PHYSICS

BOOKS - NTA MOCK TESTS

NTA NEET SET 70

Physics

1. Which one of the following statement is $WRONG$ in the context of X- rays generated from X- rays tube ?

A. Wavelength of characteristic X - rays decrease when the atomic number of the target increases

B. Cut - off wavelength of the continuous X - rays depends on the atomic number of the target

C. Intensity of the electrical power given to the X - ray tube

D. Cut - off wavelength of the continuous X - rays depends on the electrons in the X -

ray tube

Answer: B

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2. As par Bohr model, the minimum energy (in eV) required to remove an electron from the ground state of doubly ionized Li atom $(Z = 3)$ is

A. 40.8

B. 13

C. 122.4

D. 1.51

Answer: C

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3. A gun fire bullets each of mass 1 g with velocity of $10ms^{-1}$ by exerting a constant force of 5 g weight. Then , the number of bullets fired per second is (take g = $10ms^{-2}$)

A. 50

B. 5

C. 10

D. 25

Answer: B

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4. A ball kept in a close box moves in the box making collisions with the walls. The box is

kept on a smooth surface. The velocity of the centre of mass

A. Of the box remains constant

B. Of the box plus the ball system remains constant

C. Of the ball remains constant

D. Of the ball relative to the box remains constant

Answer: B

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5. Toy cart tied to the end of an unstretched string of length a, when revolved moves in a horizontal circle of radius 2a with a time period T. Now the toy cart is speeded up until it moves in a horizontal circle of radius 3a with a period T. If Hooke's law (F=kx) holds, then

A. $T' = \sqrt{\frac{3}{2}}T$

B. $T' = \left(\frac{\sqrt{3}}{2}\right)T$

C. $T' = \left(\frac{3}{2}\right)T$

D. $T' = T$

Answer: A

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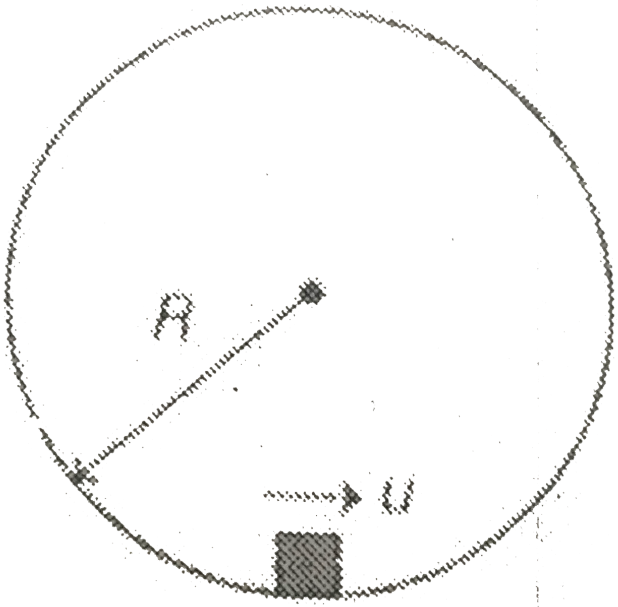
6. A particle is given an initial speed u inside a smooth spherical shell of radius $R = 1$ m such that it is just able to complete the circle. Acceleration of the particle when its velocity is

vertical is



A. $g\sqrt{10}$

B. g

C. $g\sqrt{2}$

D. 3g

Answer: A

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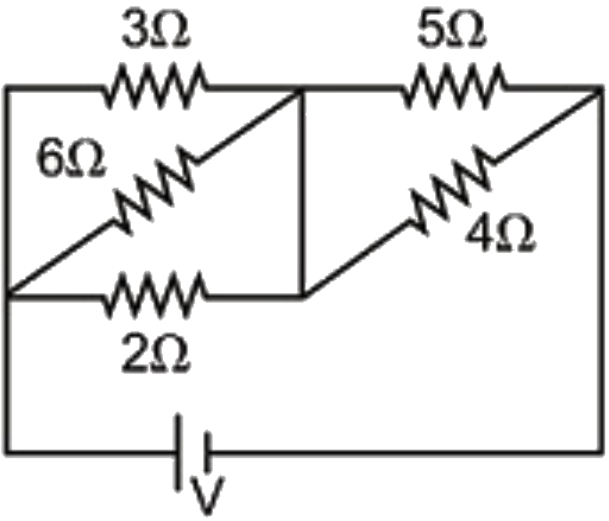
7. The resistor in which maximum heat will be produced is



A. 6Ω

B. 2Ω

C. 5Ω

D. 4Ω

Answer: D

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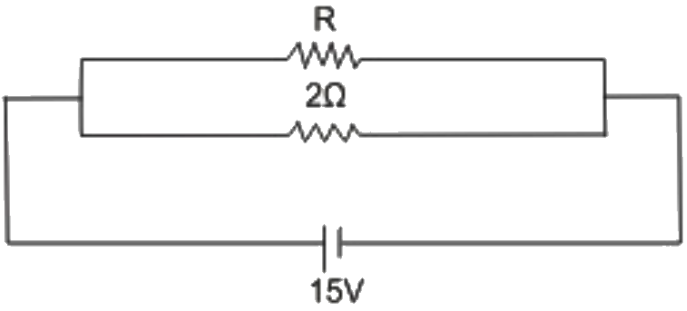
8. If in the circuit , power dissipation is 150 W, then R is



A. 2Ω

B. 6Ω

C. 5Ω

D. 4Ω

Answer: B

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9. In a series resonant LCR circuit the voltage across R is 100 volts and R = $1k(\Omega) with C = 2(\mu)F.$ The resonant frequency (ω) is $200 rad/s.$ At resonance the voltage across L is

A. $4 \times 10^{-3} V$

B. $2.5 \times 10^{-2} V$

C. $40V$

D. $250V$

Answer: D

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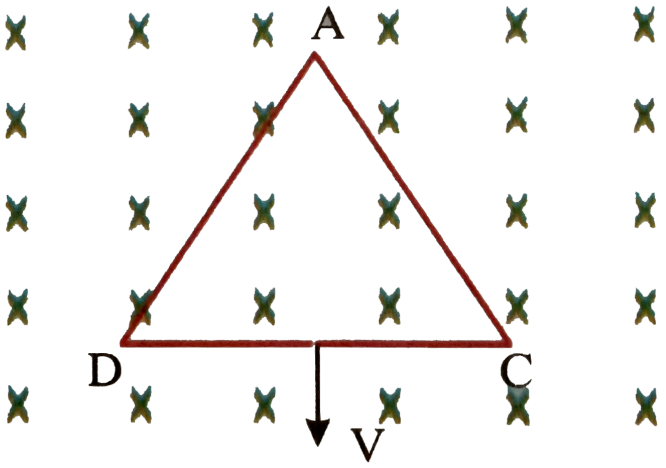
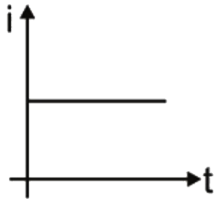
10. An equilateral triangular loop ADC having some resistance is pulled with a constant velocity v out of a uniform magnetic field directed inot the paper. At time $t = 0$, side DC of the loop at is at edge of the magnetic field.

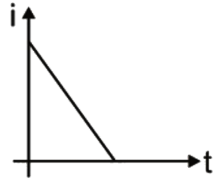


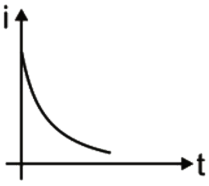
The induced current (i) versus time (t) graph will be as

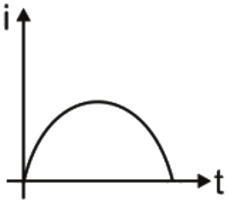
A.



B.



C. 

D. 

Answer: B

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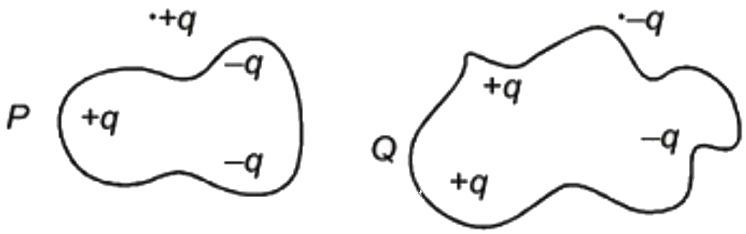
11. Arrangements of charges are shown in the figure. Flux linked with the closed surface P

and Q respectively are .....and .....



A. Zero, zero

B. $\frac{q}{\in_0}, \frac{-q}{\in_0}$

C. $\frac{-q}{\in_0}, \frac{q}{\in_0}$

D. $\frac{q}{\in_0}, zero$

Answer: C

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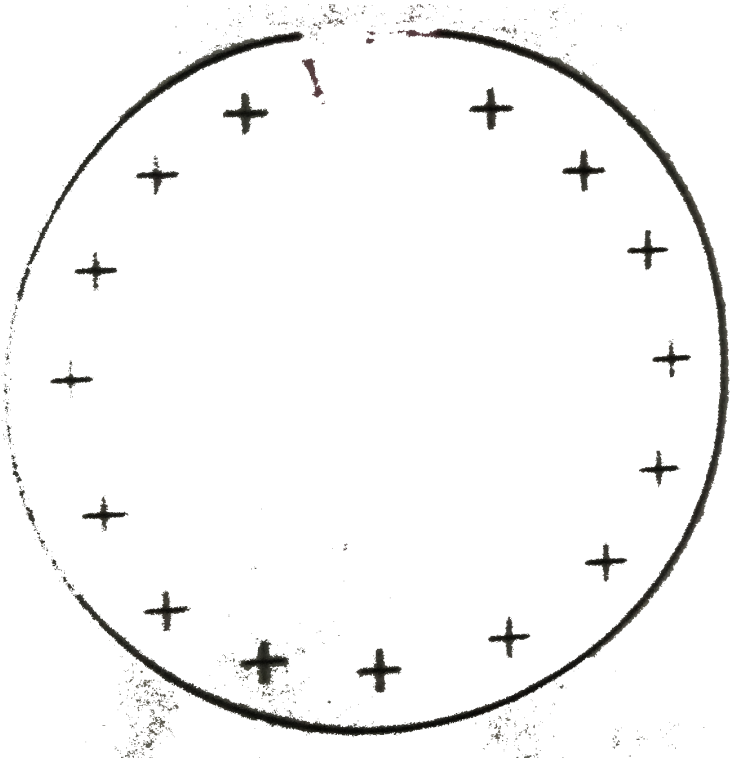
12. A ring of charge with radius $0.5m$ has 0.002π m gap. If the ring carries a charge of $+1C$ the electric field at the center is



A. $7.5 \times 10^7 NC^{-1}$

B. $7.2 \times 10^7 NC^{-1}$

C. $6.2 \times 10^7 NC^{-1}$

D. $6.5 \times 10^7 NC^{-1}$

Answer: B

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13. Let E_1 and E_2 denotes gravitational field at distance r_1 and r_2 from the axis of an infinitely long solid cylinder of the radius R. Which of the following must hold true ?

A. $E_1 < E_2$ if $r_1 < r_2 < R$

B. $E_1 > E_2$ if $R < r_1 < r_2$

C. $E_1 > E_2$, if $r_1 = R - E, r_2 = R + E$ (E

is positive constant $< R$)

D. All of the above

Answer: D

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14. The time period of a satellite of earth is 5 hours. If the separation between the centre of earth and the satellite is increased to 4 times the previous value, the new time period will become-

A. 40 hours

B. 20 hours

C. 10 hours

D. 80 hours

Answer: A

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15. The radiation emitted by a star A is 1000 times that of the sun. If the surface temperature of the sun and star A are $6000K$ and $2000K$ respectively. The ratio of the radii of the star A and the sun is:

A. $300:1$

B. $600:1$

C. $900:1$

D. $1200:1$

Answer: C

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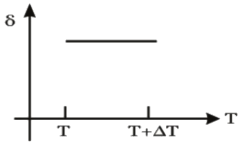
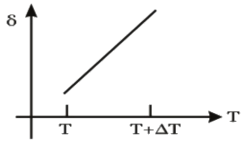
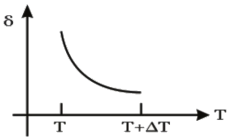
16. An ideal gas is initially at temperature T and volume V. Its volume is increased by ΔV due to an increase in temperature ΔT, pressure remaining constant. The quantity $\delta = \frac{\Delta V}{V\Delta T}$ varies with temperature as

A. 

B. 

C. 

D. 

Answer: C

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17. An ideal gas is heated at constant pressure and absorbs amount of heat Q. if the adiabatic exponent is γ. Then find the fraction of heat absorbed in raising the internal energy and perofrming the work is.

A. $1 - \frac{1}{\gamma}$

B. $1 + \frac{1}{\gamma}$

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

D. $1 + \frac{2}{\gamma}$

Answer: A

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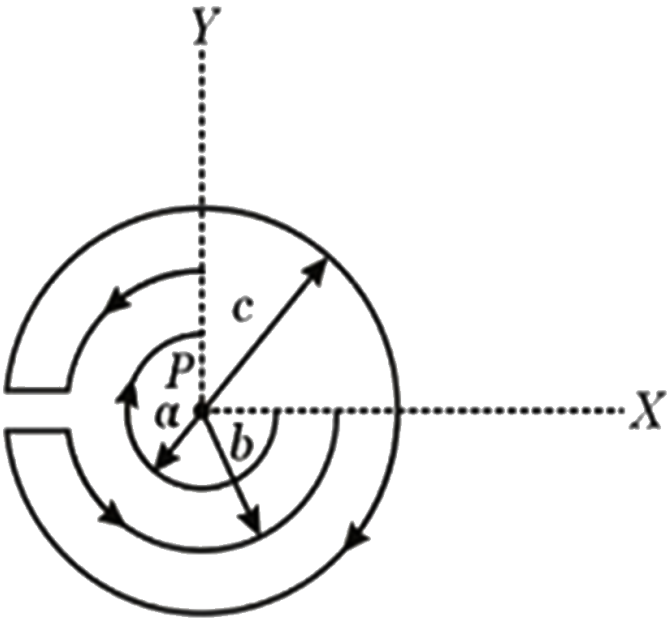
18. For c = 2 a and $a < b < c$, the magnetic field at the point P will be zero when



A. a = b

B. $a = \frac{3}{5}b$

C. $a = \frac{5}{3}b$

D. $a = \frac{1}{3}b$

Answer: C

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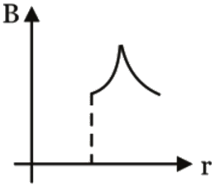
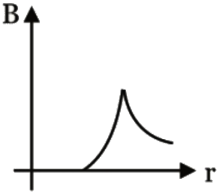
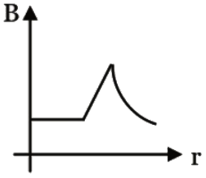
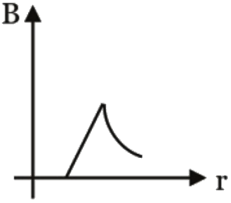
19. A current i is uniformly distributed over the cross section of a long hollow cylinderical wire of inner radius R_1 and outer radius R_2.

Magnetic field B varies with distance r form the axis of the cylinder is

A. 

B. 

C. 

D. 

Answer: B

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20. If a bar magnet of pole strength $'m'$ and magnetic moment $'M'$ is cut equally 5 times parallel to its axis and 4 times perpendicular to its axis then the pole strength and magnetic moment of each piece are respectively

A. $\frac{m}{20}, \frac{M}{20}$

B. $\frac{m}{4}, \frac{M}{20}$

C. $\frac{m}{5}, \frac{M}{20}$

D. $\frac{m}{5}, \frac{M}{4}$

Answer: C

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21. A particle is released from rest from a tower of height 3h. The ratio of time intervals for fall of equal height h i.e. $t_1 : t_2 : t_3$ is :

A. $\sqrt{3}:\sqrt{2}:1$

B. $3:2:1$

C. $9:4:1$

D. $1:\left(\sqrt{2}-1\right):\left(\sqrt{3}-\sqrt{2}\right)$

Answer: D

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22. Two bullets are fired simultaneously, horizontally and with different speeds from

the same place. Whch bullet will hit the ground first?

A. The fastest bullet

B. The slower bullet

C. Both will hit simultaneously

D. Depends on the masses

Answer: C

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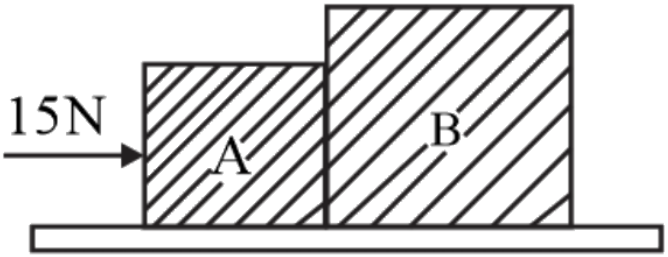
23. On a smooth plane surface (figure) two block A and B are accelerated rightwards by applying a force 15 N on A. If the mass of B is twice that of A, the force on B is



A. 30 N

B. 15 N

C. 10 N

D. 5 N

Answer: C

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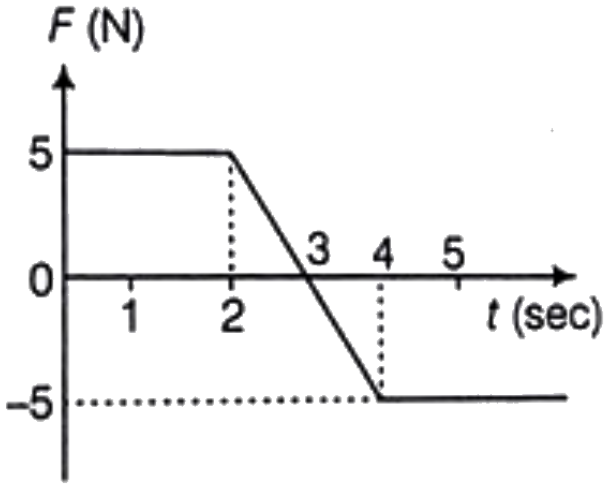
24. A block of the mass of 1 kg is moving on the x-axis . A force F acting on the block is shown . The velocity of the block at time t = 2 s is - $3ms^{-1}$ what is the speed of the block at

time t = 4 s?



A. $8ms^{-1}$

B. $2ms^{-1}$

C. $3ms^{-1}$

D. $5ms^{-1}$

Answer: C

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25. The activity of a radioactive substance becomes from 8000 Bq to 1000 Bq in 12 days . What is the half-life of the radioactive substance ?

A. 4 days

B. 6 days

C. 2 days

D. 3 days

Answer: A

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26. Calculate the energy equivalent of 1g of substance.

A. $18 \times 10^{13} J$

B. $9 \times 10^{13} J$

C. $18 \times 10^{6} J$

D. $9 \times 10^6 J$

Answer: B

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27. The time period of a simple pendulum measured inside a stationary lift is found to be T . If the lift starts accelerating upwards with an acceleration $g/3$, the time period is

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

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

C. $T\sqrt{3}$

D. $\frac{T}{\sqrt{3}}$

Answer: B

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28. A particle is subjected to two simple harmonic motions along x and y directions according to $x = 3\sin 100\pi t, y = 4\sin 100\pi t.$

A. Motion of particle will be an ellipse traversing it in clockwise direction.

B. Motion of particle will be one a straight line with slope 4/3.

C. Motion will be a simple harmonic motion along x - axis with amplitude 5.

D. Phase difference between two motions is $\pi / 2$

Answer: B

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29. Wavelength of characteristic X-ray depends on which property of target?

A. A

B. Z

C. Melting Point

D. All of these

Answer: B

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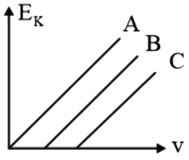
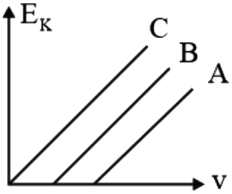
30. The work functions of three metals A, B and C are W_A, W_B and W_C respectively . They are in decreasing order. The correct graph between kinetic energy and frequency V of incident radiation is

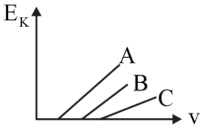
A.

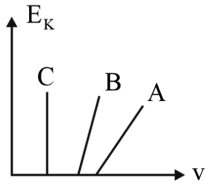


B.



C.



D. 

Answer: B

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31. Two water pipes P and Q having diameters $2 \times 10^{-2} m$ and $4 \times 10^{-2} m$, respectively, are joined in series with the main supply line of water. The velocity of water flowing in pipe P is

A. 4 times that of Q

B. 2 times that of Q

C. 1/2 times that of Q

D. 1/4 times that of Q

Answer: A

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32. A hydraulic automobile life has input and output pistons with diameters of 10 cm and 30 cm. The life is used to hold up a car with a

weight of $1.44 \times 10^4 N$.

What is the force on the input piston ?

A. $1.6 \times 10^3 N$

B. $1.5 \times 10^3 N$

C. $1.4 \times 10^3 N$

D. $1.8 \times 10^3 N$

Answer: A

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33. If the distance between the virtual image from Its real object is 60 cm in case of a concave mirror . The focal length of the concave mirror If the image formed is 3 times magnified image is

A. $+15cm$

B. $-15cm$

C. $+22.5cm$

D. $-22.5cm$

Answer: D

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34. Two thin equiconvex lenses each of focal length 0.2 m are placed coaxially with their optic centres 0.5m apart. Then find the focal length of the combination.

A. $-0.4m$

B. $0.4m$

C. $-0.1m$

D. 0.1 cm

Answer: A

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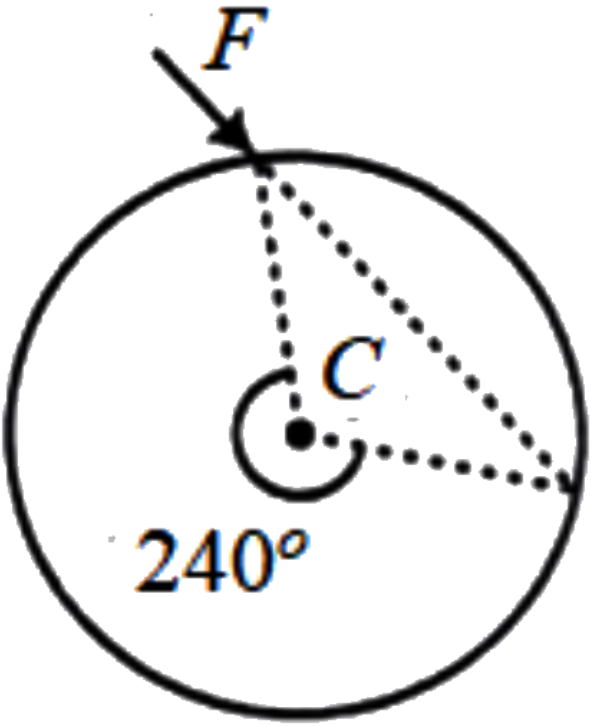
35. A uniform disc of mass M and radius R is hinged at its centre C . A force F is applied on the disc as shown . At this instant , angular

acceleration of the disc is



A. $\sqrt{3}\frac{F}{MR}$

B. $\frac{F}{MR}$

C. $\frac{2}{\sqrt{3}}\frac{F}{MR}$

D. $\frac{F}{2MR}$

Answer: B

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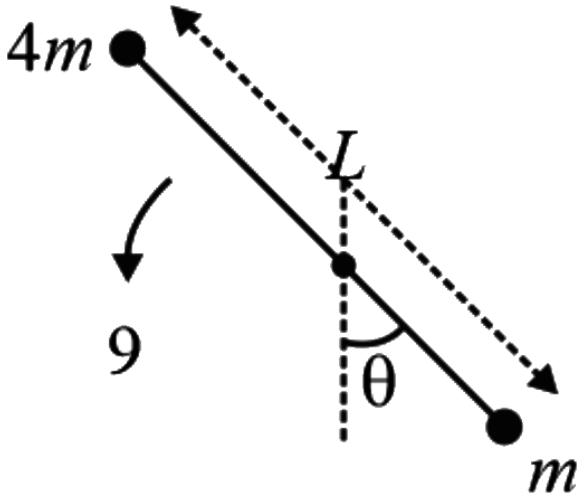
36. Two balls of mass m and 4m are connected by a rod of length L. The mass of the rod is small and can be treated as zero . The size of the balls also can of the neglected . We also assume the centre of the rod is hinged ,but the rod can rotate about its centre in the

vertical plane without friction . What is the gravity - induced angular acceleration of the rod when the angle between the rod and the vertical is θ as shown ?



A. $\frac{5g}{6L}\sin\theta$

B. $\frac{g}{6L}\cos\theta$

C. $\frac{6g}{5L}\sin\theta$

D. $\frac{g}{3L}\sin\theta$

Answer: C

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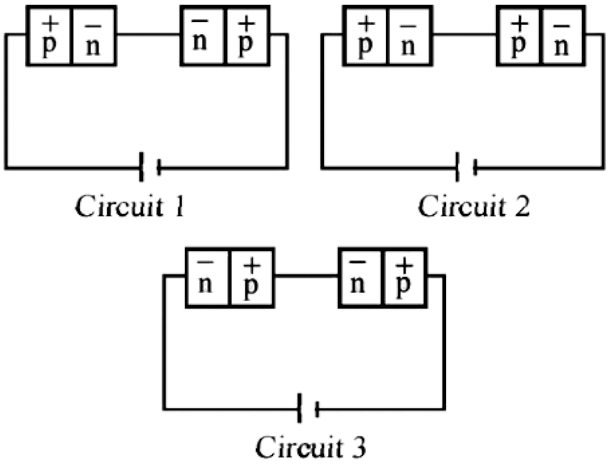
37. Two identical p-n junctions may be connected in series in which a battery in three ways , fig . The potential drops across the two

p - n junctions are equal in



A. Circuit -1, and circuit - 2

B. Circuit -2 and circuit - 3

C. Circuit -3 and circuit - 1

D. Circuit - 1 only

Answer: B

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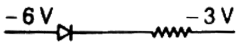
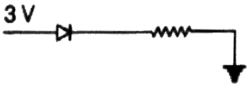
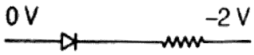
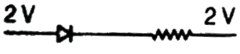
38. A reverse biased diode is

A. 

B. 

C. 

D. 

Answer: A

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39. A liquid of density $0.85g/cm^3$ flows through a calorimeter at the rate of $8.0cm^2/s$. Heat is added by means of a 250 W electric heating coil and a temperature difference of $15^\circ C$ is established in steady state conditions between the inflow and the outflow points of the liquid. The specific heat for the liquid will be

A. $0.6\text{kcal kg}^{-1}K^{-1}$

B. $0.3\text{kcal kg}^{-1}K^{-1}$

C. $0.5\text{kcal kg}^{-1}K^{-1}$

D. $0.4\text{kcal kg}^{-1}K^{-1}$

Answer: A

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40. The pressure on a square plate is measured by measuring the force on the plate and the length of the sides of the plate . If the maximum error in the measurement of force and length are , respectively , 4% and 2%.

Find the maximum error in the measurement of pressure.

A. 1%

B. 2%

C. 6%

D. 8%

Answer: D

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41. A single slit Fraunhofer diffraction pattern is formed with white light. For what wavelength of light the third secondary maximum in the diffraction pattern coincides with the secondary maximum in the pattern for red light of wavelength 6500 Å ?

A. 9100Å

B. 4642Å

C. 4100Å

D. 4400Å

Answer: B

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42. In a Young's double slit experiment the intensity at a point where tha path difference is $\frac{\lambda}{6}$ (λ being the wavelength of light used) is I. If I_0 denotes the maximum intensity, $\frac{I}{I_0}$ is equal to

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

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

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

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

Answer: A

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43. A siren emitting a sound of frequency 800 Hz moves away from an observer towards a cliff at a speed of $15ms^{-1}$. Then the frequency of sound that the observer hears in the echo

reflected from the cliff is (Take velocity of sound in air $= 330ms^{-1}$)

A. 765 Hz

B. 800 Hz

C. 838 Hz

D. 885 Hz

Answer: C

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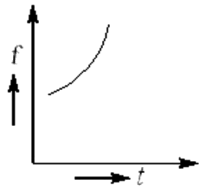
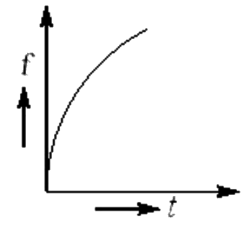
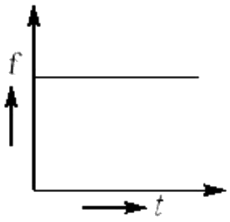
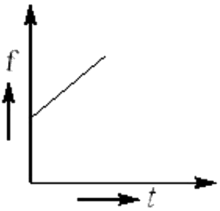
44. An observer starts moving with unifrom acceleration a towards a stationary sound soure of frequency f_o. As the observer approaches the source ,the apparent frequency f heard by the observer varies with time t as

A. 

B. 

C. 

D. 

Answer: D

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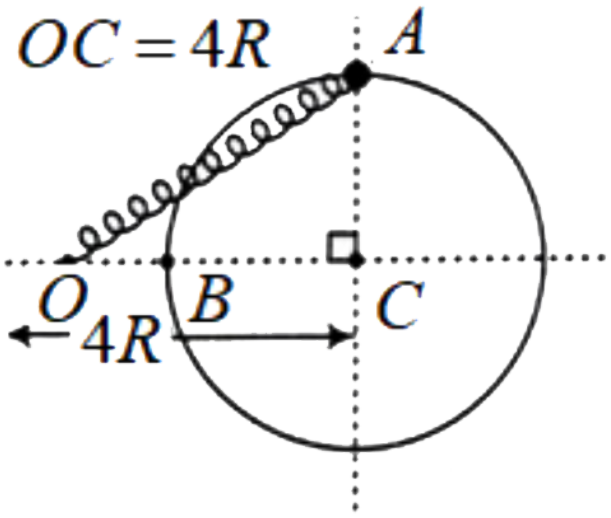
45. A bead of mass m can slide without friction on a fixed circular horizontal ring of radius 3R having a centre at the point C. The bead is

attached to one of the ends of spring of spring constant k. Natural length of spring is R and the other end of the spring is R and the other end of the spring is fixed at point O as shown in the figure. If the bead is released from position A, then the kinetic energy of the bead when it reaches point B is



A. $\frac{25}{2}kR^2$

B. $\frac{9}{2}kR^2$

C. $8kR^2$

D. $12kR^2$

Answer: C

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