer: D

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43. A 5.5 m length of string has a mass of 0.035 kg. If the tension in the string is 77 N the speed of a wave on the string is

A. $110ms^{-1}$

B. $165ms^{-1}$

C. $77ms^{-1}$

D. $102ms^{-1}$

Answer: A

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44. A particle of mass m is moving in a circular path of constant radius r such that its centripetal acceleration a_c is varying with time t as $a_c = k^2rt^2$, where k is a constant. The power delivered to the particle by the forces acting on it is :

A. $2\pi mk^2r^2$

B. mk^2r^2t

C. $\frac{mk^4r^2t^5}{3}$

D. zero

Answer: B

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45. A running man has the same kinetic energy as that of a boy of half his mass. The man speed up by $2ms^{-1}$ and the boy changes his speed by xms^{-1} so that the kinetic energies

of the boy and the man are again equal. Then x in ms^{-1} is

A. $4\sqrt{2}$

B. $2\sqrt{2}$

C. $\sqrt{2}$

D. 2

Answer: B

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