PHYSICS

BOOKS - NTA MOCK TESTS

NEET MOCK TEST 13

Mcqs Physics

1. We have three beakers A , B and C containing glycerine, water and kerosene respectively. They are stirred vigorously and

placed on a table. The liquid which comes to rest at the earliest is

A. glycerin

B. water

C. kerosene

D. all of them at the same

Answer: A

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2. A block rests on a fixed rough inclined place and a horizontal force F is applied to it, as shown in the figure. Which of the following statements are correct?

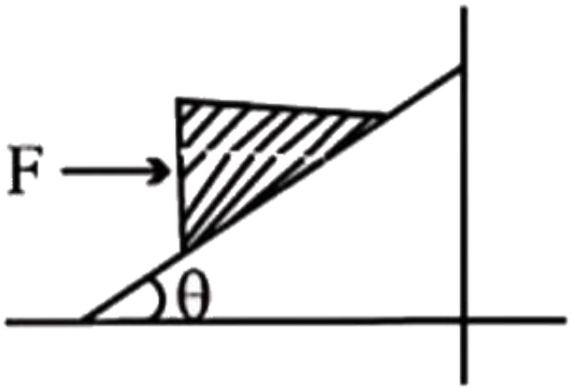
(A) Normal reaction on the block is $F \sin\theta + mg\cos\theta$

(B) The friction force is zero when $F\cos\theta = mg\sin\theta$

(C) The value of limiting friction is $\mu(mg\sin\theta + F\cos\theta)$

(D) The value of limiting friction is

$\mu(mg\sin\theta - F\cos\theta)$



A. 1,2

B. 3,4

C. 2,4

D. 2,3

Answer: A

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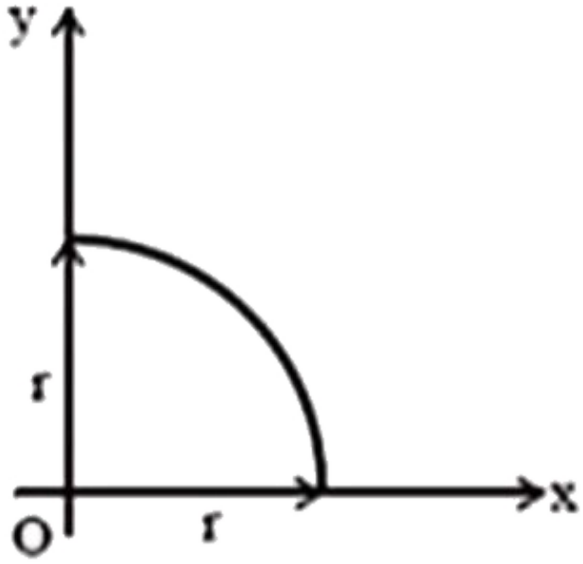
3. The coordinates of the center of mass of the following quarter circular arc are



A. $\left(\frac{r}{2}, \frac{r}{2}\right)$

B. $\left(\frac{2r}{3}, \frac{2r}{3}\right)$

C. $\left(\frac{2r}{\pi}, \frac{2r}{\pi}\right)$

D. $\left(\frac{4r}{\pi}, \frac{4r}{\pi}\right)$

Answer: C

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4. A radioactive material has mean lives of 1620 years and 660 years for α and β emissions respectively the material decays by

simultaneous α and β emission. The time in which $\frac{1}{4}th$ of the material remains intact is-

A. 4675 years

B. 720 years

C. 650 years

D. 324 years

Answer: C

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5. Two wires A an dB of the same material, having radii in the ratio I : 2 and carry currents in the ratio 4: I. The ratio of drift speed of electrons in A and Bis :

A. $16:1$

B. $1:16$

C. $1:4$

D. $4:1$

Answer: A

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6. If K_1 and K_2 are maximum kinetic energies of photoelectrons emitted when light of wavelength λ_1 and λ_2 respectively are incident on a metallic surface. If $\lambda_1 = 3\lambda_2$ then

A. $K_1 > K_2/3$

B. $K_1 < K_2/3$

C. $K_1 = 3K_2$

D. $K_2 = 3K_1$

Answer: B

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7. In Uranium (Z=92), the K absorption edge is 0.107 Å and the K_α line is 0.126 Å. The wavelength of the L absorption edge is

A. 0.7 Å

B. 1 Å

C. 2 Å

D. 3.2 Å

Answer: A

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8. A camera objective has an aperture diameter d . If the aperture is reduced to diameter $d/2$ the exposure time under identical conditions of light should be made

A. $\sqrt{2}$ fold

B. 2 fold

C. $2\sqrt{2}$ fold

D. 4 fold

Answer: D

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9. When an object is at distances x and y from a lens, a real image and a virtual image is formed respectively having same magnification. The focal length of the lens is

A. $\frac{x+y}{2}$

B. $x - y$

C. $\sqrt{xy}$

D. $x + y$

Answer: A

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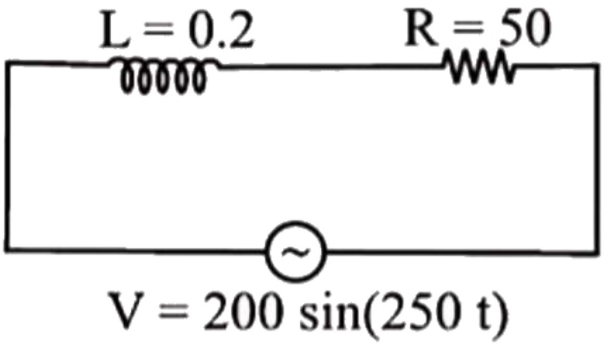
10. In the given circuit the average power developed is:



A. $50\sqrt{2}$ watt

B. 200 watt

C. $150\sqrt{2}$ watt

D. $200\sqrt{2}$ watt

Answer: B

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11. A current $I = 10\sin(100\pi t)$ amp. Is passed in first coil, which induces a maximum e.m.f of 5π volt in second coil. The mutual inductance between the coils is-

A. 5 mH

B. 10 mH

C. 15 mH

D. 20 mH

Answer: A

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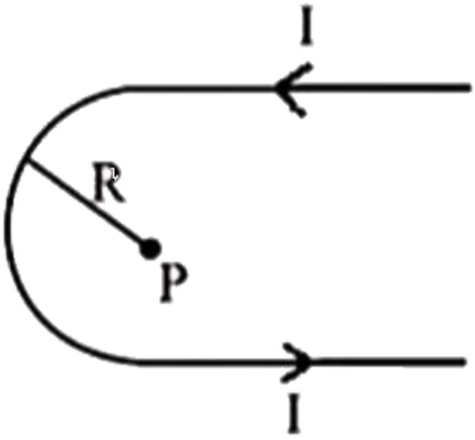
12. What will be the magnetic field at point P in the figure below?



A. $\frac{\mu_0 i}{4R}\frac{3}{4}$

B. $\frac{\mu_0 i}{4R}\left(\frac{2}{\pi}+1\right)$

C. $\frac{\mu_0 i}{2R}\left(\frac{2}{\pi}+1\right)$

D. $\frac{2\mu_0 i}{2R}\left(\frac{2}{\pi}+1\right)$

Answer: B

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13. The time of vibration of a dip needle in the vertical plane is 3 sec the magnetic needle is made to vibrate in the horizontal plane, the time of vibration is $3\sqrt{2}s$. Then angle of dip will be-

A. 90°

B. 60°

C. 45°

D. 30°

Answer: B

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14. If only one hundredth part of total current flowing in the circuit is to be passed through a

galvanometer of resistance $G\Omega$, Then the value of shunt resistance required will be-

A. $\frac{G}{10}$

B. $\frac{G}{100}$

C. $\frac{G}{99}$

D. $\frac{G}{999}$.

Answer: C

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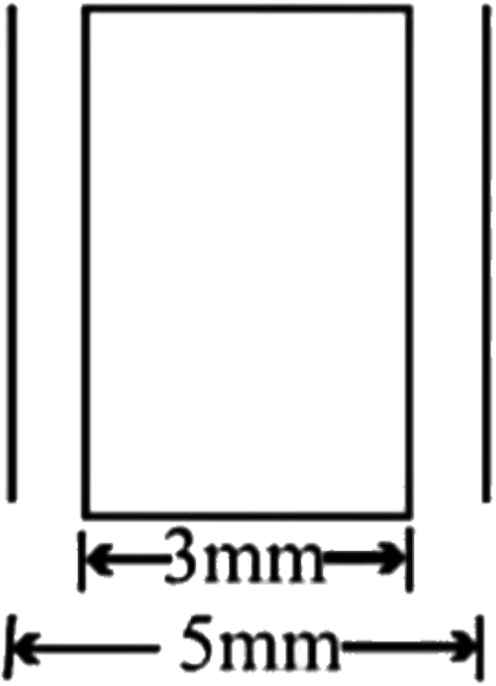
15. Separation between the plates of parallel plate capacitor is 5 mm. this capacitor, having air as the dielectric medium between the plates, is charged to a potential difference 25 V using a battery. The battery is then disconnected and a dielectric slab of thickness 3mm and dielectric constant K=10 is placed between the plates as shown. potential difference between the plates after the

dielectric slab has been introduced is-



A. 18.5V

B. 13.5V

C. 11.5V

D. 6.5V

Answer: C

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16. A capacitor of capacitance $100(\mu)F$ is charged by connecting it to a battery of emf 12 V and internal resistance $2(\Omega)$. (a) Find the time constant of the circuit. (b) Find the time taken before 99% of maximum charge is stored on the capacitor.

A. 0.92 ms

B. 0.4ms

C. 0.8ms

D. 0.1ms

Answer: A

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17. Positive charge q is given to each plate of a parallel plate air capacitor having area of each plate A and seperation between them, d. Then

find

(i) Capacitance of the system. (ii) Charges appearing on each surface of plates

(iii) Electric field between the plates (iv) Potential diffrence between the plates

(v) Energy stored between hte plates

A. since both the plates are identically charged, therefore, capacitance becomes equal to zero

B. energy stored in the space between the capacitor plates is equal to $\frac{q^2}{\varepsilon_0 A^2}$.

C. no charge appears on inner surface of the plates

D. potential difference between the plates is equal to $\frac{2qd}{\varepsilon_0 A}$

Answer: C

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18. Which of the following statements is correct?

A. When a lens is dipped in water, magnitude of its focal length increases.

B. When a lens is dipped in water, magnitude of its focal length decreases

C. When a spherical mirror is dipped in water, magnitude of its focal length increases.

D. None of these.

Answer: A

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19. A 25 W, 220V bulb and 100W, 220V bulb are joined in series and connected to the mains. Which bulb will glow brighter-

A. 25 W bulb

B. 100 W bulb

C. first 25 W bulb and then 100 W bulb

D. Both will glow with same brighteness

Answer: A

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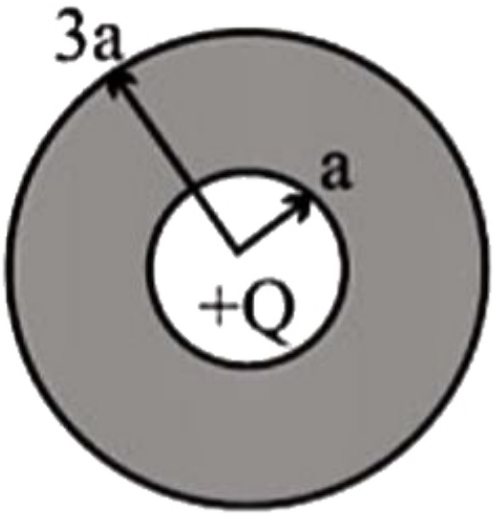
20. A solid, uncharged conducting sphere of radius 3a contains a concentric hollowed spherical cavitiy of radius a.



A point charge +Q is placed at the center of

the spheres. Taking V=0 at $r \to \infty$, the potential at positiion r=2a from the center is-

A. $\frac{KQ}{a}$

B. $\frac{KQ}{2a}$

C. $\frac{KQ}{3a}$

D. $\frac{2KQ}{3a}$

Answer: C

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21. Two point charges placed at a distance r in air exert a force f on each other. The value of distance R at which they experience force 4F when placed in a medium of dielectric constant K = 16 is :

A. r

B. $\frac{r}{8}$

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

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

Answer: B

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22. The root-mean-square (rms) speed of oxygen molecules (O_2) at a certain absolute temperature is v.If the temperature is double and the oxygen gas dissociated into atomic oxygen, the rms speed would be

A. v

B. $\sqrt{2}v$

C. $2v$

D. $2\sqrt{2}v$

Answer: C

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23. The pressure and volume of a given mass of gas at a given temperature are P and V respectively. Keeping the temperature constant, the pressure is increased by 10% and the system is allowed to achieve a steady-

state, then the pressure is decreased by 10% what cann be said about the final volume?

A. less than V

B. more than V

C. equal to V

D. less than V for diatomic and more than V for monoatomic

Answer: B

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24. Four spheres A, B, C and D of different metals but all same radius are kept at same temperature. The ratio all their densities and specific heats are $2:3:5:1$ and $3:6:2:4$. Which sphere will show the fastest rate all cooling (initially) (assume black body radiation for all of them)

A. A

B. B

C. C

D. D

Answer: D

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25. A man is standing between a stationary source and cliff. When he starts moving along line joining him and source, he hears 10 beats per second. The velocity of mas is [frequency of source=600Hz, velocity of sound=330ms^{-1}]

A. 5.5 m/s

B. 11m/s

C. 16/5m/s

D. 2.75m/s

Answer: D

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26. An earthquake generates both transverse (S) and longitudinal (P) sound waves in the earth. The speed of S waves is about 6 km s^{-1} and that of P waves is about 9 km s^{-1}. A seismograph records P and S waves from an

earthquarke. The first P wave arrives 5 minutes before the first S wave. the epicenter of the earth quake is located at a distance

A. 54 km

B. 540 km

C. 5400 km

D. 72 km

Answer: C

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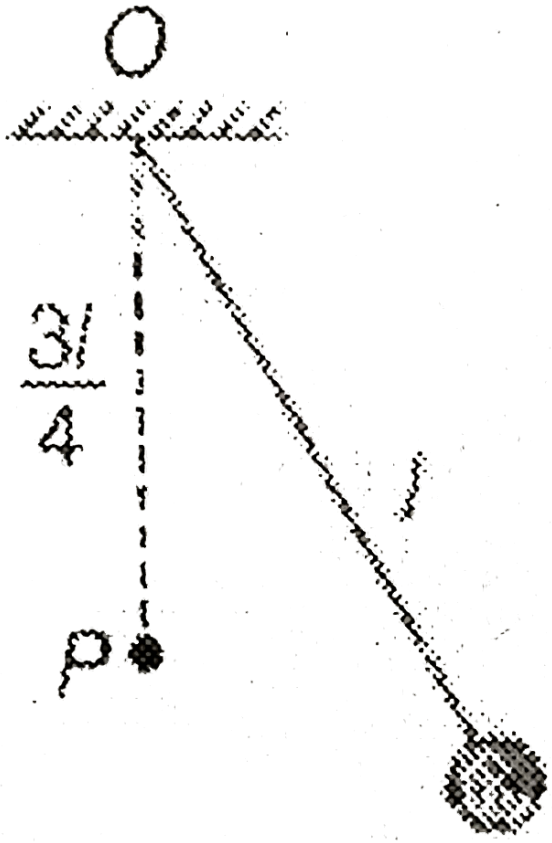
27. A pendulum has time period T for small oscillations. An obstacle P is situated below the point of suspension O at a distance $\frac{3l}{4}$. The pendulum is released from rest. Throughout the motion, the moving string makes small angle with vertical. Time after which the pendulum returns back to its initial

position is



A. T

B. $3T/4$

C. $3T/5$

D. $4T/5$

Answer: B

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28. A body is projected up with a velocity equal to $3/4th$ of the escape velocity from the surface of the earth. The height it reaches is (Radius of the earth is R)

A. 10R/9

B. $9\frac{R}{7}$

C. 9R?8

D. 10R/3

Answer: B

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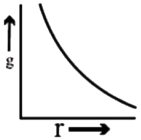
29. If the density of a planet is constant, then the curve between value of g on its surface and its radius r will be-

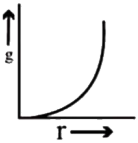
A.

B.

C.



D.



Answer: A

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30. Why are electric field lines perpendicular at a point on an equipotential surface of a conductor ?

A. perpendicular to the surface

B. parallel to the surface

C. in all directions

D. zero

Answer: A

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31. Three rods each of length L and mass M are placed along X, Y and Z axis in such a way that one end of each of the rod is at the origin. The moment of inertia of this system about Z axis is

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

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

C. $\frac{2ML^2}{6}$

D. ML^2

Answer: B

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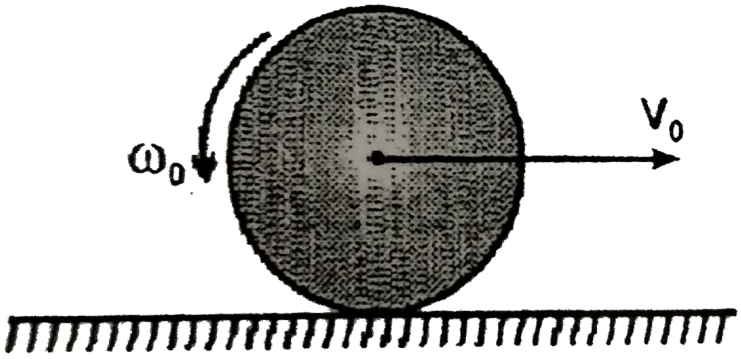
32. A uniform circular disc placed on a horizontal rough surface has initially a velocity v_0 and an angular velocity ω_0 as shown in the figure. The disc comes to rest after moving some distance in the direction of motion. Then v_0 / ω_0 is :



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

B. 2

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

D. 3

Answer: A

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33. A ball of mass m approaches a wall of mass M (M>>m), with speed 2 ms^{-1} along the normal to the wall. The speed of wall is 1

ms^{-1} towards the ball. The speed of the ball after an elastic collision with the wall is-

A. $2ms^{-1}$ away from the wall

B. $3ms^{-1}$ away from the wall

C. $4ms^{-1}$ away from the wall

D. $5ms^{-1}$ away from the wall

Answer: C

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34. Consider the nuclear reaction $X^{200} \rightarrow A^{110} + B^{80} + 10n^1$. If the binding energy per nucleon for X, A and B are 7.4 MeV, 8.2 MeV and 8.1 MeV respectively, then the energy released in the reaction:

A. 70 MeV

B. 200 MeV

C. 190 MeV

D. 10 MeV

Answer: A

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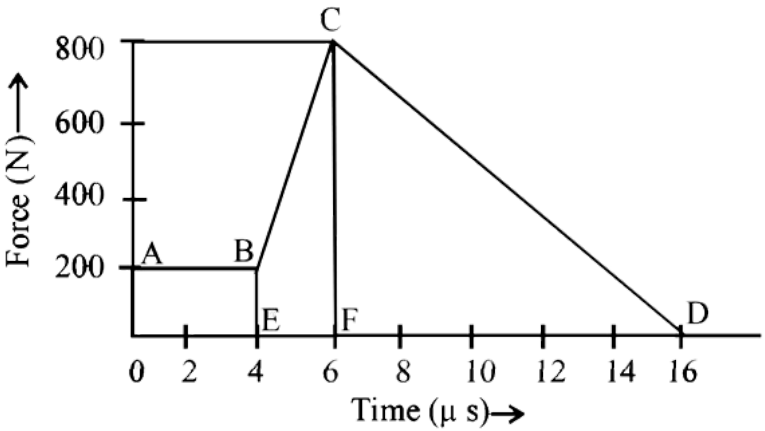
35. The magnitude of the force (in newtons) acting on a body varies with time t (in micro seconds) as shown in the fig AB, BC and CD are straight line segments. The magnitude of the total impulse of the force on the body from

$t = 4\mu s$ to $t = 16\mu s$ is ....Ns



A. $6 \times 10^{-3} Ns$

B. $5.0 \times 10^{-3} Ns$

C. $8.4 \times 10^{-3} Ns$

D. $7.6 \times 10^{-3} Ns$

Answer: B

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36. Mass is non-uniformly distributed over the rod of length l, its linear mass density varies linearly with length as $\lambda = kx^2$. The position of centre of mass (from lighter end) is given by-

A. $2l/5$

B. $3/l$

C. $3l/4$

D. $2l/3$

Answer: C

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37. A hydrogen atom moving at a speed v absorbs a photon of wavelength 122 nm and stops. The value of v is (mass of hydrogen atom $= 1.67 \times 10^{-27}$ kg)

A. 2.75 m/s

B. 3.25m/s

C. 4.85m/s

D. 5.65 m/s

Answer: B

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38. In a common emitter amplifier, using output reisistance of 5000 ohm and input resistance fo 2000ohm, if the peak value of input signal voltage is $10mV$ and $\beta = 50$, then the peak value of output voltage is

A. $5 \times 10^{-6}V$

B. $2.5 \times 10^{-4} V$

C. $1.25 V$

D. 125V

Answer: C

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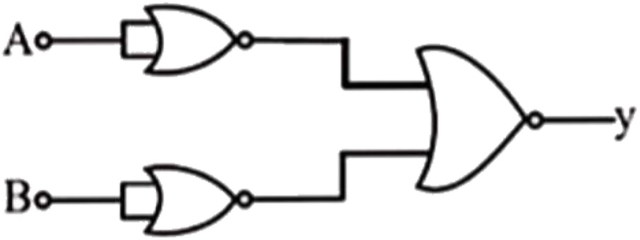
39. Identify the operation performed by the circuit given below-



A. NOT

B. AND

C. OR

D. NAND

Answer: B

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40. The electric field and the electric potential at a point are E and V respectively.

A. If E=0, V must be zero

B. If V=0, E must be zero

C. If $E \neq 0$, V may be zero

D. If $V \neq 0$, E cannot be zero

Answer: C

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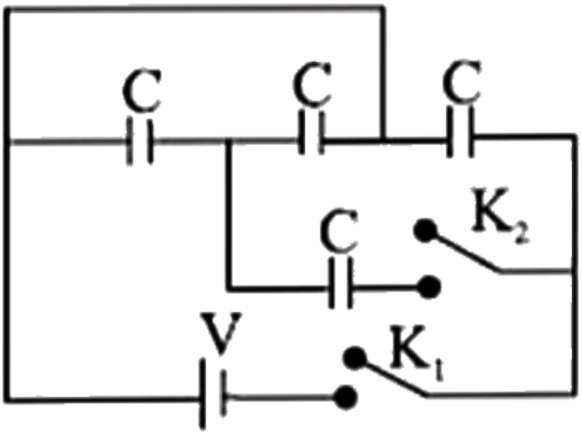
41. Initially K_1 is closed, now if K_2 is also closed, find heat dissipated in the resistances of connecting wires



A. $\frac{1}{2}CV^2$

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

C. $\frac{1}{3}CV^2$

D. $\frac{1}{4}CV^2$

Answer: C

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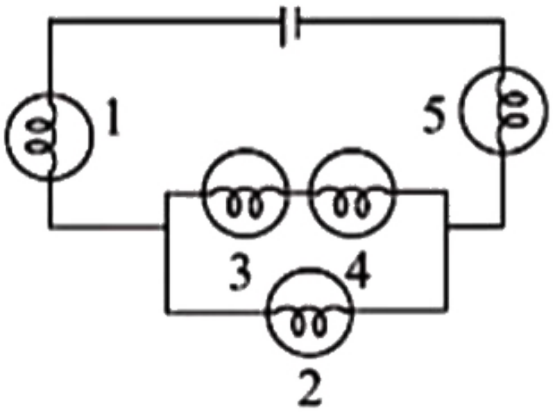
42. All the bulbs below are identical. Which bulb(s) shine(s) most brightly?



A. 1 only

B. 2 only

C. 3 and 4

D. 1 and 5

Answer: D

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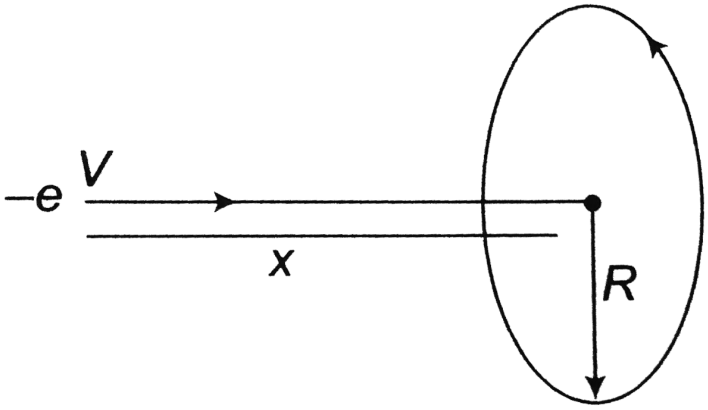
43. An electron moving with a velocity v along the positive x-axis approaches a circular current carrying loop as shown in the fig. the

magnitude of magnetic force on electron at this instant is



A. $\frac{\mu_0}{4}\frac{eviR^2x}{(x^2+R^2)^{3/2}}$

B. $\mu_0\frac{eviR^2x}{(x^2+R^2)^{3/2}}$

C. $\frac{\mu_0}{4\pi}\frac{eviR^2x}{(x^2+R^2)^{3/2}}$

D. None of these.

Answer: D

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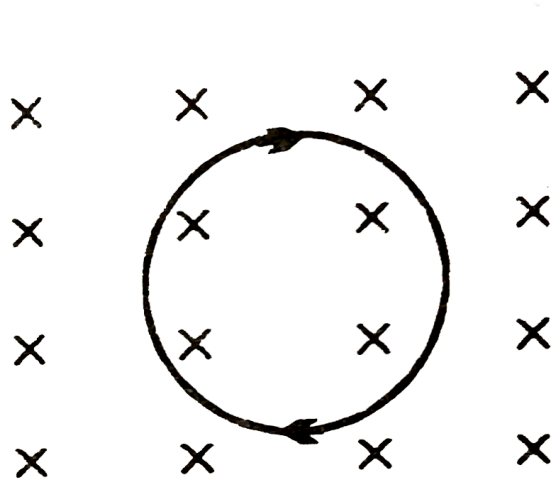
44. A circular coil carrying current I is placed in a region of uniform magnetic field acting perpendicular to a coil as shown in te Mark

correct option



A. coil exapands

B. coil contracts

C. coil moves left

D. coil moves right

Answer: A

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45. The material suitable for making electromagnets should have

A. high retentivity and low coercivity

B. low retentivity and low coercivity

C. high retentivity and high coercivity

D. low retentivity and high coercivity

Answer: B

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