PHYSICS

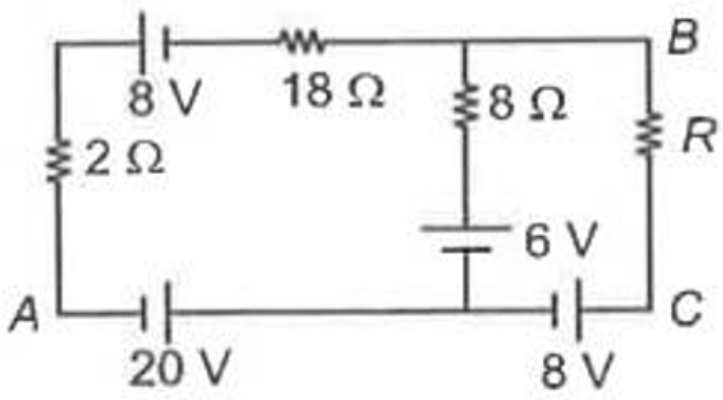
AAKASH INSTITUTE ENGLISH

TEST 1

Example

1. In the circuit shown in the figure , no current flows through the 8Omega resistor, then the

potential difference between points A and B(V_A



- V_B) is

A. 14V

B. 42V

C. $-26V$

D. $-12V$

Answer:

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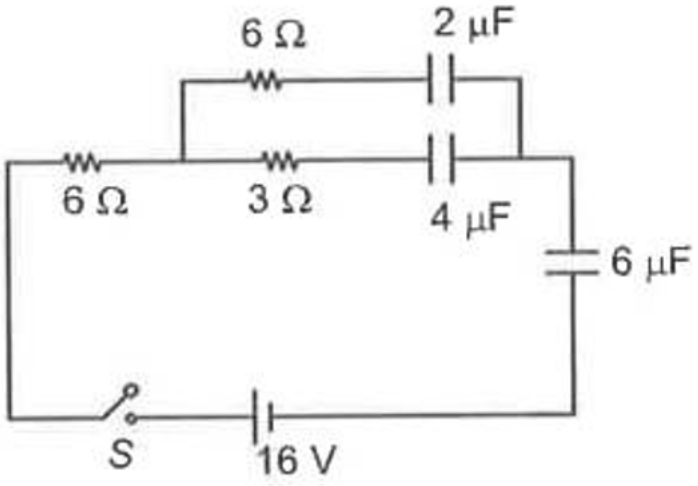
2. The current through the battery just after the switch S is Closed is (the capacitors are initially uncharged)



A. 3A

B. 8A

C. 2A

D. Zero

Answer:

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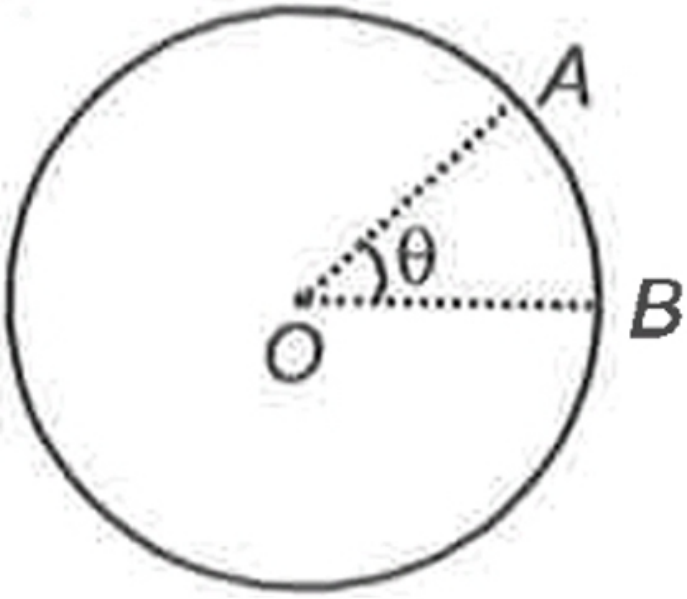
3. A uniform wire is bent in the form of a circle as shown in the figure. The effective resistance

between A and B is maximum if theta is



A. 180 degree

B. 90 degree

C. 45 degree

D. 60 degree

Answer:

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4. Electrostatic field in a region is given by , vecE= (yzhati + zxhatj + xyhatk)V/m , where x,y and z are in m. If electric potential at origin is zero, then potential at (1m,1m, 1m) is

A. $-1V$

B. $1V$

C. $-3V$

D. $3V$

Answer:

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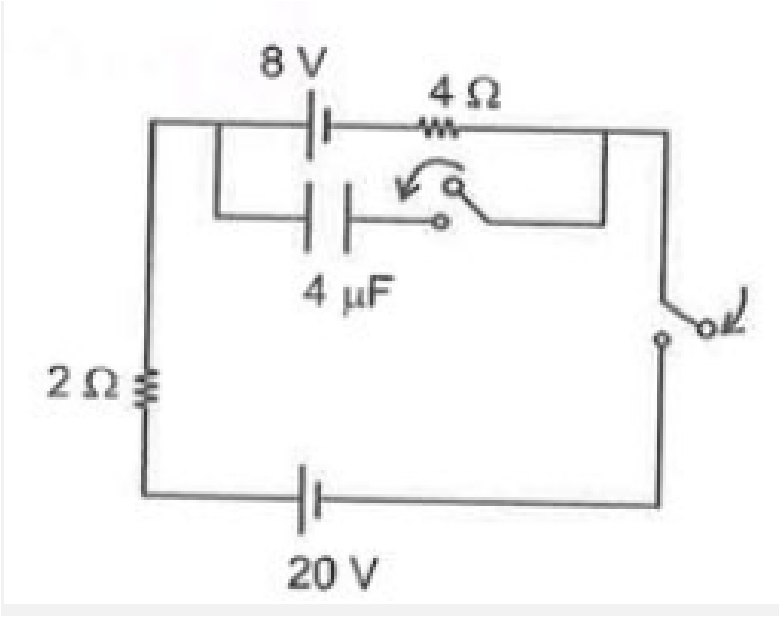
5. Steady state current through the resistor of resistance 4 Omega when both switches are closed, as compared to the current when both

switches are open , is



A. Increase by 1.2 A

B. Increase by 2 A

C. Increase by 1A

D. Increase by 0.5 A

Answer:

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6. The resistivity of three conductors of identical dimensions is rho_1, rho_2 and rho_3 respectively . The effective resistivity when the conductors are connected in series is

A. 

B. 

C. 

D. 

Answer:

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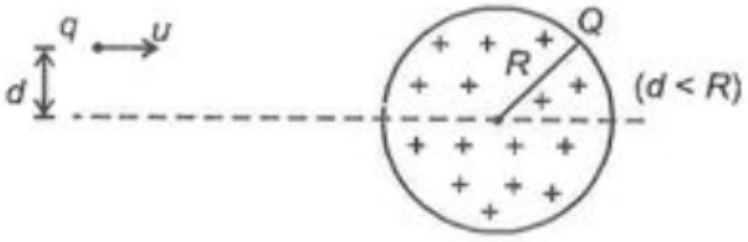
7. A positive charge q of mass m is projected , a very large distance , toward a fixed non-conducting sphere having Q charge uniformly distributed inside it, as shown in figure. If the charge q just grazes the sphere , then the speed

of projection u is $\kappa = \left(\frac{1}{4}\pi\varepsilon_0\right)$.



A. $\sqrt{\frac{2kqQR}{m(R^2-d^2)}}$

B. $\sqrt{\frac{kqQR}{m(R^2-d^2)}}$

C. $\sqrt{\frac{3kqQR}{m(R^2-d^2)}}$

D. $\sqrt{\frac{4kqQR}{m(R^2-d^2)}}$

Answer:

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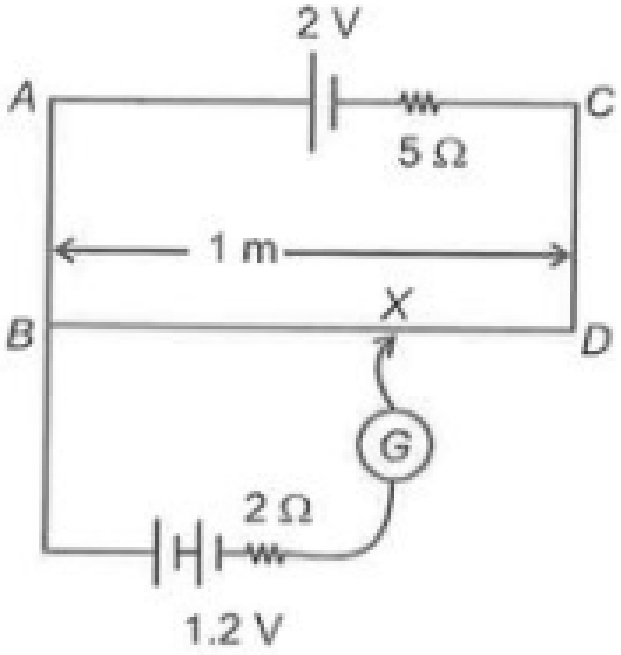
8. Consider the potentiomter circuit diagram as shown in the figure. If the potentiometer wire BD has net resistance of 15Omega, the choose the correct statement



A. For null point of galvanometer ,BX =0.5m

B. For null point of galvanometer ,BX =0.80m

C. For null point of galvanometer ,BX =0.1m

D. For null point will be obtained for the circuit shown circuit

Answer:

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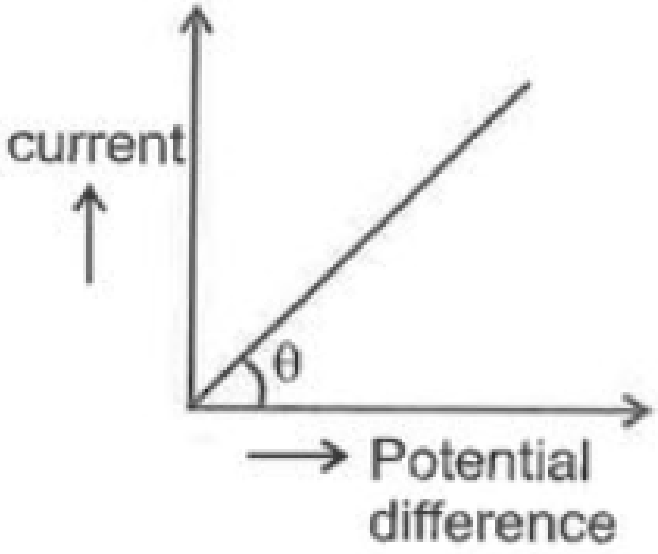
9. For a given metallic conductor , the variation of current through the conductor with

potential difference applied across the conductor is shown in the given graph. If temperature of the conductor is increased , then slope tan theta



A. Decrease

B. Remain same

C. Increases

D. Both (2) and (3)

Answer:

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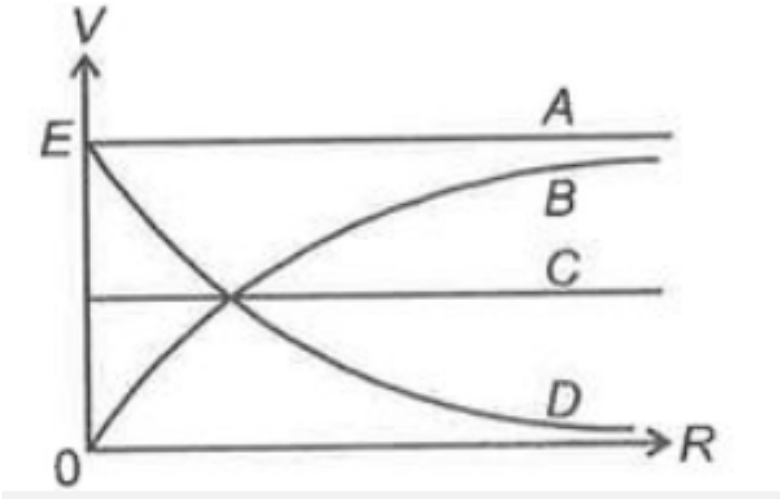
10. A cell of e.m.f E and internal resitance r ,is connected to an external resistance R. the variation of potential difference V across the resistance R as function of R as shown in the

figure, is the best represented by curve



A. A

B. B

C. C

D. D

Answer:

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11. A carbon resistor of (54 ± 2.7) Momega is to be marked with rings of different colours for its identification. The color code sequence will be

A. Green-Yellow-Blue-Gold

B. Green-Yellow-Blue-Silver

C. Green-Blue-Yellow-Gold

D. Yellow-Green-Blue-Gold

Answer:

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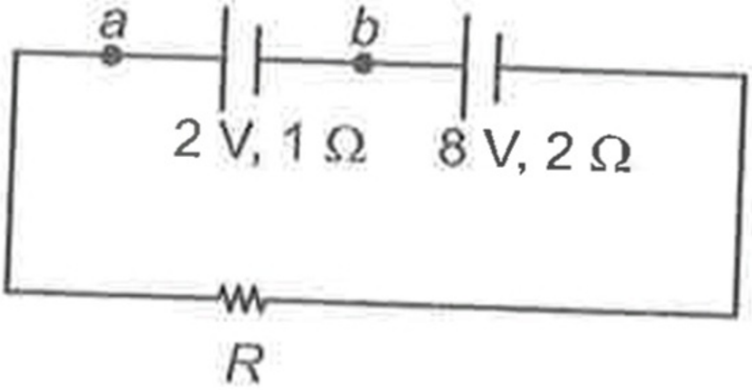
12. Two non-ideal batteries have e.m.f 2V and 8V respective ly and internal resistance 1 Omega and 2 Omega respectively as shown in the figure. If the potential difference between a and b is zero then the resistance R has a value



A. 1 Ω

B. 3 Ω

C. 2 Ω

D. 5 Ω

Answer:

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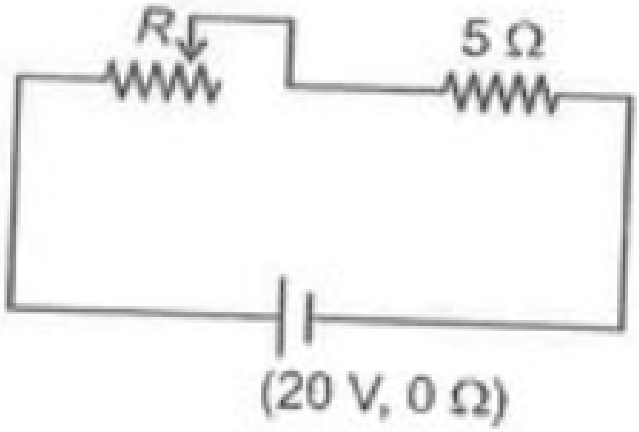
13. In the circuit shown in the figure , the resistance marked R can be varied by using a Rheostat. The power across the 5 Omega resistor will be maximum if the Rhoestat has

resistance equal to



A. 5 Ω

B. 20 Ω

C. 10 Ω

D. Zero

Answer:

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14. Two bulbs B_1 and B_2 with ratings (10W, 220V) and (20 W, 220V) respectively are connected in parallel across a 440V input supply. Then

A. Both bulbs will fuse

B. Only bulb B_1 will fuse

C. Only bulb B_2 will fuse

D. No bulb will fuse

Answer:

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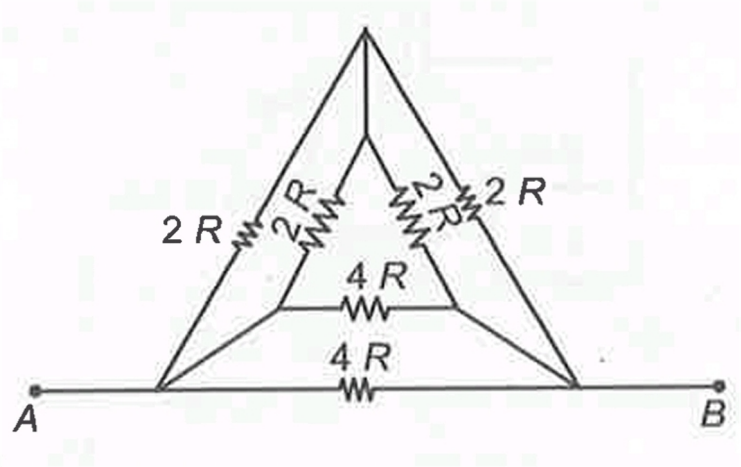
15. The equivalent resistance across points A and B , in the circuit shown in the figure , is



A. 4 R

B. 2 R

C. 3 R

D. R

Answer:

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16. The correct statement of the following,is

A. All free charged particles move from the region of lower electric potential to region of higher electric potential.

B. Electrostatic field inside a conductor is Zero

C. Surface of any conductor has uniform charge density in eletrostatic condition.

D. Both (1) and (3)

Answer:

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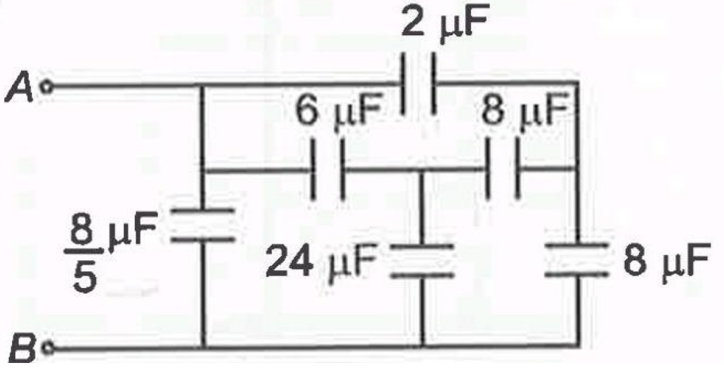
17. The equivalent capacitance of the circuit as shown in figure between points A and B is



A. $10\mu F$

B. $8\mu F$

C. $2\mu F$

D. $15\mu F$

Answer:

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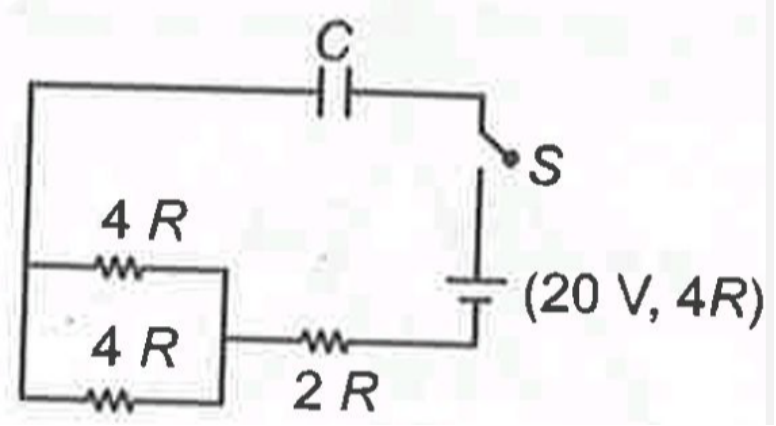
18. The time constant, for charging of capacitor C, when switch S is closed as shown in the figure , is



A. 2 RC

B. Only bulb B_1 will fuse

C. 8 RC

D. 6 RC

Answer:

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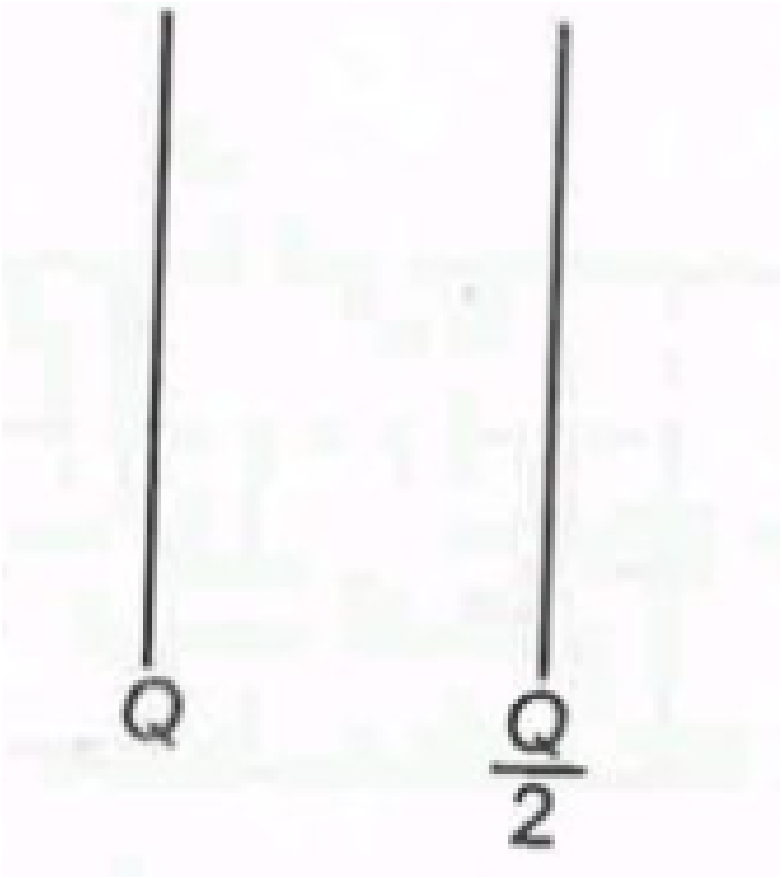
19. Force between two conducting large plates , with charges Q and $\frac{Q}{2}$ as shown in the figure, is

(Area of each face of plate =A)



A. $\frac{Q^2}{4A\varepsilon_0}$

B. $\frac{Q^2}{2A\varepsilon_0}$

C. $\frac{Q^2}{A\varepsilon_0}$

D. $\frac{Q^2}{8A\varepsilon_0}$

Answer:

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20. An ideal voltmeter V and ideal ammeter A are connected in a circuit as shown in the figure. If the reading of the voltmeter is 32 V, the reading of ammeter will be

A. 4A

B. 8A

C. 10A

D. 80A

Answer:

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21. A potentiometer circuit with potentiometer wire 10 m long, and an ideal main battery of e.m.f 8 V, has been set up for finding the internal resistance of a given cell. When the resistance R, connected across the given cell, has values of (i) infinity, (ii) 10 omega , the balancing lengths, on the potentiometer wire are found to be 2.4 m and x respectively. If the internal resistance of the cell is 2 ω, the value of x is

A. 1m

B. 6m

C. 2m

D. 8m

Answer:

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22. The power dissipated in the resistance R, in the circuit as shown in the figure, is maximum if R is equal to

A. $\frac{40}{3}\Omega$

B. 20Ω

C. 40Ω

D. $\frac{60}{5}\Omega$

Answer:

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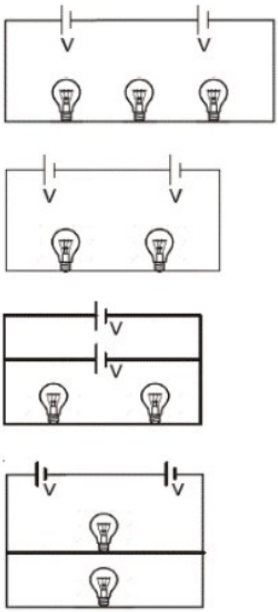
23. Among the circuits as shown in the following figures,the glow intensity of any individual bulb will be minimum in (assume all cells to be identical and ideal, all bulbs to be

identical and no bulb fuses)



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24. There are two concentric conducting spherical shells of radius r_A and r_B respectively $(r_B = 2r_A)$. If the inner shell is given a charge

Q and outer shell is given a charge 2Q, then the potential difference between the surfaces of the shells will be $K = \frac{1}{4\pi\varepsilon_0}$

A. $k\frac{Q}{2r_A}$

B. $k\frac{Q}{r_A}$

C. $k\frac{Q}{2r_B}$

D. $k\frac{Q}{4r_B}$

Answer:

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25. The current in the resistor R_3 in the circuit as shown in the figure is 

A. 0.3A

B. 1.8A

C. 0.6A

D. Zero

Answer:

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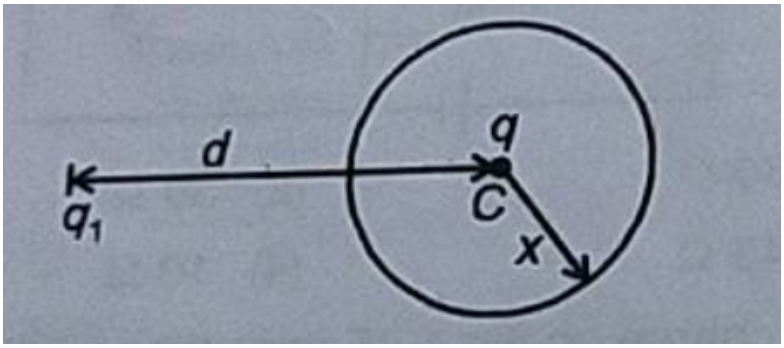
26. Inside a neutral hollow conducting sphere of radius X and centre C, a point charge q is placed as shown in the figure. Another point charge q_1, is placed outside the sphere at distance d from centre. The net- electrostatic force on charge q placed at the centre is $K = \frac{1}{4\pi\varepsilon_0}$



A. Zero

B. $\frac{Kq}{(d+X)^2}q_1$

C. $\frac{kqq_1}{X^2}$

D. $\frac{kqq_1}{d^2}$

Answer:

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27. The ratio of currents passing through resistance R_1 as shown in the figure, before and after switch S is closed, is (The potentials at A and B remain unchanged)

A. $2:01$

B. $1:01$

C. $3:01$

D. $1:07$

Answer:

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28. The charge on the 4 uF capacitor, when a battery of 20 V is connected across points A and B in the circuit as shown in the figure is

A. 40 muC

B. 20 muC

C. 10 muC

D. 60 muC

Answer:

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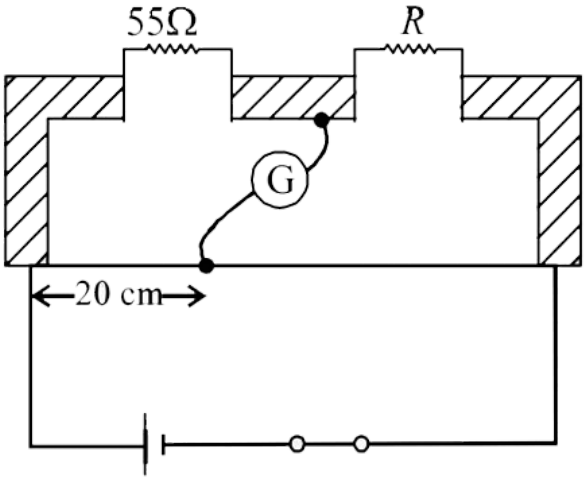
29. A meter bridge setup is shown in the figure.

If there is null deflection in galvanometer when

length AC = 20 cm, then the value of resistance R is



A. 60Ω

B. 30Ω

C. 45Ω

D. 10Ω

Answer:

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30. The bob of a simple pendulum of length /has a positive charge q on it. The pendulum is fixed to a horizontally oriented positively charged sheet as shown in the figure. The time period of the small oscillations of simple pendulum is

A. $Equal \rightarrow 2\pi\left(\frac{l}{g}\right)^{\frac{1}{2}}$

B. Less than $2\pi\left(\frac{l}{g}\right)^{\frac{1}{2}}$

C. Greater than $2\pi\left(\frac{l}{g}\right)^{\frac{1}{2}}$

D. Infinite

Answer:

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31. On closing the switch S in the circuit as shown in the figure, the reading of the galvanometer G 

A. Increases

B. Decreases

C. Remains same

D. May increase or decrease

Answer:

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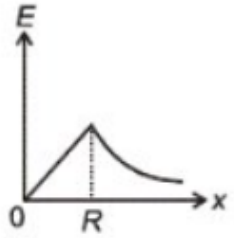
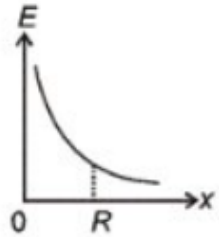
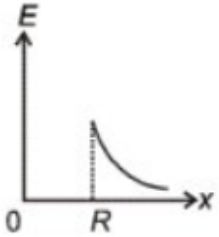
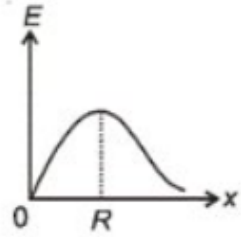
32. A non-conducting solid sphere of radius R, has a uniform charge density. The graph representing variation of magnitude of electric field (E) as a function of distance (x) from the

centre of the sphere is









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33. The effective resistance of the infinite resistance ladder circuit between terminais A and B as shown in the figure is

A. $\left(2+2(2)^{\frac{1}{2}}\right)\Omega$

B. $\left(2-(2)^{\frac{1}{2}}\right)\Omega$

C. $\left(3+(3)^{\frac{1}{2}}\right)\Omega$

D. $\left(5+(2)^{\frac{1}{2}}\right)\Omega$

Answer:

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34. The capacitance of each capacitor as shown in the circuit is C. The effective capacitance of the circuit between terminals A and B is

A. 4C

B. C/2

C. 8C

D. 2C

Answer:

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35. A frustum of cone having radii 5 m and 2 m of its plane surfaces is kept in a uniform electric field 5 N/C perpendicular to the plane faces as shown in the figure. The magnitude of electric flux through the curved surface of the frustum is

A. $50\pi N\frac{m^2}{C}$

B. $105\pi N\frac{m^2}{C}$

C. $80\pi N\frac{m^2}{C}$

D. $100\pi N\frac{m^2}{C}$

Answer:

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36. The value of current i, in the electrical network as shown in the figure is 

A. 2A

B. 3A

C. 4A

D. 8A

Answer:

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37. Equivalent capacitance of the circuit shown in figure,between the points A and B is

A. (2)/3 uF

B. (5/3) uF

C. (8)/3 uF

D. 7/3 uF

Answer:

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38. The charge on the capacitor, at the instant as shown in the figure is

A. 32muC

B. 20muC

C. 64muC

D. 100muC

Answer:

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39. The equivalent resistance between X & Y of network shown below, when switch S is closed

A. 2R

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

C. 3R/2

D. 4R

Answer:

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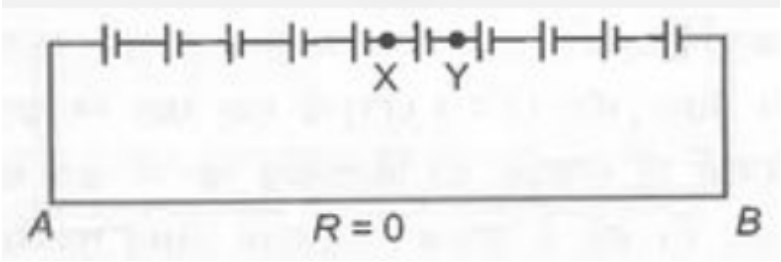
40. There are ten identical cells each of emf $10V$ and internal resistance $0.25\ \Omega$ are short circuited as shown in figure. The value of potential difference $(V_x - V_y)$ is



A. Zero

B. 10V

C. 20 V

D. Cannot be determined

Answer:

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41. The electric current through 10 ohm resistor in circuit given below is

A. 1A

B. $\frac{20}{21}$A

C. $\frac{21}{20}$A

D. 20A

Answer:

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42. A potentiometer wire has length 5m and resistance 1002. A rheostat of range $(1002 - 1k2)$ and accumulator of emf 20 V is connected with potentiometer wire. The

maximum potential gradient possible in the wire is

A. 4/11' V/m

B. 40/11` V/m

C. 4' V/m

D. 2' V/m

Answer:

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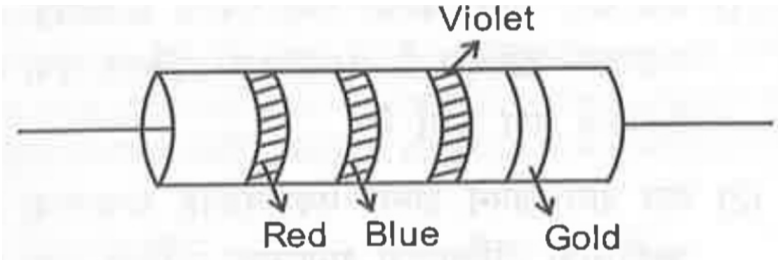
43. A carbon resistor has coloured strips as shown in igure. What is its resistance?



A. $26 \cdot 10^7 \Omega \pm 5\%$

B. $20 \cdot 10^7 \Omega \pm 5\ \%$

C. $21 \cdot 10^7 \Omega \pm 5\ \%$

D. $26 \cdot 10^7 \Omega \pm 10\ \%$

Answer:

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44. There are some identical bulbs of 50 W, 200 V are connected in parallel across 200 V source using 5 A fuse. How many maximum bulbs can be operated safely among the following options?

A. 19

B. 21

C. 40

D. 15

Answer:

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45. The potential gradient for a potentiometer depends on

A. Resistivity of the Potentiometer wire

B. Length of potentiometer wire

C. The emf of driving cell

D. A of these

Answer:

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46. The radius of Ge nucleus is measured to be twice the radius 4 Be 9. How many nucleons are there in Ge nucleus?

A. 64

B. 72

C. 82

D. 86

Answer:

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47. A battery of emf 10 V is connected with a load resistance of 50 Omega the total power delivered by the battery is 2 W. If load resistance is replaced by R then power delivered is 4 W, the value of R is

A. 10Omega

B. 15Omega

C. 30Omega

D. 25Omega

Answer:

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48. Two resistors with temperature coefficient of 3 resistances $4 \cdot 10^{-3}/^{o}$C and $2 \cdot 10^{-3}/^{o}$C have of resistances 20 Omega and 10 Omega respectively at 0^{o}C. If they are connected in

series, then equivalent temperature coefficient of resistor combination is

A. $\frac{8}{3} \cdot 10^{-23}/^{o}C$

B. $6 \cdot 10^{-3}\ /^{o}C$

C. $\frac{4}{3} \cdot 10^{-3}/^{o}C`$

D. $\frac{10}{3} \cdot 10^{-3}/^{o}C$

Answer:

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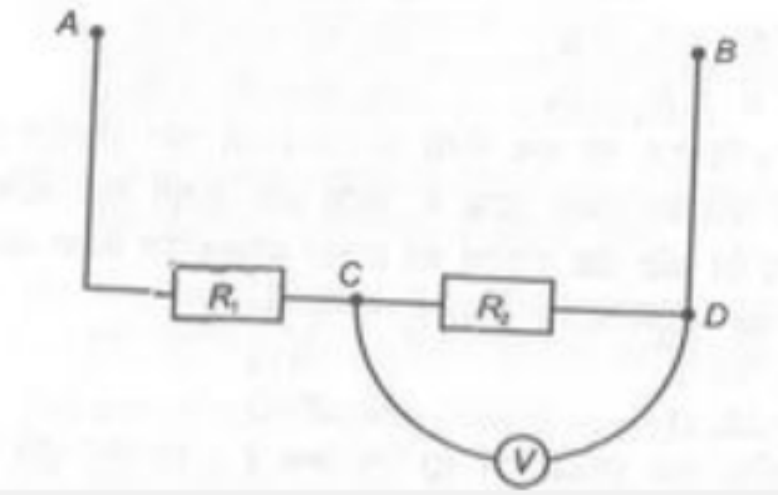
49. Two resistances R_1, and R_2, each of 100 Omega 22 Omega are connected with potential source of 40 V between A and B. If resistance of voltmeter is 200 Omega, then reading of voltmeter is



A. 20V

B. 40V

C. 16V

D. 24V

Answer:

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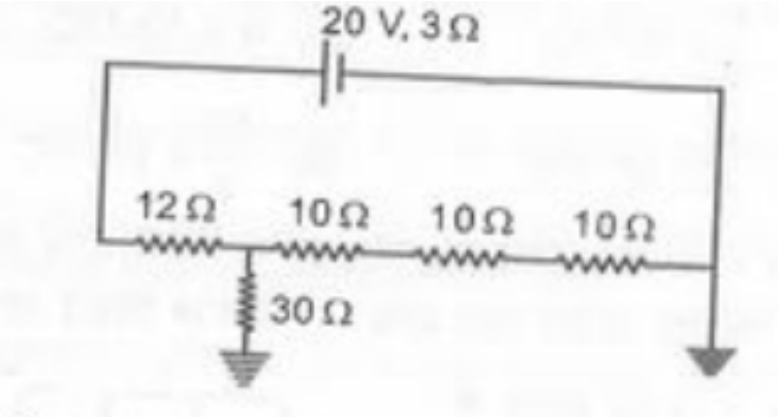
50. The electric current drawn from cell is



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

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

C. $\frac{4}{15}$A

D. zero

Answer:

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51. At absolute zero temperature, extrinsic semiconductors will behave like

A. Conductor

B. Insulator

C. Conductor if impurity is pentavalent

D. Conductor if impurity is trivalent

Answer:

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52. Half life of a radioactive material is 24 hour and its initial quantity is 512 gram. After three days quantity of the radioactive material will be

A. 32g

B. 64g

C. 128g

D. 16g

Answer:

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53. Electric current due to electrons motion in n th orbit (I_n) of hydrogen atom is proportional to

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

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

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

D. n^3

Answer:

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54. An unpolarised light of intensity 64 Wm^(-2) passes through three polarisers such that the transmission axis of the last polariser is normal

to first. If the intensity of emerging light is 6 Wm(-2),then angle between first two polariser may be

A. 30°

B. 45°

C. 37°

D. 57°

Answer:

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55. Refractive index of a thin soap film of a uniform thickness is 1.38. The smallest thickness of the film that gives an interference maxima in the reflected light when light of wavelength 5520 Å falls at normal incidence is

A. 500Å

B. 1500Å

C. $1000\ \text{Å}$

D. $2000\ \text{Å}$

Answer:

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56. An object is placed at a distance of 80 cm from a screen. Where should a convex lens of focal length 15 cm be placed from object such that a real image of object is formed?

A. 60 cm

B. 20 cm

C. 40 cm

D. Both (1) and (2)

Answer:

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57. Refractive index of slab R if refracted ray cd is parallel to incident ray ab, is

A. $141\ \%$

B. $100\ \%$

C. $173\ \%$

D. $245\ \%$

Answer:

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58. Magnetic field in a plane electromagnetic wave is given by $B_y = \left(10^{-7}T\right)\sin\left(10^3\pi x + 2\pi \times 10^{11}\right)\hat{j}$ Then expression of electric field will be

A.

$$E_y = \left(10^{-7}\frac{V}{M}\right)\sin\left(10^3\pi x + 2\pi \times 10^{11}t\right)\hat{k}$$

B.

$$E_z = \left(20\frac{V}{M}\right)\cos\left(10^3\pi x + 2\pi \times 10^{11}t\right)\hat{k}$$

C.

$$E_z = \left(-20\frac{V}{M} \right) \cos\left(10^3 \pi x + 2\pi \times 10^{11} t\right) \hat{k}$$

D.

$$E_z = \left(20\frac{V}{M} \right) \sin\left(10^3 \pi x + 2\pi \times 10^{11} t\right) \hat{k}$$

Answer:

Watch Video Solution

59. An aeroplane with wings span 30 m flying at $200 ms^{-1}$ straight south parallel to earth surface. If the earth's magnetic field has a

horizontal component $2 \times 10^{-4} Wbm^{-2}$ and 37° dip angle, then emf induced between the tips of wings will be

A. 0.9V

B. 0.72V

C. 9V

D. 1.2V

Answer:

Watch Video Solution

60. The combination of two bar magnets makes 20 oscillations per minute in an oscillation magnetometer when like poles are tied together and 5 oscillations per minute when unlike poles are kept together. Then ratio of the magnetic moment of magnets is

A. $\left(\frac{1}{4}\right)$

B. $\left(\frac{17}{15}\right)$

C. (2/3)

D. $\left(\frac{3}{5}\right)$

Answer:

Watch Video Solution

61. A wire carrying current i is bent as shown in figure and placed in the plane of uniform magnetic field Bvec. The magnitude of magnetic force experienced by

A. $2irB$

B. $(2)^{\frac{1}{2}}irB$

C. irB

D. Zero

Answer:

Watch Video Solution

62. The magnetic field at the centre of a tightly wound spiral coil with inner radius R and outer radius 4.5 R with number of turns 22, when current i is flowing through it, is

A. $\frac{11\mu_0 i}{7R}\ln(4.5)$

B. $\frac{22\mu_0 i}{7R}\ln(4.5)$

C. $\frac{11\mu_0 i}{7R}$

D. Zero

Answer:

Watch Video Solution

63. Three 60 W, 120 V light bulbs are connected across a 120 V source as shown in figure. The total power dissipation in the three bulbs are

A. 60W

B. 40W

C. 120W

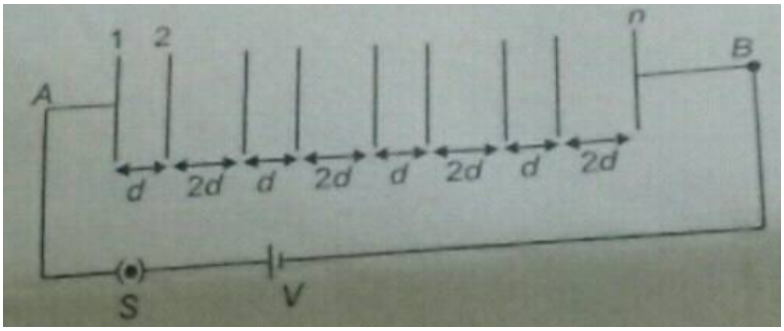
D. 180W

Answer:

Watch Video Solution

64. If n plates are arranged in series as shown in figure.Alternate plates are placed at distance d and 2d. If n is a odd number then charge supplied by the battery of voltage V when

switch S is closed is (Plate area is A)



A. $\frac{2\varepsilon_0 AV}{3d(n-1)}$

B. $\frac{\varepsilon_0 AV}{3d(n-1)}$

C. $\frac{\varepsilon_0 AV}{d(n-1)}$

D. $\frac{2\varepsilon_0 AV}{d(n-1)}$

Answer:

Watch Video Solution

65. A charge Q is enclosed by a Gaussian surface. If surface area is doubled and charge Q is tripled then the outward electric flux will

A. Be tripled

B. $Be\frac{3}{2}$ times of the initial flux

C. Remain same

D. Reduced by one third of initial flux

Answer:

Watch Video Solution

66. Two point charges 4muC and -4muC are placed at a distance 1.5 m. Total number of points except infinity, where potential due to system of charges is zero?

A. One

B. Three

C. Two

D. infinite

Answer:

Watch Video Solution

67. A transverse wave propagating along x-axis is represented as y(x,t)= $0.8\sin\left(\frac{\pi}{4}-4\pi t-\frac{\pi}{2}x\right)$ where x is in meter and t is in second. The velocity of wave is

A. $8\frac{m}{s} \in +x$ direction

B. $8\frac{m}{s} \in -x$ direction

C. 24 m/s in +x` direction

D. $4ms \in -x$ direction

Answer:

Watch Video Solution

68. A column is filled with water as shown in the figure. If liquid in the left limb is slightly depressed and released, then time period of oscillation is (L is the total length of the water column)

A. $T = 2\pi\sqrt{\frac{L}{2g}}$

B. $T = 2\pi\sqrt{\frac{5L}{8g}}$

C. $T = 2\pi\sqrt{\frac{L}{g}}$,

D. $T = 2\pi\sqrt{\frac{5L}{9g}}$,

Answer:

Watch Video Solution

69. The total energy of particle performing SHM depend on : -

A. Time period only

B. Amplitude only

C. Time period and displacement

D. Amplitude and time period

Answer:

Watch Video Solution

70. Mean free path of a molecule is

A. Directly proportional to the diameter of the molecule

B. Inversely proportional to temperature of gas

C. Inversely proportional to number of molecules per unit volume

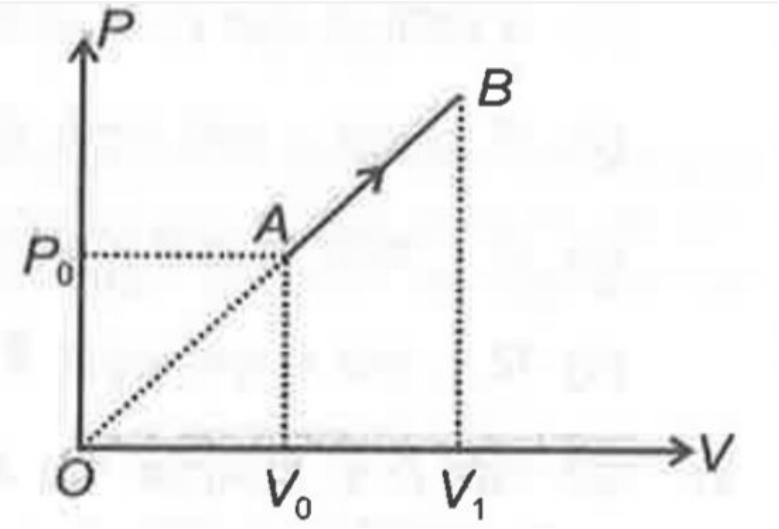
D. Directly proportional to the pressure of the gas

Answer:

Watch Video Solution

71. An ideal monoatomic gas follows a thermodynamic process as shown in pressure-

volume (P-V) plot. The work done in process AB is



A. $\frac{P_0}{2V_0}\left(V_1^2 - V_0^2\right)$

B. $\frac{P_0}{V_0}\left(V_1^2 - V_0^2\right)$

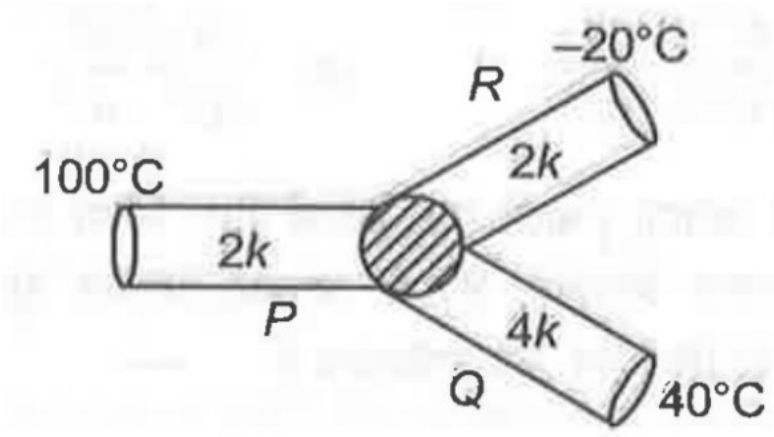
C. $\frac{3P_0}{2V_0}\left(V_1^2 - V_0^2\right)$

D. Zero

Answer:

Watch Video Solution

72. Three rodsP,Q and R having, samearea of cross section and lengths are connected with each other as shown in figure. The rod through which no heat will flow is (Thermal conductivities of rods P,Q,andR are 2k,4k and 2k respectively)



A. P

B. Q

C. R

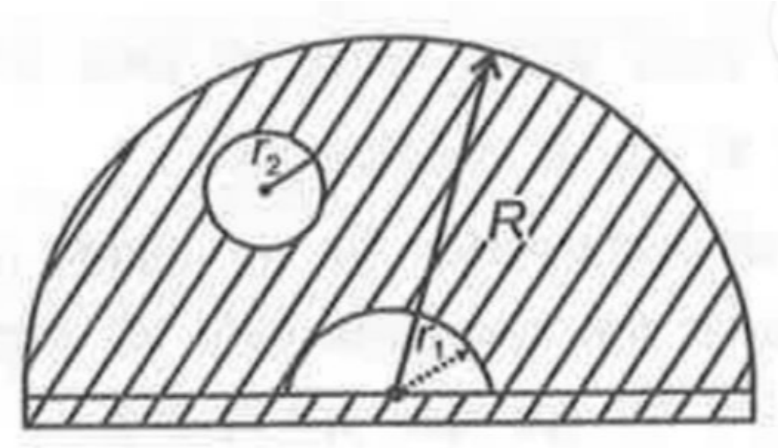
D. Heat will flow through all the rods

Answer:

Watch Video Solution

73. A semicircular metallic disc of radius R has two small cavities of radii r_1 and r_2 as shown in

the figure. On heating the disc



A. R increases and r_1, r_2

B. R, r_1 andr_2 all decreases

C. R ,r_1 increase and r_2 decreases

D. R, r_1 andr_2 all increases

Answer:

Watch Video Solution

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74. If water is ejecting from a hole of radius r at a depth h from the water surface in cylindrical vessel of diameter D, then speed with which the water level in the vessel drops .(Consider area of hole is comparable to area of vessel)

A. $\frac{4r^2}{D^2}\sqrt{2gh}$

B. $\frac{4r}{D}\sqrt{2gh}$

C. $\frac{(4r^2)\sqrt{2gh}}{\sqrt{D^4-16r^4}}$

D. $\frac{(4r)\sqrt{2gh}}{\sqrt{D^3-4r^2}}$

Answer:

Watch Video Solution

75. An ideal gas of adiabatic exponent γ, expands according to law PV= β (where β is the positive constant). For this process the compressibility of the gas is

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

B. $\frac{\beta}{p}$

C. $\frac{1}{\gamma P}$

D. $\frac{1}{(1-\beta)P}$

Answer:

Watch Video Solution

76. An object is projected in upward direction with speed $\sqrt{\frac{gR}{6}}$ from height h= 2R above the surface of earth. The speed with which the object will collide the earth surface. (Neglect the air drag, R us the radius of the earth and M is mass of earth

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

B. $\sqrt{\frac{3GM}{R}}$

C. $\sqrt{\frac{5GM}{2R}}$

D. $\sqrt{\frac{6GM}{7R}}$

Answer:

Watch Video Solution

77. If a person at equator of earth feels that his weight is reduced by a factor of two of the

present weight at equator of earth. The duration of the day will be approximately

A. 1.41 hours

B. 2 hours

C. 1.66 hours

D. 2.67 hours

Answer:

Watch Video Solution

78. A spherical object of mass m and radius R is released from the top of a smooth inclined plane of height h and angle of inclination is 37° . The radius of gyration of the object is K. The speed of object at the bottom of inclined plane is

A. $\sqrt{2gh}$

B. $\sqrt{\frac{2gh}{\left(1+\frac{K^2}{R^2}\right)}}$

C. $\sqrt{2gh\left(1+\frac{K^2}{R^2}\right)}$

D. $2\sqrt{gh}$

Answer:

Watch Video Solution

79. A large number of particles are placed around the origin, each at a distance R from the origin. The distance of the center of mass of the system from the origin is

A. More than R

B. Equal to R

C. At origin

D. Less than R

Answer:

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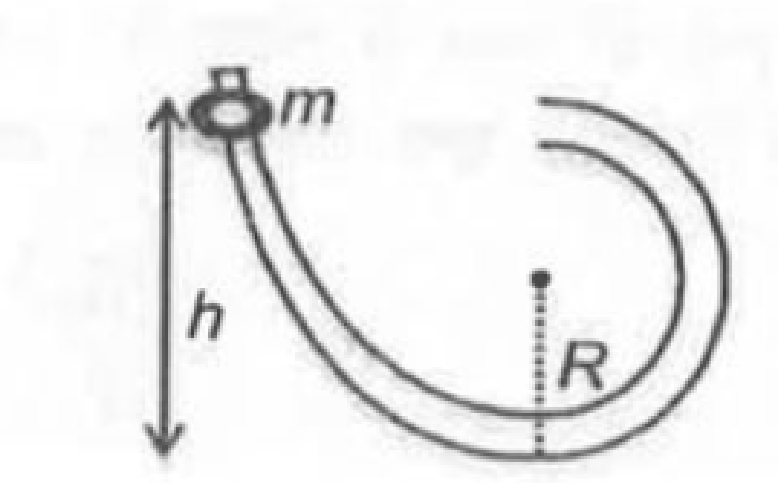
80. A bead of mass m is released from height h on smooth thread as shown in figure.The minimum value of h such that bead completes

the circular arc is



A. $h = 2.5R$

B. $h = 2R$

C. $h = 1.5R$

D. $h = 3R$

Answer:

Watch Video Solution

81. The potential energy of a particle moving along y axis is given by U(y)= $3y^4 + 12y^2$,(where U is in joule and y is in metre). If total mechanical energy is 15 joule, then limits of motion are

A. $-1.0m, +1.0m$

B. $-5.0m, +1.0m$

C. $-5.0m, +5.0m$

D. $-1.0m, +5.0m$

Answer:

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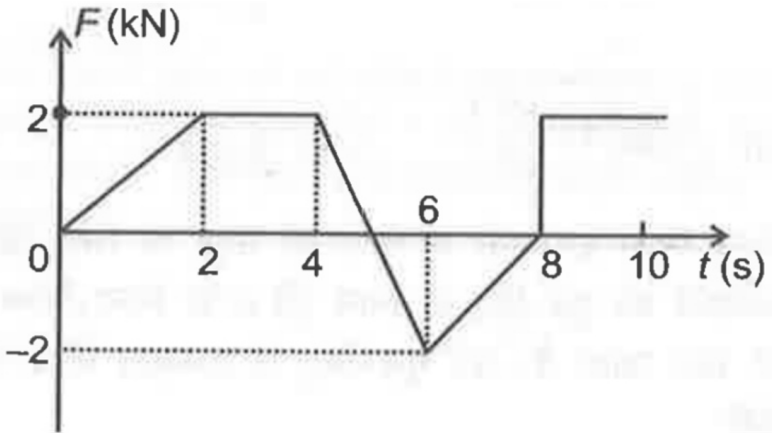
82. The force(F) acting on a particle of mass m changing with time(t) is as shown in $(F-t)$ graph. The change in linear momentum from t=0 to t=6 s (in kN s) is



A. 6

B. 8

C. 7

D. 5

Answer:

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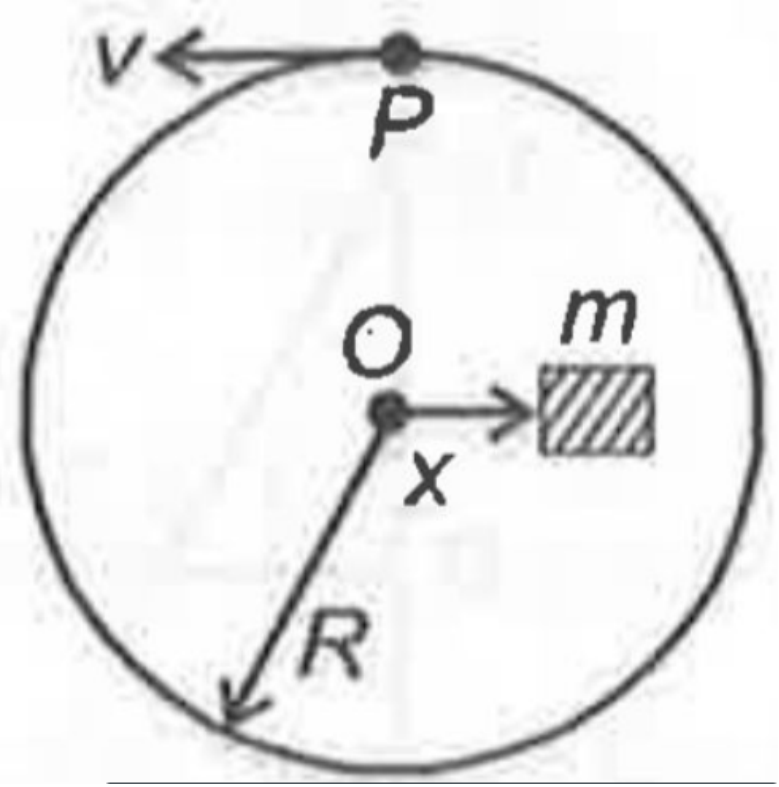
83. A block of mass m kept on rough horizontal turn table at a distance x from the centre. If the coefficient of friction between the table and

block is μ then maximum speed of point P on turn table so that the block does not slip is



A. $\sqrt{\mu g R}$

B. $\sqrt{\mu g \frac{R^2}{x^2}}$

C. $\sqrt{\mu g \frac{R^2}{x}}$

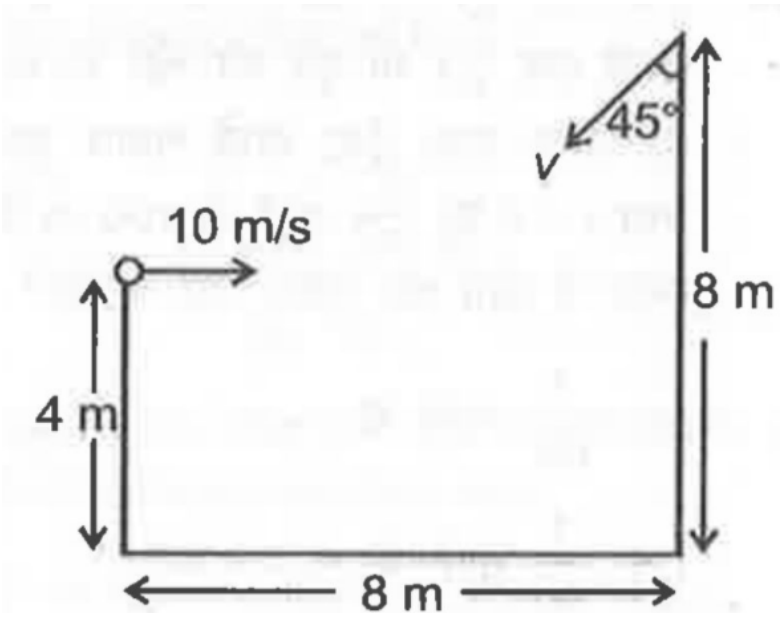
D. $\sqrt{\mu g x}$

Answer:

Watch Video Solution

84. Two particles are projected simultaneously from two towers of different heights,one is horizontal with speed 10 m/s and the other at an angle 45° below the horizontal with speed v as shown in figure. The velocity v for which

particles collides in air is



A. $10\sqrt{2}$ m/s

B. 20 m/s

C. 10 m/s

D. $\frac{10}{\sqrt{2}}$ m/s

Answer:

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85. Two particles are projected from the same point making angles angle θ_1 and θ_2 with the horizontal respectively in such a way that their horizontal velocities are equal. The ratio of maximum heights $\left(\frac{H_1}{H_2}\right)$ will be equal to

A. $\frac{\tan\theta_2}{\tan\theta_1}$

B. $\frac{\tan^2\theta_2}{\tan^2\theta_1}$

C. $\frac{\tan\theta_1}{\tan\theta_2}$

D. $\frac{\tan^2\theta_1}{\tan^2\theta_2}$

Answer:

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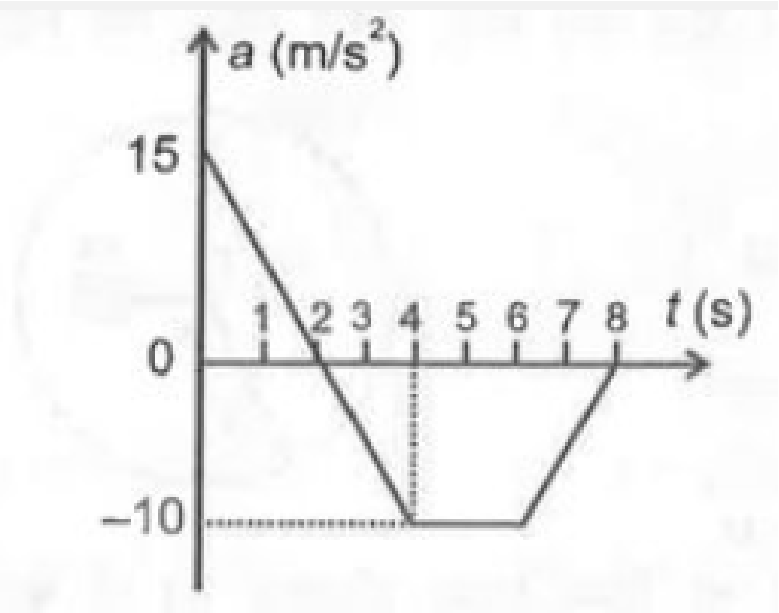
86. The acceleration-time $(a-t)$ graph of a particle moving along straight line is as shown in figure. The time at which velocity of particle

becomes equal to its initial velocity is



A. 2 s

B. 4 s

C. 4.5 s

D. 5.5 s

Answer:

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87. A parrot is flying due east at a speed of 5 m/s. A train 300 m long is also travelling due east at a speed of 15 m/s. Both parrot and train are moving in same straight line and train is 100 m behind the parrot at t=0. Then how long will train take to overtake the parrot completely?

A. $\frac{1}{60}$ hour

B. $\frac{1}{90}$ hour

C. $\frac{1}{50}$ hour

D. $\frac{1}{40}$ hour

Answer:

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88. The velocity of the particle of mass m as a function of time t is given by $v = A\omega . \cos\left[\sqrt{\frac{K}{m}}t\right]$, where A is amplitude of oscillation. The dimension of $\frac{A}{K}$ is

A. $\left[ML^0T^{-2}\right]$

B. $\left[M^{-1}LT^{-2}\right]$

C. $\left[M^{-1}LT^2\right]$

D. $\left[M^0LT^0\right]$

Answer:

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Exercise

1. If a diaelectric material of dielectric constant ε_r is completely filled between two point charges as shown in the figure, then the net electrostatic force on q_1 is

A. $\frac{1}{4\pi\varepsilon_0}\frac{q_1 q_2}{r^2}$

B. $\frac{1}{4\pi\varepsilon_0\varepsilon_r}\frac{q_1 q_2}{r^2}$

C. $\frac{\varepsilon_r}{4\pi\varepsilon_0}\frac{q_1 q_2}{r^2}$

D. zero

Answer:

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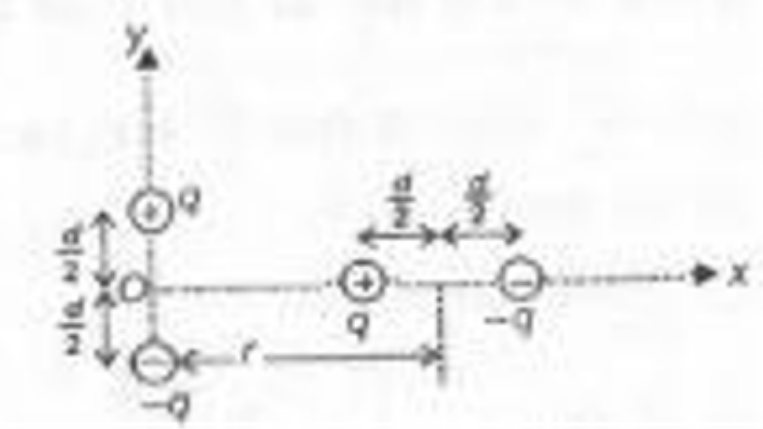
2. Two identical electric dipoles of dipole moments p are placed as shown in the figure. The electrostatic force on dipole placed along x-axis is (d << r) ($\frac{1}{4\pi\varepsilon_0}$)



A. $6k\frac{p^2}{r^4}j$

B. $6k\frac{p^2}{r^4}(-j)$

C. $3k\frac{p^2}{r^4}(-j)$

D. $3k\frac{p^2}{r^4}(j)$

Answer:

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3. Four point charges each of magnitude Q and mass m are moving on circular path with uniform speed under the influence of electrostatic force as shown in the figure. If AB=

BC= CD= DA =√2R, then speed of either of them is ($k = \frac{1}{4\pi\varepsilon_0}$)

A. $\sqrt{\frac{\left(2\sqrt{2}+1\right)kQ^2}{4mR}}$

B. $\sqrt{\frac{\left(2\sqrt{2}+1\right)kQ^2}{2mR}}$

C. $\sqrt{\frac{\left(2\sqrt{2}-1\right)kQ^2}{4mR}}$

D. $\sqrt{\frac{\left(2\sqrt{2}-1\right)kQ^2}{2mR}}$

Answer:

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4. Positive charge is uniformly distrubuted with volume charge density ρ of sphere of radius R. A spherical cavity is created in the sphere as shown in figure. This electric field intensity inside the cavity at point P is(where CP =R/5 , C_0C = 2R/3 , radius of cavity is R/4, C_0 & C are centre of sphere & cavity respectively)

A. $\frac{\rho}{3\varepsilon_0}\overline{C_0P}$

B. $\frac{\rho}{3\varepsilon_0}\overline{PC}$

C. $\frac{\rho}{3\varepsilon_0}\overline{C_0C}$

D. zero

Answer:

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5. A wire AMB is placed along y-axis having linear charge density λ C/m. The electric field intensity at point P is (PM=0.1 m)

A. $1.08 \times 10^{11} \lambda$(V/m)

B. $1.08 \times 10^{10} \lambda$(V/m)

C. $1.64 \times 10^{11} \lambda$(V/m)

D. $1.54 \times 10^{10} \lambda$(V/m)

Answer:

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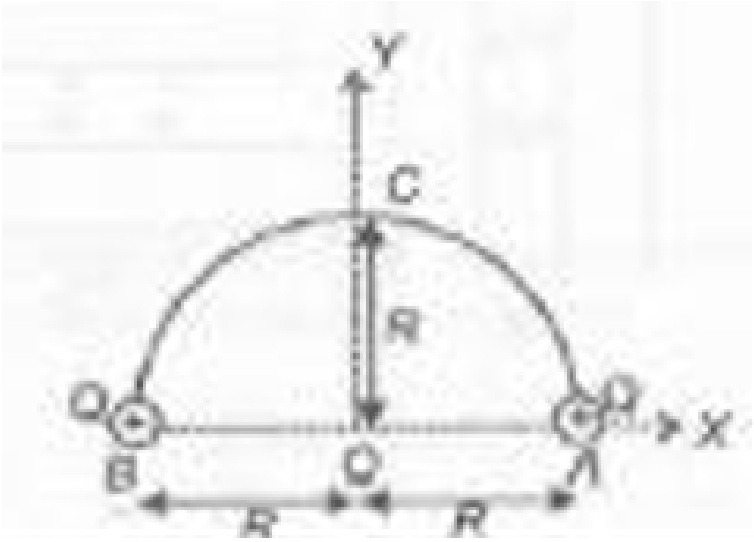
6. Two identical point charges are placed at A and B. The potential difference $V_0 - V_C$ is ($k = \frac{1}{4}\pi\varepsilon_0$)



A. zero

B. kQ/R

C. $\sqrt{2}k\frac{Q}{R}$

D. $\left(2-\sqrt{2}\right)k\frac{Q}{R}$

Answer:

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7. The magnitude electric potential difference between A and B for a given infinite line charge

having uniform density λ is approximately (Given $\log_e 2 = 0.7$, $\lambda = 10^{-8}\frac{C}{m}$)

A. 126 V

B. 63 V

C. zero

D. 31.5 V

Answer:

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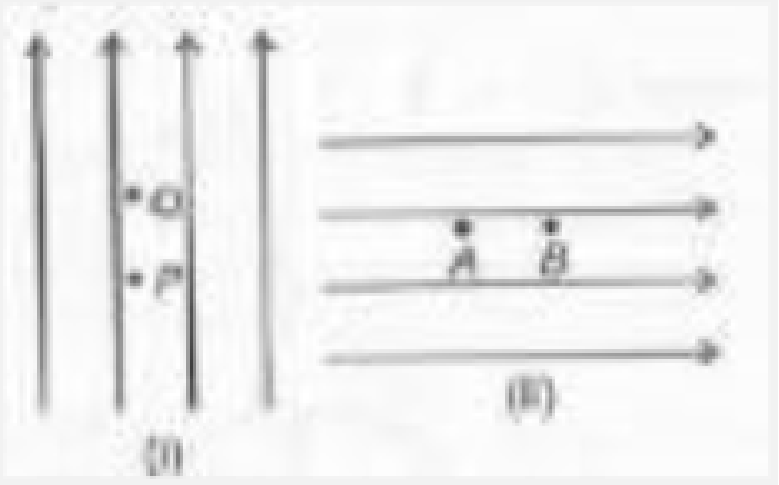
8. The uniform electric field is along positive y-axis positive x axis as shown in figure. The signs of potential differences $V_P - V_Q$ and $V_B - V_A$ respectively are



A. $+, +$

B. $-, +$

C. $+, -$

D. $-$, $-$

Answer:

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9. A short electric dipole having dipole moment $\bar{\rho}$ is placed along x-axis as shown in figure. The electric potential at point A(-2, 3) is ($k = \frac{1}{4}\pi\varepsilon_0$ and all quantities are in S. I. units)

A. $-\frac{kP}{(13)^{\frac{3}{2}}}$

B. $-\frac{2kP}{(13)^{\frac{3}{2}}}$

C. $-\frac{2kP}{(13)^2}$

D. $\frac{2kP}{(13)^2}$

Answer:

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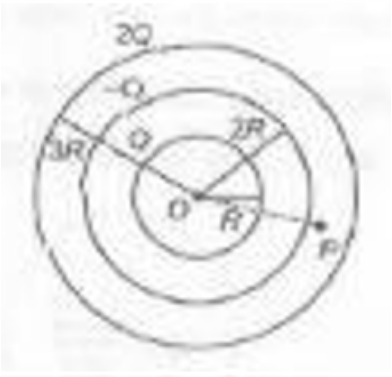
10. There are three conducting concentric spherical shells having charges Q, -Q, 2Q respectively as shown in the figure. The electric

field intensity at point P is (where OP= 2.5R) ($k = \frac{1}{4\pi\varepsilon_0}$)



A. zero

B. $\frac{3}{4}\frac{kQ}{R^2}$

C. $4k\frac{Q}{25R^2}$

D. $k\frac{Q}{4R^2}$

Answer:

Watch Video Solution

11. there are two concentric metallic shells of radii R and 2R, if outer shell is given charge q_1 , then charge on surface of inner shell will be

A. $-\frac{q_1}{2}$

B. $-q_1$

C. $\frac{q_1}{2}$

D. zero

Answer:

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12. An uncharged metallic solid sphere of radius R is placed at a distance 2R from point charge Q as shown in figure. The electric field intensity due to induced charge at centre of sphere is

A. zero

B. $\frac{Q}{2\pi\varepsilon_0 R^2}$ towards left

C. $\frac{Q}{16\pi\varepsilon_0 R^2}$ towards right

D. $\frac{Q}{16\pi\varepsilon_0 R^2}$ towards left

Answer:

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13. There are two concentric conducting spherical shells of radii $10cm$ and $20cm$. The outer shell is charged to a potential of $50esu$ while inner shell is earthed. The charge on outer shell is

A. 1000 esu

B. 2000 esu

C. 5 esu

D. 1500 esu

Answer:

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14. A parallel plate capacitor (not connected with battery) have charge Q_0 , separation between plates d_0 and area A_0 is pulled by external agent to increase the separation by 100%, then (symbols have their own meaning)

A. E=constant, V= constant and Q= constant

B. E=constant, V increases and Q= constant

C. E decreases, V decreases and Q decreases

D. E=constant, V decreases and Q= constant

Answer:

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15. An arrangement of five identical capacitors are shown in given circuit, the potential at X and Y are respectively.

A. $12V$ and $-6V$

B. 18 V and -12 V

C. 6 V and 24 V

D. 24 V and 6 V

Answer:

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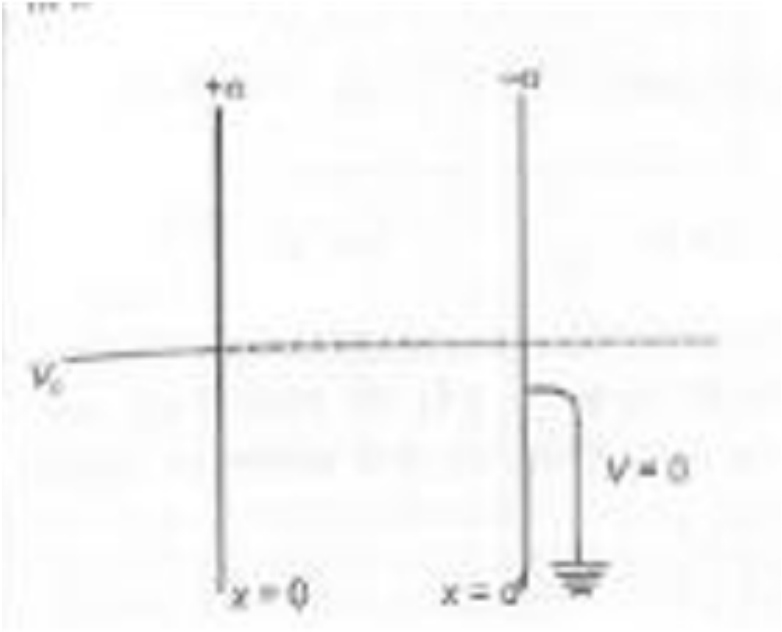
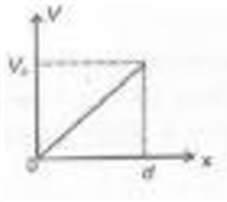
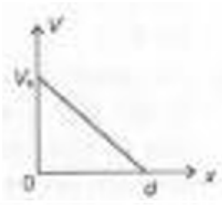
16. A parallel plate capacitor charged to potential difference V_0 . The variation of

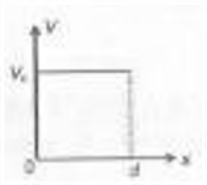
potential V from x= 0 to x= d is best described

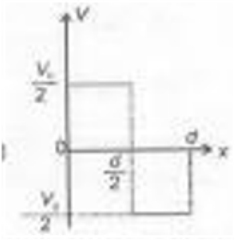


by

A. 

B. 

C. 

D. 

Answer:

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17. The area of cross section of a uniform cylindrical conducting wire is decreased by 20%

due to stretching it. The percentage change in its resistance is (approximately)

A. 56% decrease

B. 20% increase

C. 56 % increase

D. 20% decrease

Answer:

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18. Which one of the following relations is incorrect ? (Symbols have their own meanings)

A. $i = \pi e A V_0$

B. $J = \pi e^2 \frac{\tau}{m} \left(\vec{E} \right)$

C. $V = IR$

D. $\rho = \pi e^2 \frac{\tau}{m}$

Answer:

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19. If two conducting wires Aand B of same dimensions have electron density ratio 1: 3 . If their relaxation time is same then the ratio of resistance of A to resistance of B is

A. $1:1$

B. $3:1$

C. $1:3$

D. $9:1$

Answer:

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20. A current carrying conductor is connected with a cell, after some time temperature of conductor is increased by 1 unit. The percentage change in its resistivity is (Here α is temperature coefficient of resistivity)

A. $100\alpha\%$

B. $\alpha\%$

C. $\frac{\alpha}{100}\%$

D. $\frac{\alpha}{10}\%$

Answer:

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21. The voltmeter shown in the figure reads 10V across 40 ω . The resistance of voltmeter is

A. 10 ω

B. 20 ω

C. 40 ω

D. infinite

Answer: