doubtnut
India's Number 1 Education App

PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET SET 19

Physics

1. The equetion of a wave travelling on a string is

$$y = 4\frac{\sin(\pi)}{2}\left(8t - \frac{x}{8}\right)$$

if x and y are in centimetres, then velocity of waves

is

A. $64cms^{-1}$ in $-x$ direction

B. $32cms^{-1}$ in $-x$ direction

C. $32cms^{-1}$ in $+x$ direction

D. $64cms^{-1}$ in $+x$ direction

Answer: D

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2. In input in a full - wave rectifier is $e = 50\sin(314t)$ volt, diode resistance is 100Ω and load resistance is $1k\Omega$ then, pulse frequency of output voltage is

A. 50 Hz

B. 100 Hz

C. 150 Hz

D. 200 Hz

Answer: B

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3. 22 g of carbon dioxide at $27^{\circ}C$ is mixed in a closed container with 16 g of oxygen at $37^{\circ}C$. If both gases are considered as ideal gases, then the temperature of the mixture is

A. $30^\circ C$

B. $30.5^\circ C$

C. $31.5^\circ C$

D. $32^\circ C$

Answer: D

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4. In a coil of area $10cm^2$ and 10 turns, magnetic field is directed perpendicular to the plane and is changing at a rate of $10^4 Ts^{-1}$. The resistance of the coil is 20Ω. The current in the coil will be

A. 0.5 A

B. 0.20833333333333

C. 5 A

D. $5 \times 10^8 A$

Answer: c

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5. There is a magnetic material of coercitivy $2 \times 10^3 Am^{-1}$. What current should flow through solenoid of length 15 cm having 150 turns to demagnetise the substance completely?

A. $4A$

B. $2.5A$

C. $2A$

D. $3.5A$

Answer: C

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6. When a resistance wire is passed through a die the cross-section area decreases by 1%, the change in resistance of the wire is

A. 1% decrease

B. 1% increase

C. 2% decrease

D. 2% increase

Answer: D

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7. The electric potential at a point $(x, 0, 0)$ is given by $V = \left[\frac{1000}{x} + \frac{1500}{x^2} + \frac{500}{x^3}\right]$ "then the electric field at" $x = 1$ m is (in volt//m)

A. $550\left(\hat{j}+\hat{k}\right)Vm^{-1}$

B. $5500\hat{i}Vm^{-1}$

C. $\frac{5500}{\sqrt{2}}\left(\hat{j}+\hat{k}\right)Vm^{-1}$

D. $\frac{5500}{\sqrt{2}}\left(\hat{i}+\hat{k}\right)Vm^{-1}$

Answer: B

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8. In a mean life of a radioactive sample

A. about $\frac{1}{3}$ of substance disintegrates

B. about $\frac{2}{3}$ of the substance disintegrates

C. about 90% of the substance disintegrates

D. almost all the substance disintegrates

Answer: B

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9. The electric field associated with a light wave is given by $E = E_0 \sin\left[\left(1.57x10^7 m^{-1}(x - ct)\right]\right.$. Find the stopping potential when this light is used in an experiment on photoelectric affect with a metal having work - function 1.9 eV.

A. $1.2V$

B. $1.5V$

C. $1.75V$

D. $1.9V$

Answer: A

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10. When $24.8keV$ X- rays strike a material, the photoelectrons emitted from K shell are observed to move in a circle of radius 23 mm in a magnetic field of $2 \times 10^{-2}T$. The binding energy of K shell electrons is

A. 6.2 keV

B. 5.4 keV

C. 7.4 keV

D. 8.6 keV

Answer: A

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11. A telescope of diameter $2m$ uses light of wavelength 5000Å for viewing stars.The minimum angular separation between two stars whose is image just resolved by this telescope is

A. 4×10^{-4} rad

B. 0.25×10^{-6} rad

C. 0.31×10^{-6} rad

D. 5×10^{-3} rad

Answer: C

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12. A fish looking up through the water sees the outside world contained in a circular horizon. If the refractive index of water is $\frac{4}{3}$ and the fish is 12 cm below the surface, the radius of this circle is cm is

A. $36\sqrt{7}$

B. $\frac{36}{\sqrt{7}}$

C. $36\sqrt{5}$

D. $4\sqrt{5}$

Answer: B

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13. The voltage E and the current I in an instrument are represented by the equations:

$E = 2\cos\omega t V$

$I = 2\sin\omega t A$

The average power dissipated in the instrument will be

A. zero

B. 1.0 W

C. 4 W

D. 2.0 W

Answer: A

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14. A charged particle enters a uniform magnetic field with velocity vector at angle of 45° with the magnetic field. The pitch of the helical path followed by the particle is p. the radius of the helix will be

A. $\frac{p}{\sqrt{2\pi}}$

B. $\sqrt{2}p$

C. $\frac{p}{2\pi}$

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

Answer: C

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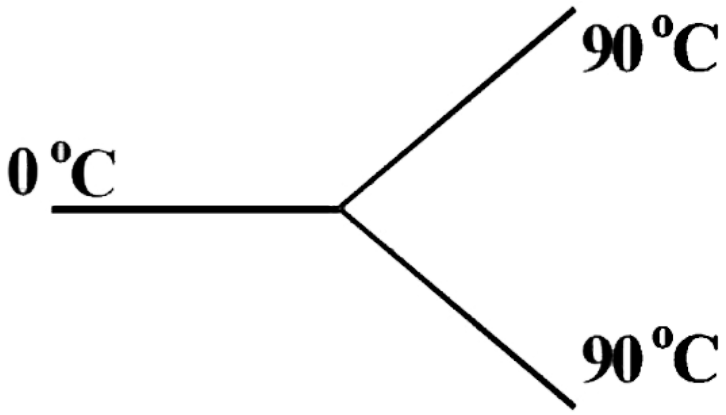
15. Three rods made of same material and having the same cross-section have been joined as shown. In the figure.Each rod is of the same length. The left and right ends are kept at $0^\circ C$ and $90^\circ C$ respectively. The temperature of the junction of the three rods will be



A. $45^\circ C$

B. $60^\circ C$

C. $30^\circ C$

D. $20^\circ C$

Answer: B

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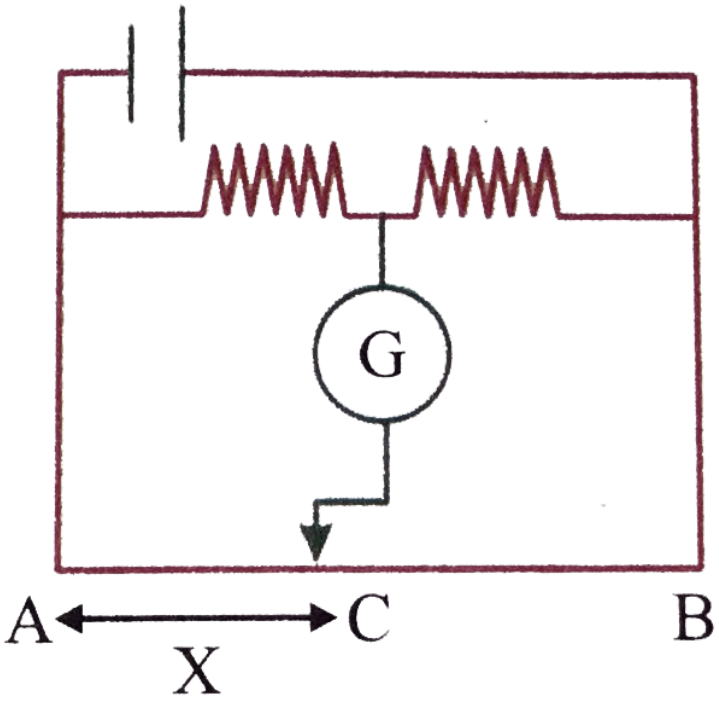
16. In the given circuit, no current is passing through the galvanometer. If the cross sectional diameter of the wire AB is doubled, then for null

point of galvanometer, the value of AC would be:



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

B. $4x$

C. $2x$

D. x

Answer: D

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17. 1000 small water drops each of radius r and charge q coalesce together to form one spherical drop. The potential of the bigger drop is larger than that of the smaller one by a factor

A. 1000

B. 100

C. 10

D. 1

Answer: B

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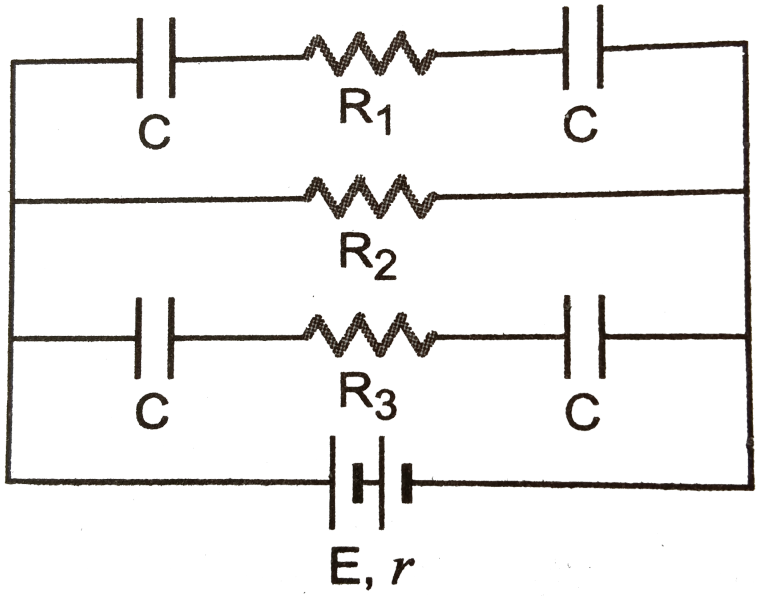
18. In Fig, $E = 5$ volt , $r = 1\Omega, R_2 = 4\Omega, R_1 = R_3 = 1\Omega$ and $C = 3\mu F.$ Then the numbercal value of the charge on each

plate of the capacitor is



A. $24\mu C$

B. $12\mu C$

C. $6\mu C$

D. $3\mu C$

Answer: C

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19. Two spheres of radii 2 cm and 3 cm are charged to the same potential. If σ and σ_2 be respectively the values of surface charge density on the conductors, then the ratio $\frac{\sigma_1}{\sigma_2}$ will be

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

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

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

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

Answer: C

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20. The average translational K.E. in one millitre volume of oxygen at NTP is

A. 0.15 J

B. 0.036 J

C. 0.56 J

D. 152 J

Answer: A

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21. An ideal gas is expanded so that the amount of heat given is equal to the decrease in internal energy of the gas. The gas undergoes the process $PV^{\frac{6}{5}} =$ constant. The gas may be

A. He

B. O_2

C. Ar

D. all of the above

Answer: B

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22. A sphere of density d, specific heat s and radius r is hung by a thermally insulating thread in an enclosure which is kept at a lower temperature than the sphere. The temperature of the sphere starts to drop at a rate which depends upon the temperature difference between the sphere and the enclosure. If the temperature difference is ΔT and surrounding temperature is T_0 then rate of fall in temperature will be

[Given that $\Delta T << T_0$]

A. $\frac{12\sigma T_0^2 \Delta T}{rdc}$

B. $\frac{12\sigma T_0^3 \Delta T}{rdc}$

C. $\frac{12\sigma T_0^4 \Delta T}{rdc}$

D. $\frac{12\sigma \Delta T}{rdcT_0^8}$

Answer: B

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23. An observer moves towards a stationary source of sound, with a velocity one-fifth of the velocity of sound. What is the percentage increase in the apparent frequency?

A. $5\ \%$

B. $20\ \%$

C. zero

D. $0.5\ \%$

Answer: B

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24. Two waves represented by the following equations are travelling in the same medium $y_1 5\sin 2\pi(75t - 0.25x), y_2 = 10\sin 2\pi(150t - 0.50x)$ The intensity ratio I_1 / I_2 of the two waves is

A. $1:2$

B. $1:4$

C. $1:8$

D. $1:16$

Answer: D

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25. A second's pendulum clock having steel wire is calibrated at 20°C. When temperature is increased to 30°C, then calculate how much time does the

clock

$[\alpha_{Steel}=1.2 \times 10^{-6^{\circ}} C^{-1}$

A. 0.3628s

B. 3.626s

C. 362.8s

D. 36.28s

Answer: D

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26. A disc of mass 4 kg and of radius 1 m rolls on a horizontal surface without slipping such that the velocity of its centre of mass is $10 \ \mathrm{cm\,sec}^{-1}$, Its rotatonal kinetic energy is

A. 0.005 J

B. 0.02 J

C. 0.03 J

D. 0.01 J

Answer: D

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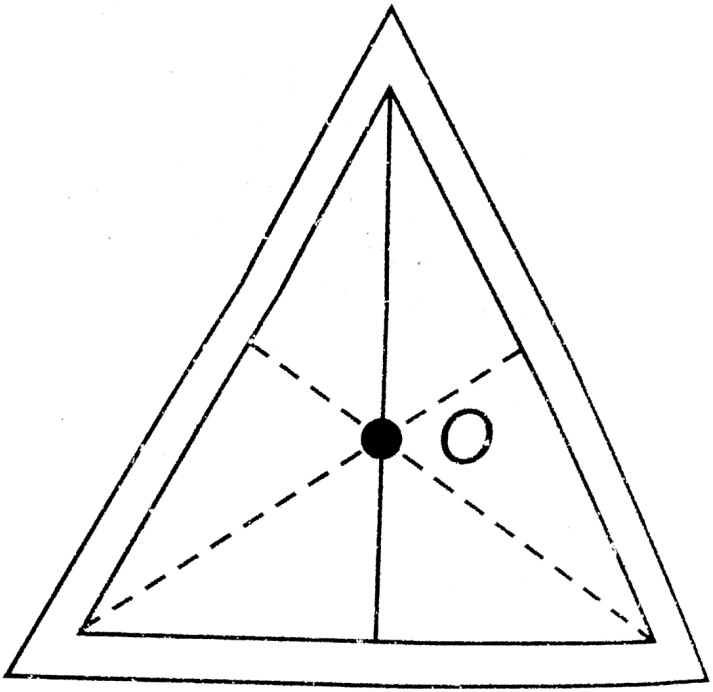
27. A rod of mass Mkg and length Lm is bent in the from of an equilateral tringle as shown in fig. The moment of inertia of the triangle about a vertical axis perpendicular to the plane of the trinangle and passing through the centre (in units of kgm^2) is.



A. $\frac{ML^2}{12}$

B. $\frac{ML^2}{54}$

C. $\frac{ML^2}{162}$

D. $\frac{ML^2}{108}$

Answer: B

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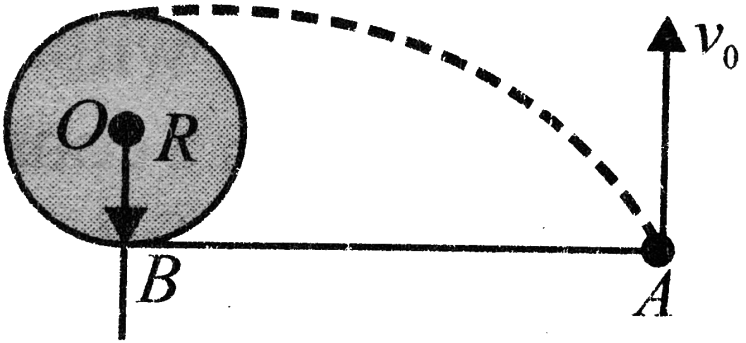
28. A horizontal plane supports a fixed vertical cylinder of radius R and a particle is attached to the cylinder by a horizontal thread AB as shown in Fig. The particle initially rest on a horizontal plane.

A horizontal velocity v_0 is imparted to the particle, normal to the threading during subsequent motion. Point out the false statements:



A. angular momentum of particle about O remains constant

B. angular momentum about B remains constant

C. momentum and kinetic energy both remain constant

D. kinetic energy along remains constant

Answer: D

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29. A cylinder rolls up an inclined plane, reaches some height, and then rolls down (without slipping throughout these motions). The directions of the frictional force acting on the cylinder are.

A. up the incline while ascending and down the incline while descending

B. up the incline while ascending as welll as descending

C. down the incline while ascending and up the incline while descending

D. down the incline while ascending as well as descending

Answer: B

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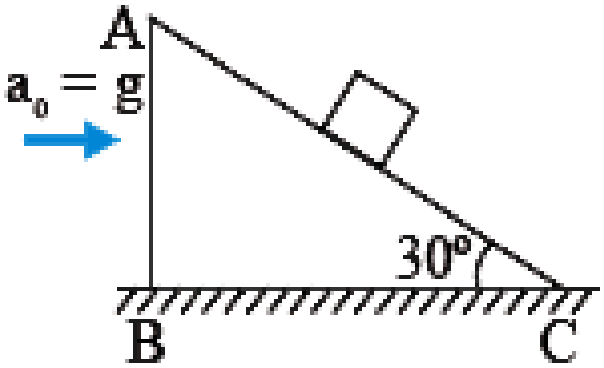
30. A block is placed on an inclined plane moving towards right horizontally with an acceleration $a_0 = g$. The length of the plane AC = 1m. Friction is absent everywhere. The time taken by the block to reach from C to A is : $(g = 10m/s^2)$



A. 1.2 s

B. 0.74 s

C. 2.56 s

D. 0.42 s

Answer: B

31. A billiard ball moving at a speed of 6.6 ms–1 strikes an identical stationary ball a glancingblow. After the collision, one ball is found to be moving at a speed of 3.3, ms–1 in a direction making an angle of 60 with the original line of motion. The velocity of the other ball is

A. $4.4ms^{-1}$

B. $6.6ms^{-1}$

C. $3.3ms^{-1}$

D. $5.7ms^{-1}$

Answer: D

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32. For proper ventilation of building, windows must be open near the bottom and top of the walls so as to let pass

A. more air in

B. cool air in near the bottom and hot air out near the roof

C. hot air in near the roof and cool air out near the bottom

D. hot air out near the roof

Answer: B

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33. A block of mass 2 kg is kept at origin at t = 0 and is having velocity $4\sqrt{5}m/s$ in positive x - direction. The only force on it is a conservative and its potential energy is defined as $U = -x^3 + 6x^2 + 15$ (SI units). Its velocity when the force acting on it is minimum (after the time t = 0) is

A. $8m/s$

B. $4m/s$

C. $10\sqrt{24}m/s$

D. none of these

Answer: A

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34. A stone of mass 500g is dropped from the top of a tower of 100m height. Simultaneously another stone of mass 1 kg is thrown horizontally with a speed of $10ms^{-1}$ from same point. The height of the centre of mass of the above two stone system after 3 sec is $\left(g = 10ms^{-2}\right)$

A. 45 m

B. 35 m

C. 55 m

D. none of these

Answer: C

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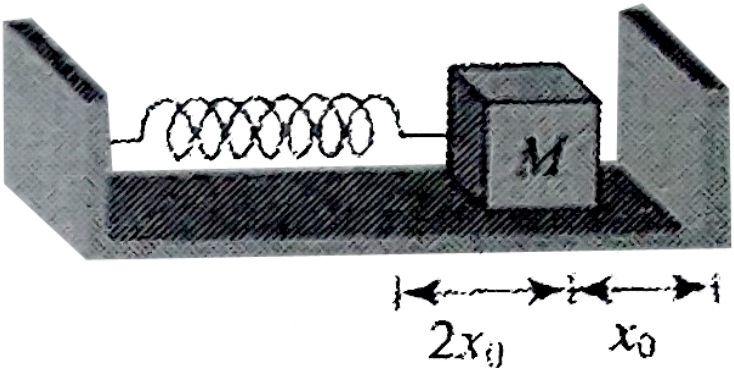
35. One end of a spring of force constant k is fixed to a vertical wall and the other to a block of mass m resting on a smooth horizontal surface. There is another wall at distance x_0 from the block. The spring is then compressed by $2x_0$ and released.

The time taken to strike the wall is



A. $\frac{\pi}{6}\sqrt{\frac{m}{k}}$

B. $\sqrt{\frac{m}{k}}$

C. $\frac{2\pi}{3}\sqrt{\frac{m}{k}}$

D. $\frac{\pi}{4}\sqrt{\frac{m}{k}}$

Answer: C

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36. The period of oscillations of a magnet is 2 sec. When it is remagnetised so that the pole strength is 4 times its period will be

A. 1 sec

B. 2 sec

C. 4 sec

D. 8 sec

Answer: A

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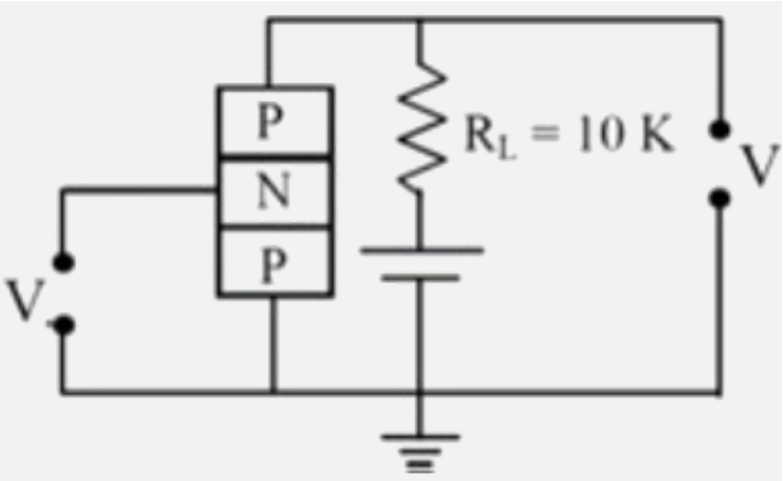
37. An $P - N - P$ transistor circuit is arranged as shown. It is a



A. common base amplifier circuit

B. common - emitter amplifier circuit

C. common - collector circuit

D. none

Answer: C

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38. A particle is thrown over a triangle from one end of a horizontal base and after grazing the vertex falls on the other end of the base. If 30° and 60° be the base angles and θ the angle of projection then $\tan\theta$ is

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

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

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

D. 3

Answer: B

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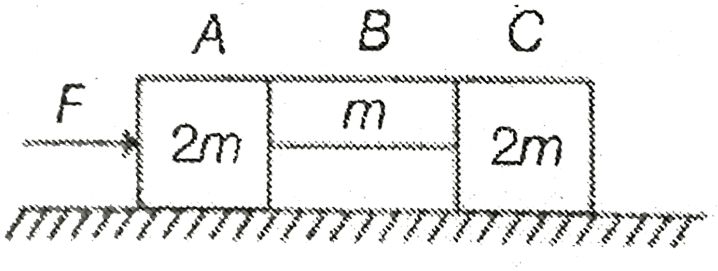
39. The system is pushed by a force F as shown in figure. All surfaces are smooth except between B and C Friction coefficient between B and C is μ. Minimum value of F to prevent block B from downward slipping is



A. $\left(\frac{3}{2\mu}\right)mg$

B. $\left(\frac{5}{2\mu}\right)mg$

C. $\left(\frac{5}{2}\right)\mu mg$

D. $\left(\frac{3}{2}\right)\mu mg$

Answer: B

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40. The potential enery of a particle varies with posiion x according to the relation $U(x) = 2x^4 - 27x$ the point $x = \frac{3}{2}$ is point of

A. unstable equilibrium

B. stable equilibrium

C. neutral equilibrium

D. none of these

Answer: B

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41. Find the quantum number n corresponding to the excited state of He^(+) ion if on transition to the ground state that ion emits two photons in succession with wavelengths state that ion emits

two photons in succession with wavelengths $1026.7 \text{ and } 304\text{Å}. \left(R = 1.096 \times 10^7 m^{-1}\right.$

A. 4

B. 6

C. 2

D. 1

Answer: B

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42. A free neutron decays into a proton, an electron and

A. the relation may be expressed as

$$._0 n^1 \rightarrow ._1 p^1 + ._{-1} e^0 + \bar{v}$$

B. every electron comes out with the same energy

C. the electron shares the major part of the energy released

D. all the above

Answer: D

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43. Photons of energy $6eV$ are incident on a metal surface whose work function is $4eV$. The minimum kinetic energy of the emitted photo - electrons will be

A. 10 eV

B. 1 eV

C. 2 eV

D. zero

Answer: D

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44. A slit of width a is illuminiated by white light. The first diffraction minimum for light of $\lambda = 6500$ Å is formed at $\theta = 30^\circ$, then the width (a) of the slit is

A. 3250Å

B. $6.5 \times 10^{-4} cm$

C. $1.3 \mu m$

D. $2.6 \times 10^{-4} cm$

Answer: C

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45. A concave lens of glass, refractive index 1.5 has both surfaces of same radius of curvature R. On immersion in a medium of refractive index 1.75, it will behave as a

A. convergent lens of focal length 3.5R

B. convergent lens of focal length 3.0 R

C. divergent lens of focal length 3.5R

D. divergent lens of focal length 3.0R

Answer: A

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