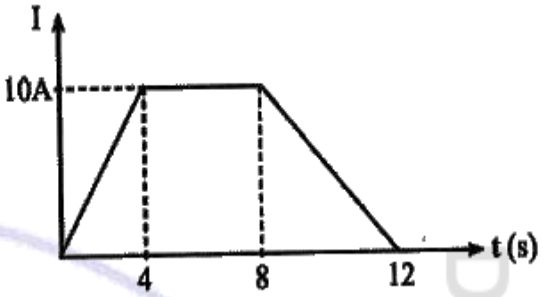
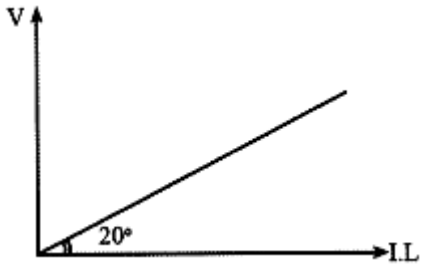
1. A conductor carrying current as in the figure, so the total electric charge passes through it in 12sec equals…….



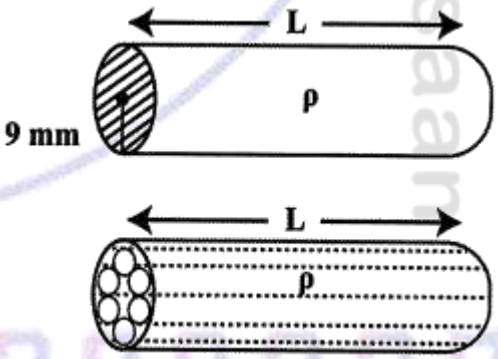
(A) 120C
(B) 60C
(C) 80C
(D) 0

2. The opposite graph represents the relation between the potential difference between the terminals of a conductor on the vertical axis and the current intensity multiplied by the length on the horizontal axis. Knowing that: $\rho_e=1.2\times10^{-6}$ W.m, so the cross-sectional area of this conductor is……mm^2



(A) 33
(B) 12
(C) 15
(D) 3.3

3. An aluminum cable of radius 9mm and resistance 5Ω is replaced by another cable of 6 thin aluminum wires each of radius 3mm and of same length, so the resistance of the second cable is.....



(A) 3Ω
(B) 18Ω
(C) 15Ω
(D) 7.5Ω

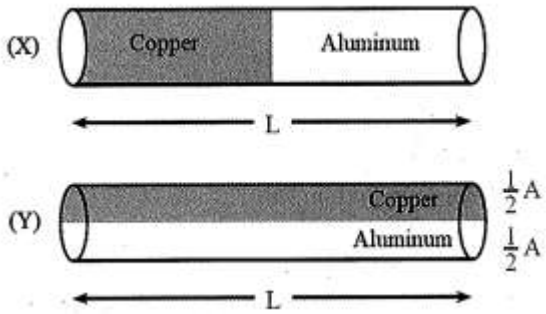
4. Two cables made of copper and aluminum, the cross-sectional area of them is (A) and the length of them is (L), one of them is (X) and the other is (Y), so (Knowing that: $\rho_{Cu} = 1.7x10^{-8}$ Ω.m and $\rho_{Al} = 2.8\times10^{-8}$ Ω.m)

(A) The resistance of them are equal.

(B) The resistance of (Y) is greater.

(C) The resistance of (X) is greater

(D) Not related to.



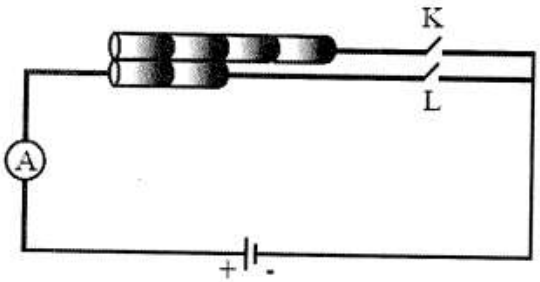
5. In the opposite figure two conductors of same material and same cross-sectional area. When the switch (K) only is closed, the reading of the ammeter was (I_1) and when the switch (L) only is closed, the reading of the ammeter was (I_2), so the ratio I_1/I_2 is……..

(A) 1/4

(B) 1/3

(C) 2/3

(D) 1



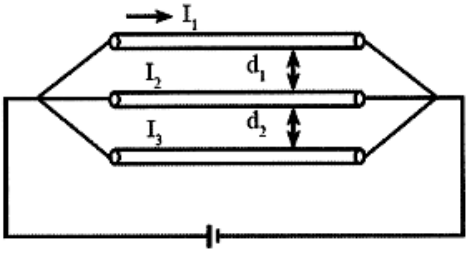
6. Three parallel wires of same lengths, same material and the ratio between their resistances 3 : 4 : 5 are connected with a battery as in figure, if the force effect on the d middle wire = zero, so the ratio d_1/d_2 is……

(A) 3/1

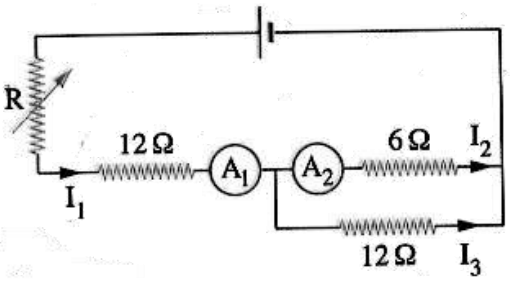
(B) 4/3

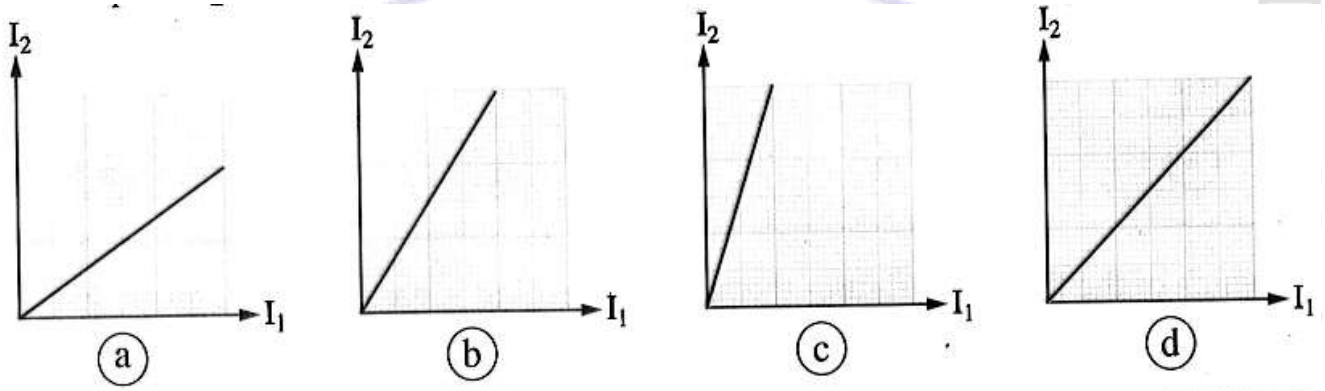
(C) 5/3

(D) 2/3



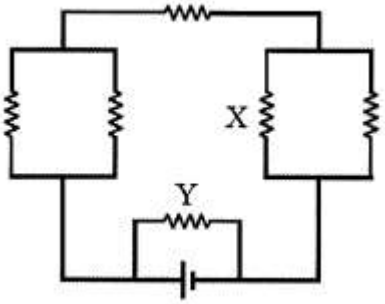
7. Which of the following graphs represents the relation between the readings of the two ammeters A_1 and A_2 when the value of the taken resistance from R changes? (Where: I_1 and I_2 are represented with the same drawing scale)





8. In the circuit shown, all resistors are identical and when the current passing through resistor (X) = (I), so the current passing through resistor (Y) equals.....

(A) 2I
(B) 3I
(C) 4I
(D) 6I



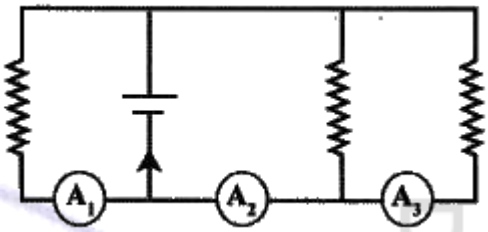
9. Which ammeter in the circuit shown in the figure gives the largest reading? (Knowing that all resistors are identical).

(A) The ammeter (A_1).

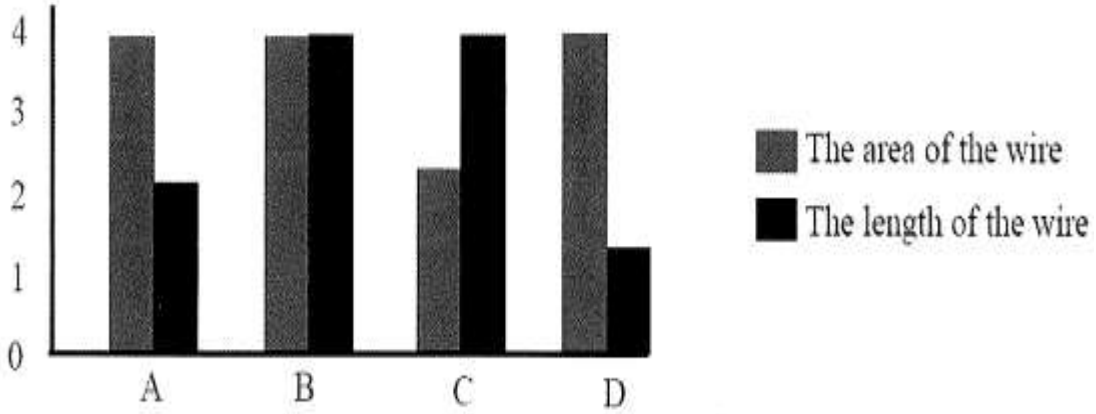
(B) The ammeter (A_2)

(C) The ammeter (A_3).

(D) All readings of the devices are equal.



10. In the opposite figure four copper wires, so the wire of lower resistance is…….



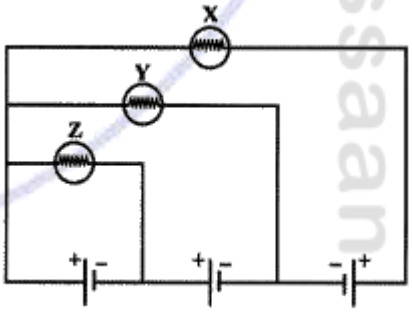
11. In the circuit 3 lamps (X, Y, Z) so the ranking of their power (Brightness) is…….(the lamps are identical and the batteries are identical)

(A) $P_X > P_Y > P_Z$

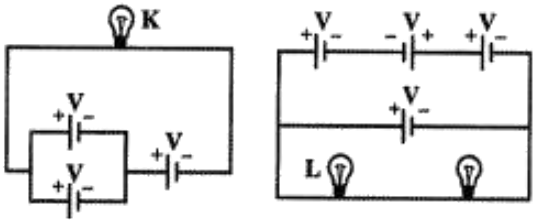
(B) $P_Z > P_Y > P_X$

(C) $P_Y > P_X = P_Z$

(D) $P_X > P_Y = P_Z$



12. In the opposite circuits there are identical bulbs and identical cells of negligible internal resistance, so the consumed power is……..

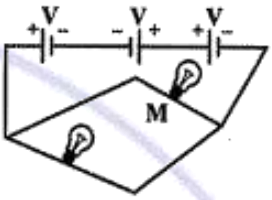


(A) $P_K > P_M > P_L$

(B) $P_K > P_L = P_M$

(C) $P_K > P_L > P_M$

(D) $P_M > P_K > P_L$



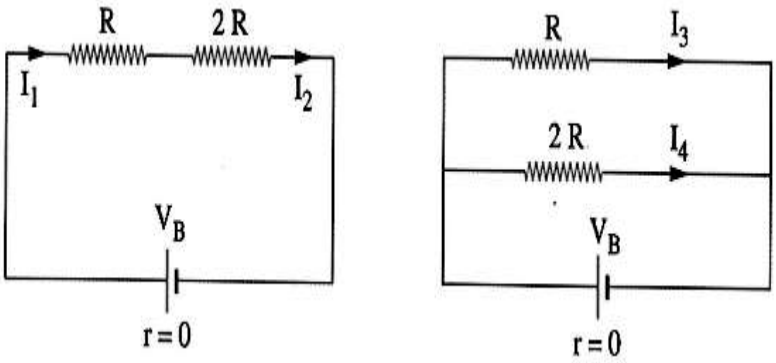
13. In the shown electric circuits, two resistors R and 2R are connected in two different ways to a battery of emf V_B and negligible internal resistance, so which of the following B relations is correct?

(A) $I_3 > I_2$

(B) $I_4 > I_3$

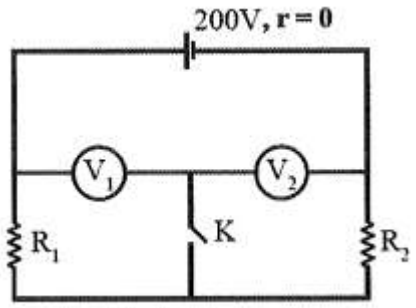
(C) $I_1 = 0.5I_2$

(D) $I_1 > I_4$



14. In the opposite circuit two voltmeters (V_1) and (V_2) of resistances 3000Ω and 2000Ω respectively and two resistances (R_1) and (R_2) of resistance 2000Ω and 3000Ω respectively, so the reading of the voltmeters when the key is opened are.....

	(V_1)	**(V_2)**
A	100V	100V
B	120V	80V
C	80V	120V
D	200V	200V



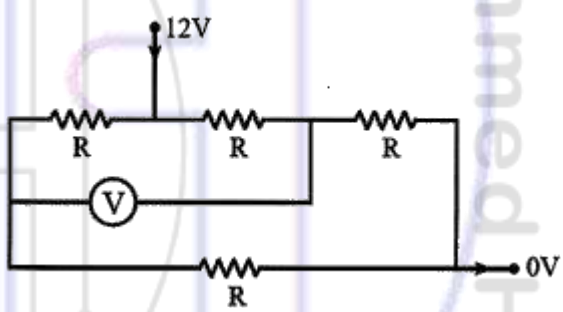
15. The reading of the shown voltmeter is……

(A) 12V

(B) 6V

(C) 0V

(D) 3V



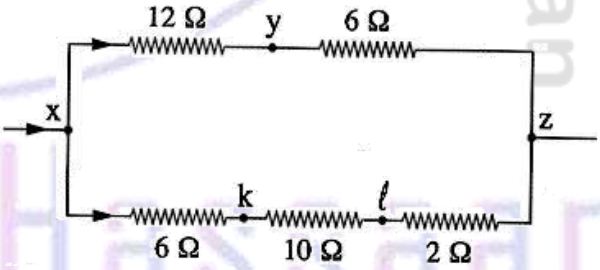
16. The opposite figure represents a section of electric circuit, so which of the following relations is correct for the potential differences between the given points?

(A) $V_{kl} > V_{xy}$

(B) $V_{yz} > V_{xk}$

(C) $V_{kx} = V_{xy}$

(D) $V_{ex} = 2V_{lz}$



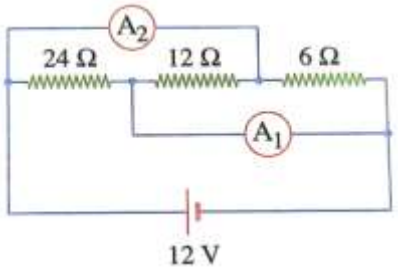
17. In the opposite circuit, the ratio between the readings of the two ammeters (A_1/A_2) equals

A) 5/1

B) 2/1

C) 1/2

D) 1/5



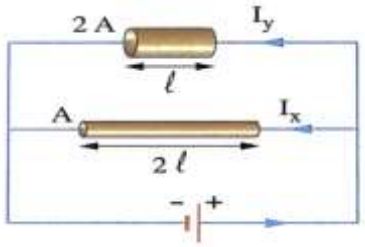
18. Two conductors (x and y) that are made of the same material but with different dimensions are connected in an electric circuit as shown in the opposite figure, so the ratio between the intensities of the currents that pass through them (I_x/I_y) is.....

A) 2/1

B) 1/1

C) 1/2

D) 1/4



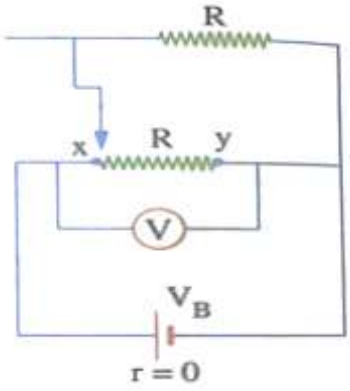
19. In the opposite circuit, if the sliding contact of the rheostat is moved from point x to point y, the reading of the voltmeter.....

A) increases

B) decreases till it vanishes

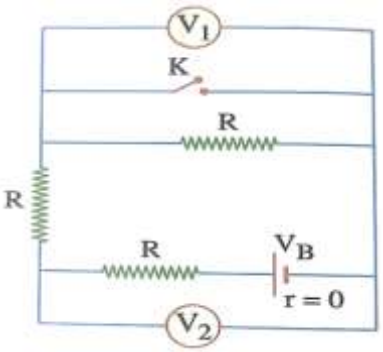
C) remains unchanged

D) decreases but doesn't vanish



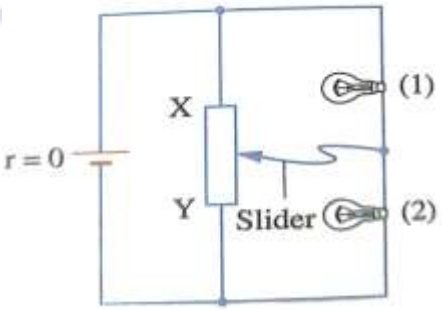
20. When closing switch K in the opposite electric circuit.....

Choice	Reading of V_1	Reading of V_2
A	Decrease but doesn't equal zero	Becomes zero
B	Increase	Increase
C	Becomes zero	Increase
D	Becomes zero	Decrease but doesn't equal zero



21. In the opposite electric circuit, the two lightbulbs are identical, hence when the sliding contact is positioned in the midpoint between X and Y, the two bulbs glow with the same brightness, so if the sliding contact is moved slightly towards Y, which of the following choices shows what will happen to the brightness of each bulb?

Choice	Brightness bulb (1)	Brightness bulb (2)
A	Increase	Increase
B	Increase	Decrease
C	Decrease	Increase
D	Decrease	Decrease



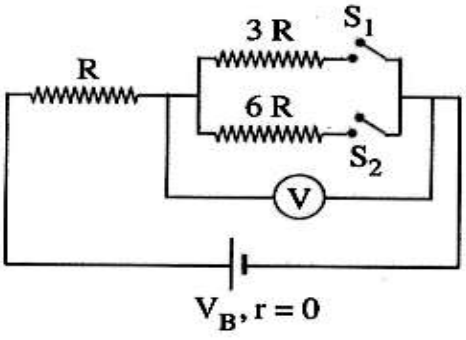
22. In the opposite electric circuit when switch S_1 only is closed, the reading of the voltmeter becomes V_1 when switch S_2 only is closed, the reading of the voltmeter becomes V_2 and when both switches S_1 and S_2 are closed together, the reading of the voltmeter becomes V_3 then……

(A) $V_1 < V_2 < V_3$

(B) $V_3 < V_1 < V_2$

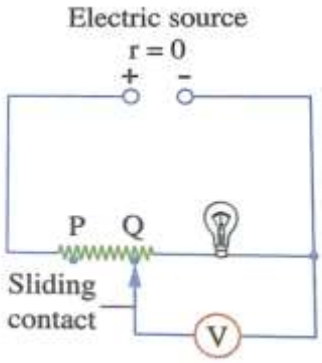
(C) $V_2 < V_1 < V_3$

(D) $V_3 < V_2 < V_1$



23. In the opposite electric circuit, how will the brightness of the lightbulb and the reading of the voltmeter change when the sliding contact moves from Q to P?

Choice	brightness of the lightbulb	Reading of voltmeter
A	Increase	Decrease
B	Increase	Increase
C	Remains unchanged	Decrease
D	Remains unchanged	Increase



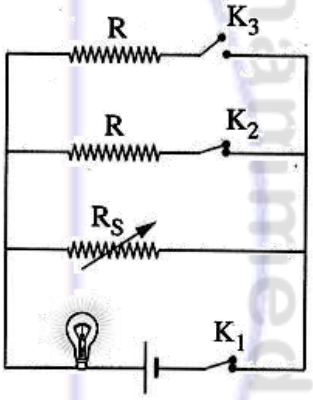
24. In the shown electric circuit, which of the following changes will lead to an increase in the brightness of the lightbulb?

(A) Opening switch K_1

(B) Opening switch K_2

(C) Closing switch K_3

(D) Increasing the resistance of R_s



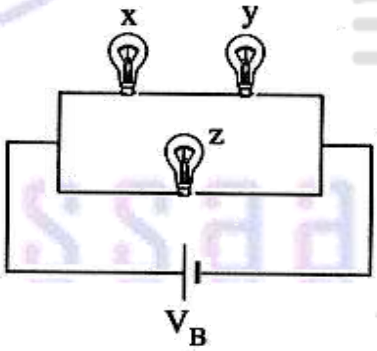
25. In the opposite electric circuit, three identical electric bulbs x, y and z are connected together with a battery of negligible internal resistance, hence the ratio between the consumed powers in the three bulbs $(P_W)_x : (P_W)_y : (P_W)_z$ respectively is……

(A) 1 : 1: 4

(B) 1 : 1: 1

(C) 4 : 4: 1

(D) 1 : 1: 2



26. Figure (1) shows an electric circuit containing a battery of electromotive force V_B whose internal resistance is negligible. Multiple readings for the voltmeter (V) and the ammeter (A) were recorded by changing resistance R_2 , then the relation between $(V_B - V)$ and (I) is drawn to obtain the graph in figure (2), so the slope of the straight line represents…….

(A) R_1

(B) R_2

(C) R_3

(D) $R_1 + R_3$

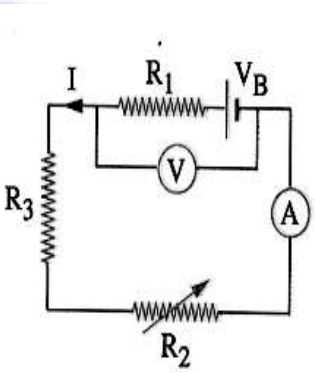


Figure (1)

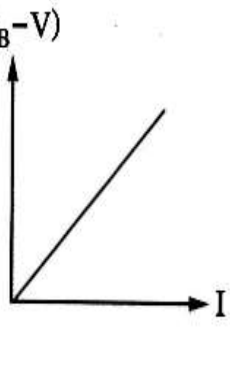


Figure (2)

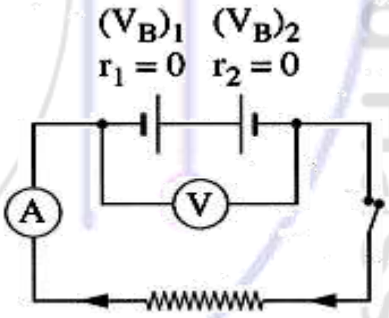
27. In the opposite electric circuit, if we reversed the poles connection of the battery (V_{B2}), then the reading of the voltmeter becomes……. (Where: $(V_{B1}) > (V_{B2})$)

(A) 0

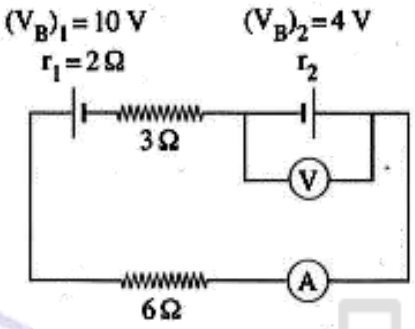
(B) $(V_{B1}) - (V_{B2})$

(C) $(V_{B1}) + (V_{B2})$

(D) $(2V_{B1}) - (V_{B2})$

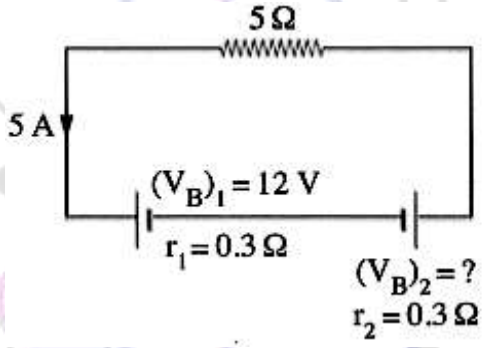


28. In the opposite electric circuit, if the reading of the voltmeter is 4.5V, then the value of the internal resistance (r_2) equals……..Ω



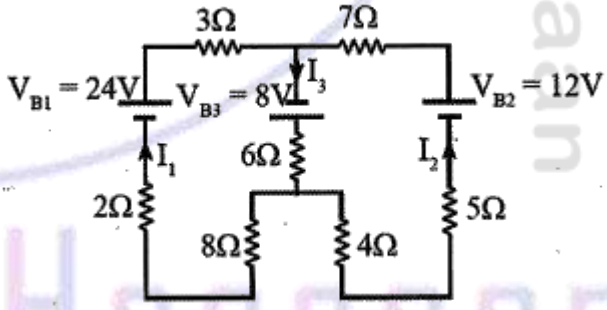
(A) 0.5
(B) 1
(C) 1.2
(D) 1.8

29. In the opposite figure, if the battery (V_{B1}) is charging by a current of intensity 5A, then the electromotive force of the battery (V_{B2}) is……..



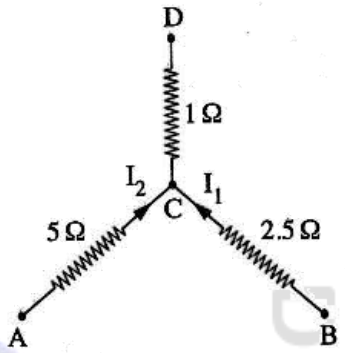
(A) 40V
(B) 32V
(C) 24V
(D) 16V

30. By using the data in the electric circuit as shown in the figure with neglecting the internal resistance of all batteries in the circuit, so the potential difference across the terminals of the resistor 6Ω is……



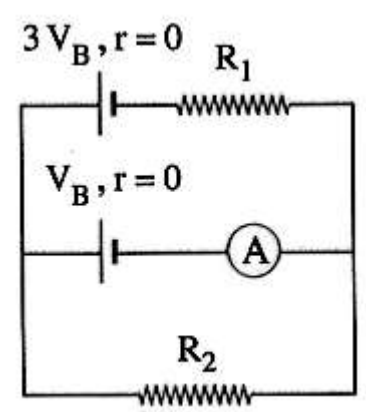
(A) 2.75V
(B) 0.45V
(C) 12V
(D) 3V

31. The opposite figure shows a section of an electric circuit, if the electric potentials of points A, B and D respectively are 15V, 20V and 5V, the electric potential of point C is.....V



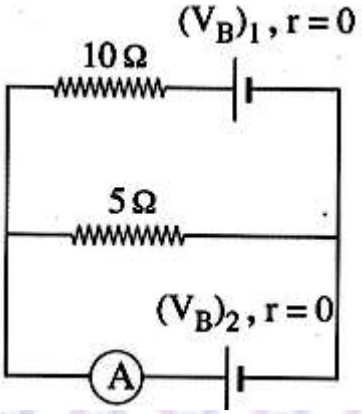
(A) 8
(B) 10
(C) 12
(D) 14

32. In the shown electric circuit, if the ammeter reading = 0, the ratio (R_1/R_2) is.....



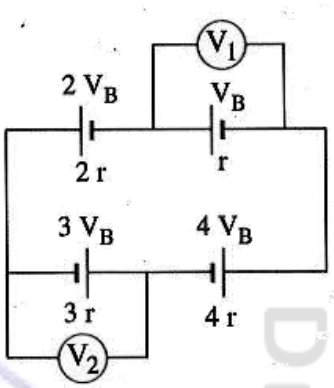
(A) 1/1
(B) 2/1
(C) 3/1
(D) 4/1

33. In the shown electric circuit, if the ammeter reading = 0, the ratio (V_{B1}/V_{B2}) is.....



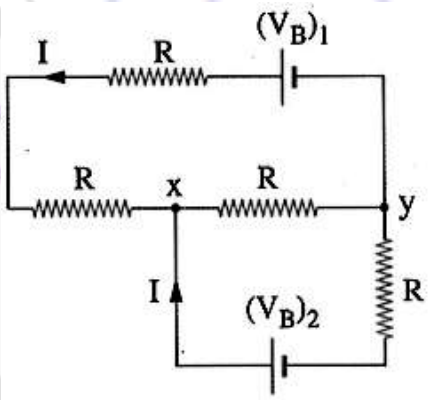
(A) 1/1
(B) 2/1
(C) 3/1
(D) 4/1

34. In the shown electric circuit, which of the following relations is correct for each of V_1 and V_2?



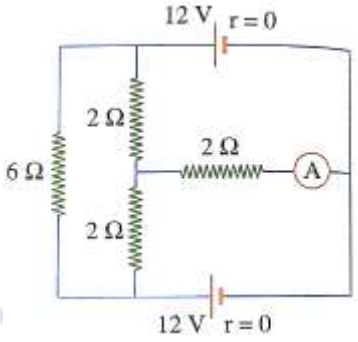
(A) $V_1 > V_2$
(B) $V_1 < V_2$
(C) $V_1 = V_2 \neq 0$
(D) $V_1 = V_2 = 0$

35. In the shown electric circuit, which of the following relations is correct for each of (V_{B1}), (V_{B2}) and V_{xy}?



(A) $V_{xy} < V_{B1} = V_{B2}$
(B) $V_{B1} > V_{xy} = V_{B2}$
(C) $V_{B1} < V_{xy} < V_{B2}$
(D) $V_{xy} < V_{B2} < V_{B1}$

36. In the opposite electric circuit, the ammeter reading equals



A) 1A

B) 2A

C) 3A

D) 4A

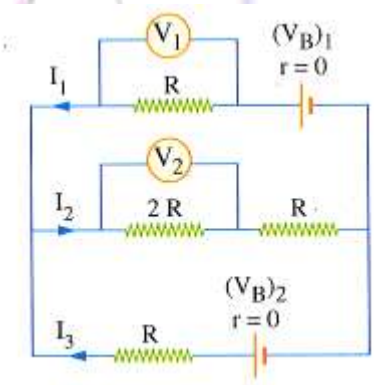
37. In the opposite electric circuit, if the ratio between the readings of the two voltmeters ($V_1/V_2 = 1/4$) , the ratio of ($(V_{B1}/(V_{B2}$) equals.....

A) 1/4

B)1/3

C) 1/2

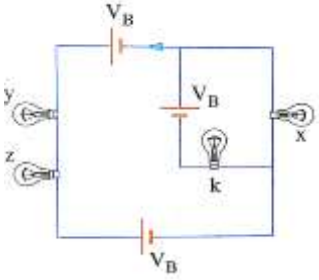
D) 1/1



38. The opposite figure illustrates an electric circuit that contains identical batteries of negligible internal resistances and also contains multiple identical lightbulbs, which of the bulbs filaments glows more intensely?

A) X B) Y

C) Z D) K



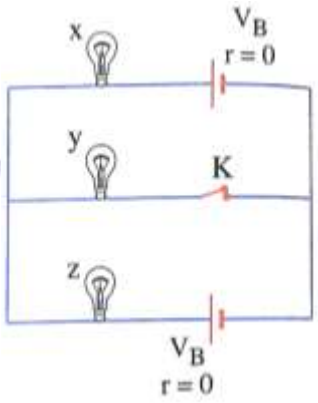
39. Three identical lightbulbs (x, y and z) are connected together in an electric circuit that contains two identical batteries as shown in the opposite figure, so when opening switch K, the brightness of bulb X.....

A) increases

B) doesn't change

C) decreases but doesn't vanish

D) vanishes



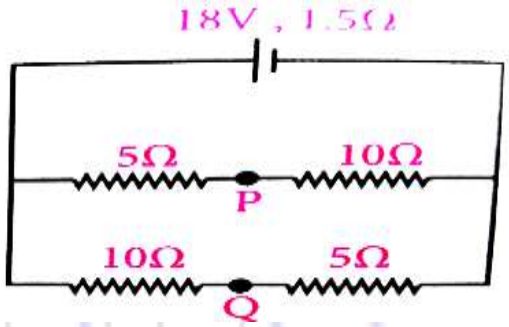
40. If in the circuit shown, the internal resistance of the battery is 1.5 Ohms and Vp, and V_Q are the potentials at P & Q respectively. What is the potential difference between P and Q?

a) Zero

b) 5V ($V_p > V_Q$)

c) 15V ($V_q > V_Q$)

d) 15V ($V_p > V_Q$)



41. A battery of negligible internal resistance, electric bulb and a rheostat are connected together in two methods as in figures (1), (2), Which method do you prefer to control the lighting of the bulb and **why**?

Answer:

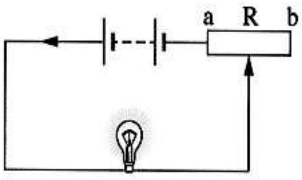


Figure (1)

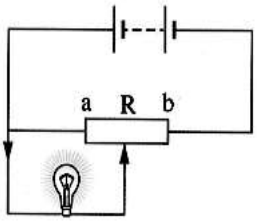


Figure (2)

42. Figure (1) represents an electric circuit consisting of a battery of negligible internal resistance, ammeter, constant 6Ω resistor and a rheostat R_v that ranges from zero to 18 Ω:

a. **What** is the reading of the ammeter when the slider is adjusted at:

- ❖ The start of the rheostat
- ❖ The d of the rheostat.

b. On the given graph paper in figure (2), represent graphically the relation between the ammeter reading (I) and value of the variable resistor (R_v).

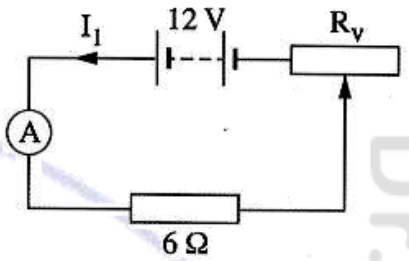


Figure (1)

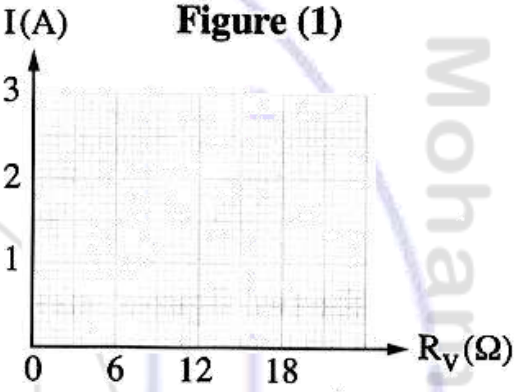
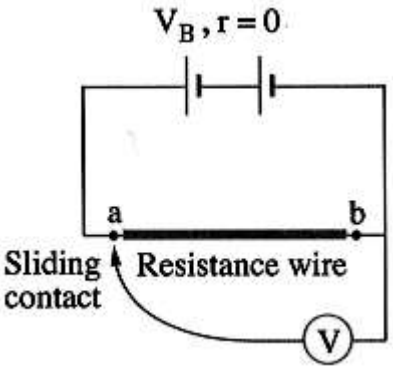


Figure (2)

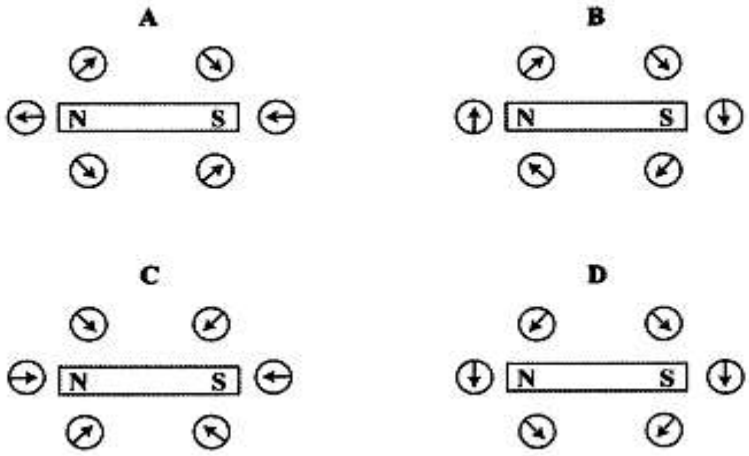
Answer:

43. A battery of emf V, that has a negligible internal V_B resistance is connected to a resistance wire ab, a voltmeter and a sliding contact as shown in the opposite figure, what change does appear in the voltmeter reading when moving the sliding contact from point a to b? Give reasons.



Answer:

44. The figure represents the position of a magnetic needle around a bar magnet, so the position that represents the right direction of the needle is……..



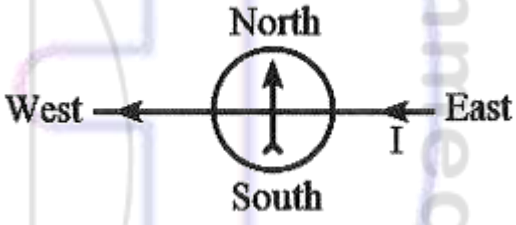
45. When passing a current in the wire above a compass as shown, so the needle…….

(A) deflects 180°

(B) not deflected

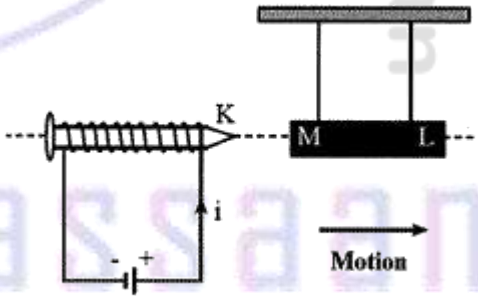
(C) deflect to the East

(D) deflect to the West

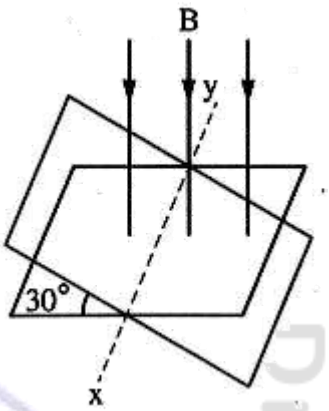


46. In the opposite figure a bar magnet is hanged in the presence of an electromagnet when the circuit is closed, the magnet moves away,
so the magnetic poles are……

	K	M	L
A	N	N	S
B	N	S	S
C	S	S	N
D	S	N	N



47. In the opposite figure, a coil is placed perpendicular to a uniform magnetic field of flux density B, so the magnetic flux that penetrates the coil is ϕ_m, if the coil has rotated from this position by an angle of 30° about the xy axis, then the magnetic flux that penetrates the coil becomes……



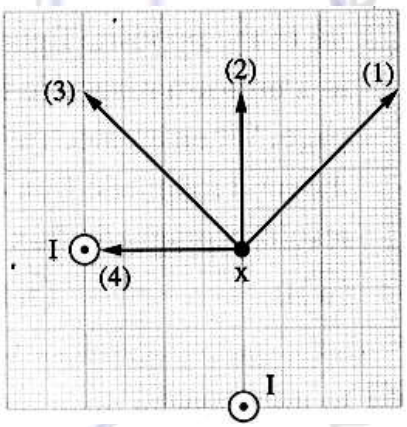
(A) $\frac{\sqrt{3}}{2}\phi_m$

(B) $0.5\ \phi_m$

(C) $1/3\ \phi_m$

(D) $3\ \phi_m$

48. The opposite figure shows two parallel very long straight wires that are carrying currents of equal intensities, hence the net magnetic flux density at point x is in the direction of…….



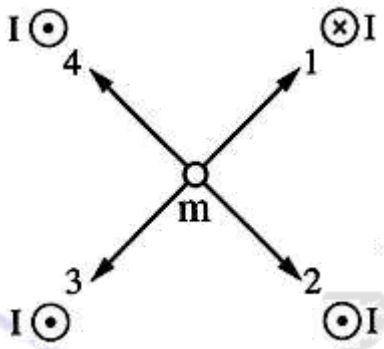
(A) 1

(B) 2

(C) 3

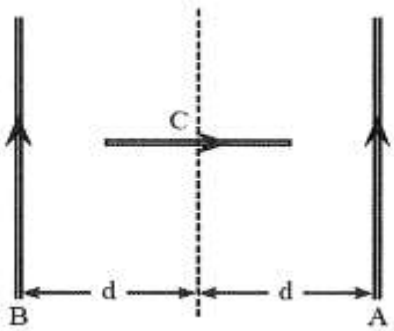
(D) 4

49. In the opposite figure, four very long parallel wires are placed perpendicular to the plane of the page at corners of a square. The four wires carry currents of equal intensities with directions. as shown in the figure, so the direction of the net magnetic flux. density at the center point (m) between the four wires is……



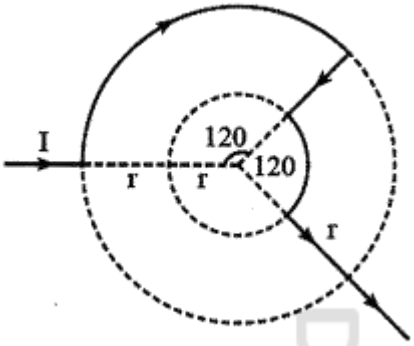
(A) 1
(B) 2
(C) 3
(D) 4

50. Three wires (A, B, C) passing through them the same current, the wires (A, B) very long and parallel to each other and wire (C) placed at midpoint between them as shown, so wire (C)……..



	If wire (C) placed at midpoint	If the current in wire (B) is reversed
A	Rotates in clockwise until become parallel to the two wires then stop.	Rotates in anticlockwise until become parallel to the two wires then stop.
B	Rotates in clockwise until become parallel to the two wires then stop.	Moves downward
C	Rotates in anticlockwise until become parallel to the two wires then stop.	Moves downward
D	Rotates in anticlockwise until become parallel to the two wires then stop.	Rotates in anticlockwise until become parallel to the two wires then stop.

51. In the opposite figure a current of 10A is produced in the circular path, so the magnetic flux density at its center is……..



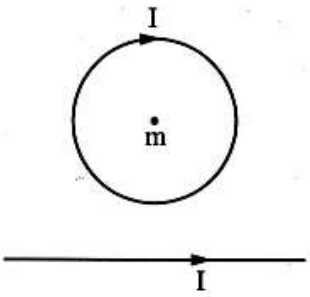
(A) 5μ/r

(B) 5μ/2r

(C) μ/3r

(D) 5μ/3r

52. The opposite figure shows a very long straight wire and a metallic ring that are placed in the plane of the page, where both carry electric currents of the same intensity I in the directions shown in the figure, so the resultant magnetic flux at the center m…….



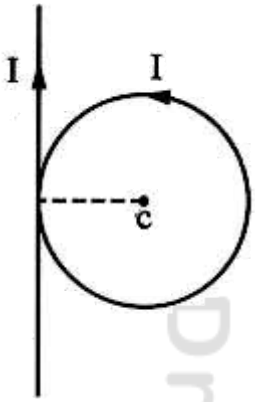
(A) equals zero

(B) is perpendicular out of the page

(C) is perpendicular into the page

(D) is inclined to the coil's plane by an angle of 45°

53. In the opposite figure, a ring and a straight wire that are insulated are placed in the same plane tangent to each other and each of them carries an electric current of same intensity I so that both of them produce magnetic fluxes at the center of the ring (c) of densities B_1 and B_2 respectively, hence the resultant magnetic flux density at the center of the ring (c) equals……

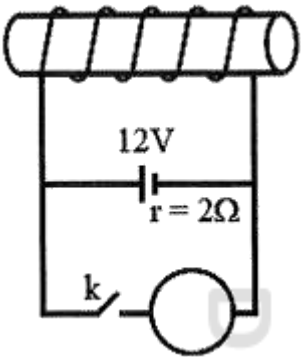


(A) 0
(B) $(B_1 - B_2)$ and its direction is out of the page
(C) $(B_1 - B_2)$ and its direction is into the page
(D) $(B_1 + B_2)$ and its direction is out of the page

54. An electric current is set up in a circular coil so that a magnetic flux of density B is formed at the center of the coil. So, when decreasing the electric current intensity to half its initial value and increasing the diameter of the coil to the triple with keeping the number of turns unchanged, the magnetic flux density at the center of the coil becomes

(A) B
(B) 6B
(C) B/6
(D) B/4

55. A solenoid 20cm, consists of 100 turns and its resistance 6Ω, wounded around an iron core of permeability 0.004Wb/A.m, connected with a battery as represented in the figure, so the change that could be done to the magnetic field before and after the switch is closed is..... Knowing that the resistance of the wire of the ring is 12Ω



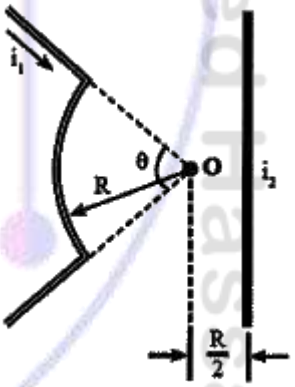
(A) 1T

(B) 2T

(C) 3T

(D) 6T

56. In the opposite figure, a straight wire passing through it a of current 1A, placed at R/2 distance from the center of another wire shapes as an arc of a circle its radius (R) and its current 2A, if the magnetic flux density at the center (O) is vanished, so the value of angle (θ) is.....



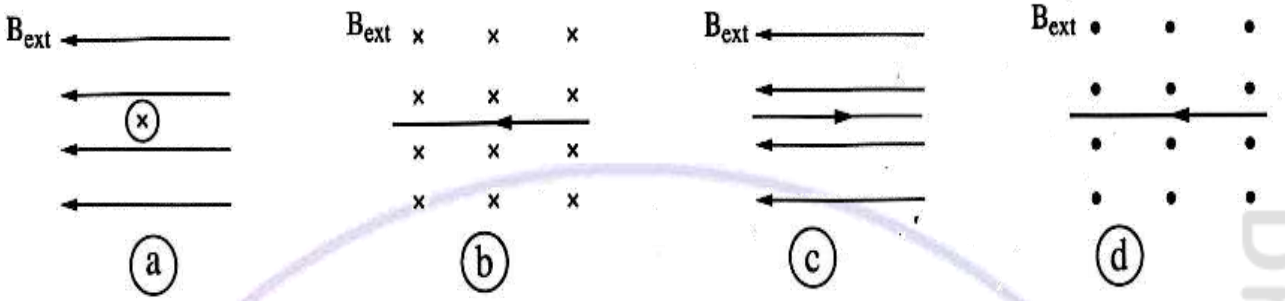
(A) π

(B) 1/π

(C) 114.6°

(D) 60.5°

57. In which of the following cases the wire is not affected by a magnetic force?



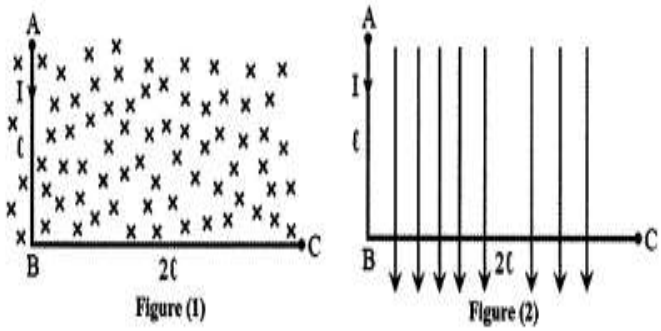
58. A straight wire passing through it a current (1) placed perpendicular to a magnetic field of density (B) as shown in the figure (1), if the magnetic field rotates 90° such that its direction is (north, south) as shown in figure (2), so the net force acting on the wire AB is……

(A) 0.5BIL&2BIL

(B) 2BIL& zero

(C) 0.25BIL&zero

(D) Zero&BIL



59. A straight wire (x) that carries a current of 50A is placed horizontally in air such that it becomes free to move vertically parallel to another wire (y) that carries a current of 80A and at a distance of 6.4cm from wire (x). If the net force that affects wire (x) equals zero, the mass of a unit length of it equals……..kg/m

(A) 1/8000

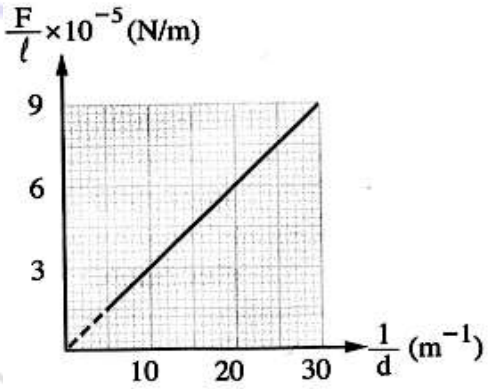
(B) 1/800

(C) 1/6400

(D) 1/640

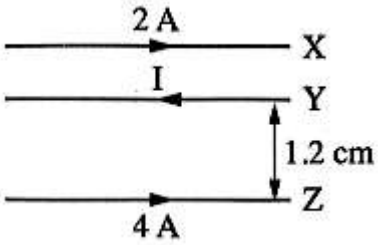
60. The opposite graph represents the variation of the mutual magnetic force between two long parallel wires per each unit of length (F/L) with respect to the reciprocal of the perpendicular distance between the two wires (1/d). If the two wires carry the same electric current intensity, then the intensity of this current equals……..

(A) 2.34A
(B) 2.78A
(C) 3.23A
(D) 3.87A

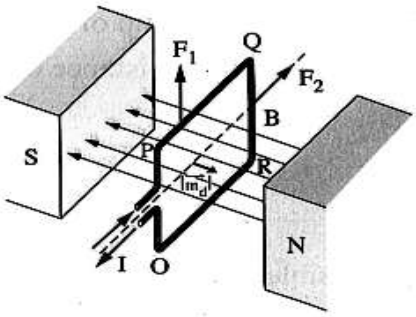


61. In the opposite figure, three very long current carrying wires X, Y and Z are parallel and lie in the plane of the page. If the net magnetic force that acts on wire Y equals zero, then the distance between wire Z and wire X equals……cm

(A) 0.6
(B) 1.8
(C) 2.4
(D) 3.6

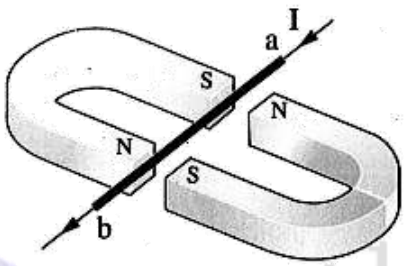


62. The opposite figure shows a rectangular coil (PQRO) that carries an electric current of intensity I while being placed between the two poles of a magnet where its plane is perpendicular to the magnetic flux lines and the figure shows some directions that are referring to some physical quantities, so which of these directions is not correct?



(A) The direction of magnetic field B that affects the coil.
(B) The direction of the magnetic dipole moment $|\overrightarrow{m_d}|$
(C) The direction of the magnetic force F, on side PQ
(D) The direction of the magnetic force F, on side QR

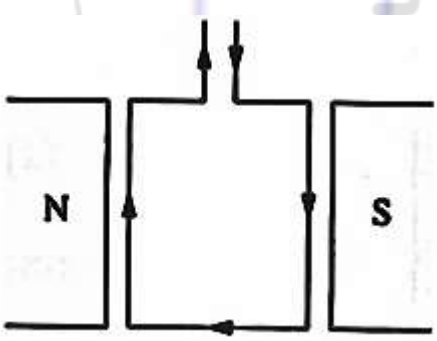
63. An aluminum rod ab is suspended horizontally between two identical U-shaped magnets that are fixed as shown in the opposite figure, so if an electric current I is set through the rod, the terminals of the rod get affected by two forces that……..



(A) are both upwards
(B) are both downwards
(C) cause a torque in a horizontal level
(D) cause a torque in a vertical level

64. The opposite figure represents a rectangular frame that carries an electric current while being in the plane of the page parallel to a uniform magnetic field, so the direction of the magnetic dipole moment of that coil is…….

(A) parallel to page and rightward
(B) parallel to page and leftward
(C) **perpendicular into the page**
(D) perpendicular out of the page



65. A coil is placed in a uniform magnetic flux of density B where its plane is parallel to the field. When an electric current of intensity I is set up in the coil it gets affected by a torque of magnitude τ. If the magnetic field strength becomes greater than B while the coil remains parallel to the field carrying the same current intensity I, the magnitude of the torque that affects the coil becomes……..

(A) Greater than τ
(B) Less than τ
(C) Equals τ
(D) Can't be known

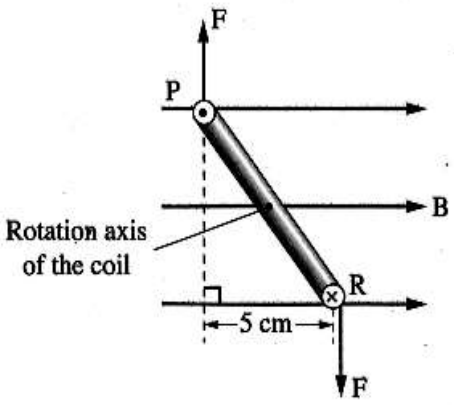
66. The opposite figure represents a front view of a rectangular coil that carries an electric current which passes through it out of the page at point P and into the page at point R, so if the length of the coil's side PR which is perpendicular to the rotation's axis is 10cm, then what is the value of the torque that affects the coil in this position with respect to the maximum value of the torque (τ_o)?

(A) $\sqrt{2}\ \tau_o$

(B) $1/\sqrt{2}\ \tau_o$

(C) $\sqrt{3}/2\ \tau_o$

(D) $0.5\ \tau_o$



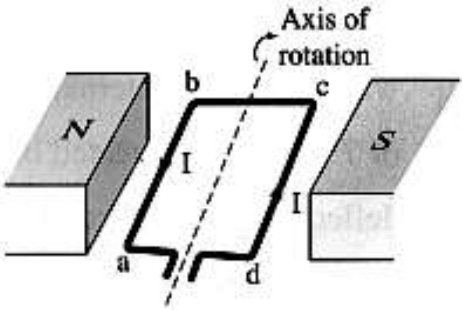
67. The opposite figure represents a rectangular coil (abcd) placed between the two poles of a magnet while its plane is being parallel to the magnetic field. If an electric current of intensity I is set up in the coil, which of the following physical quantities changes in direction relative to the page during the coil's rotation for 90°?

(A) The force acting on the coil's side ab

(B) The magnetic field which is acting on the coil.

(C) The torque acting on the coil.

(D) The magnetic dipole moment of the coil.



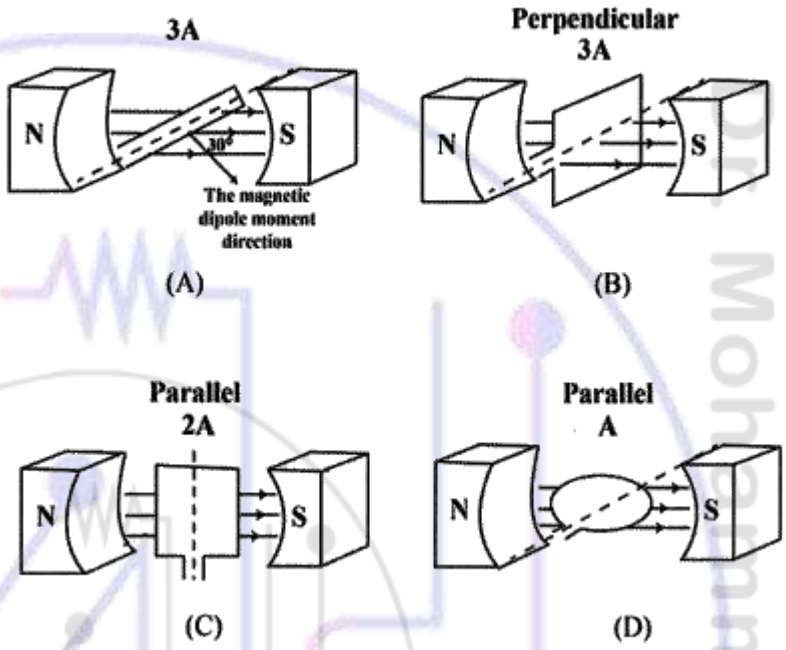
68. Four coils are equal in the number of tunes and different in the area, are placed in a uniform magnetic field has the same density as shown in the figure. When a current of the same intensity passing through them, arrange the value of the torque on them ascending…..

(A) A < B < C < D

(B) D < B < A < C

(C) B < D < A < C

(D) C < A < D < B



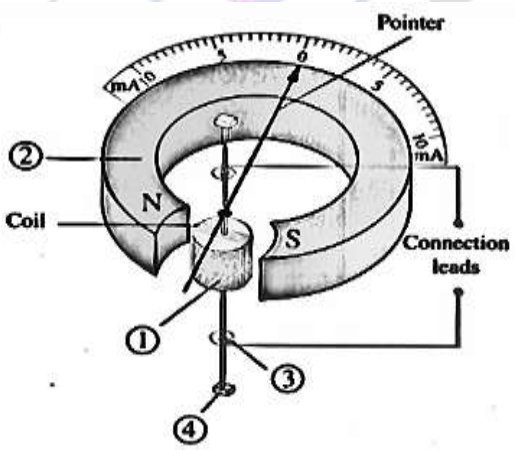
69. The opposite figure represents the internal structure of a moving coil galvanometer, so the component that is made of agate to reduce the friction during the motion of the coil is…….

(A) 1

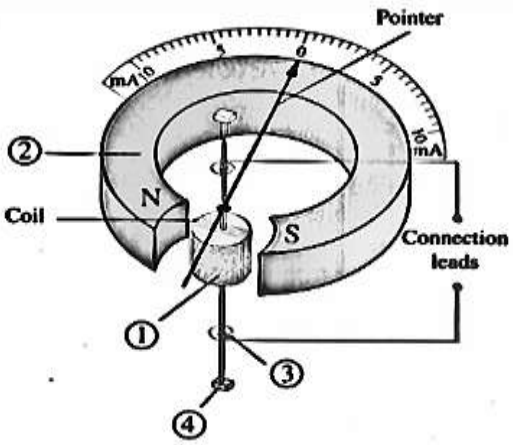
(B) 2

(C) 3

(D) 4



70. The opposite figure represents the internal structure of a moving coil galvanometer, so the magnetic flux lines that affects the coil are formed as radial lines due to…….

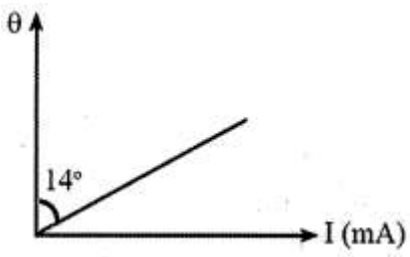


(A) The presence of component 1 only
(B) the design of component 2 and the presence of component 1
(C) the presence of component 3 only
(D) the presence of components 3 and 4

71. If the maximum angle of deflection for the pointer of a moving coil galvanometer from zero is 64° and when the galvanometer is connected in an electric circuit through which a current of intensity 480μA is passing, its pointer gets deflected by an angle of 24°, hence the maximum current that the galvanometer can withstand equals……mA

(A) 0.64
(B) 0.96
(C) 1.04
(D) 1.28

72. The graph shows relation between the angle of the deflection of a sensitive galvanometer and the current intensity. The value of the sensitivity of the device is……..degree/mA



(A) 8
(B) 4
(C) 0.25
(D) 2

73. Figure (1) represents a moving coil galvanometer of resistance R_g that carries a current g of intensity I and figure (2) represents the connection of that galvanometer with a shunt resistance R_s to convert it into an ammeter that carries a current of 2I. Then the ratio between the resistance of the galvanometer and that of the shunt resistance (R_g/R_s) is……..

(A) 3/1
(B) 4/1
(C) 7/1
(D) 8/1

Figure (1)

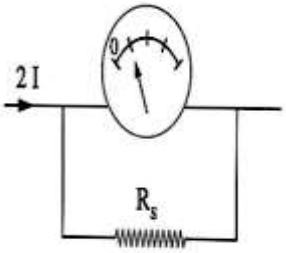


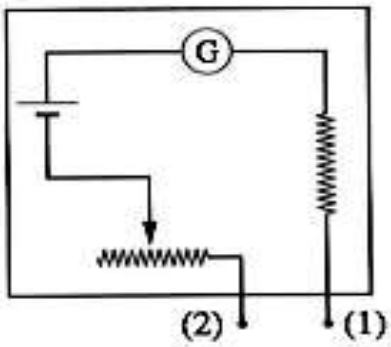
Figure (2)

74. A wire of uniform cross-sectional area that has a resistance R, is cut into a number of n equal parts. If these parts are connected together in parallel, then the equivalent resistance of them equals……

(A) n^2R
(B) R/n^2
(C) R/n
(D) Rn

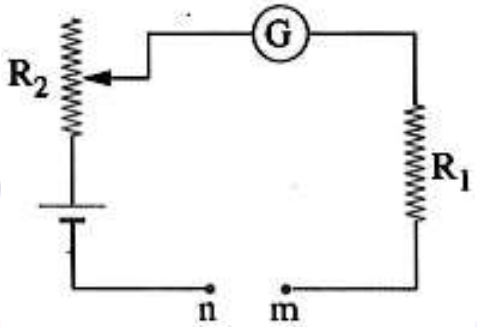
75. The opposite figure shows the components of an ohmmeter of total resistance R_o. When a resistor R is connected to the terminals (1, 2) of the ohmmeter, its pointer deflects to 1/5 the current scale, so what is the value of the resistor R in terms of the ohmmeter resistance R_o?

Answer:

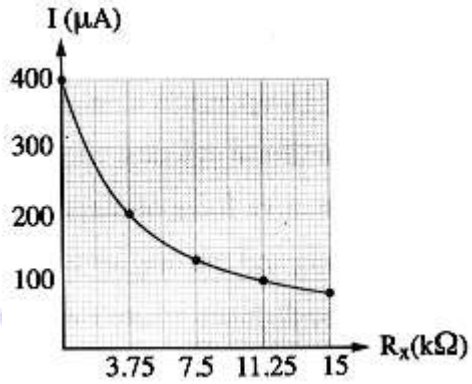


76. In the opposite figure, an ohmmeter device consists of a sensitive galvanometer of resistance 500 Ω, an electric cell of negligible internal resistance, constant resistance (R_1 = 1500Ω) and variable resistance (R_2), when the terminals of the ohmmeter (m, n) are connected together, its pointer gets deflected to the maximum of its scale (I_g) and when a resistance of 6750Ω is connected between the terminals (m, n), the pointer of the galvanometer gets deflected to the quarter of its scale (1/4 I_g), then the resistance taken from R_2 in ohmmeter circuit equals……

(A) 200Ω
(B) 250Ω
(C) 400Ω
(D) 450Ω



77. The opposite graph represents the relation between the current intensity (I) in an ohmmeter and the external resistance (R) which is connected to the terminals of the device. Calculate:

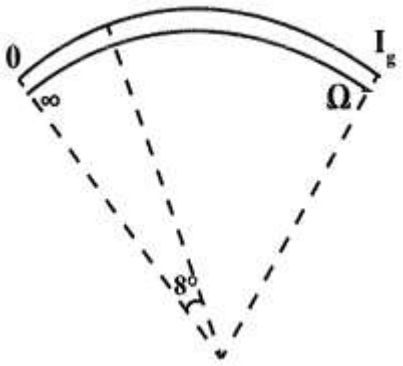


a. The maximum current that can pass through the ohmmeter.
b. The resistance of the ohmmeter device.
c. The value of resistor R that makes the passing current in the ohmmeter 50μA.

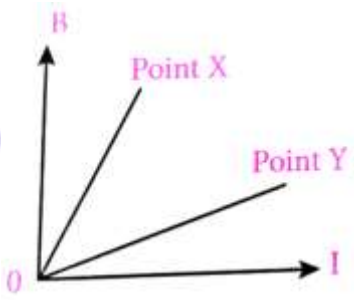
Answer:

78. The opposite figure shows the deflection of an ohmmeter, its resistance is 1200Ω, the maximum angle of division is 80°, when the ohmmeter connected to an external resistance the angle of division equals 8°. **Calculate** the value of the external resistance?

Answer:



79. Two points (X, Y) are examined around a straight wire carries electric current can change its intensity (1), and so the magnetic flux density (B) changes at each of the two points. And the relation between the two quantities are represented for each point by a straight line as shown in figure. Which point (X or Y) located on the nearest distance from the wire?



a) point (X) located on the nearest distance from the wire

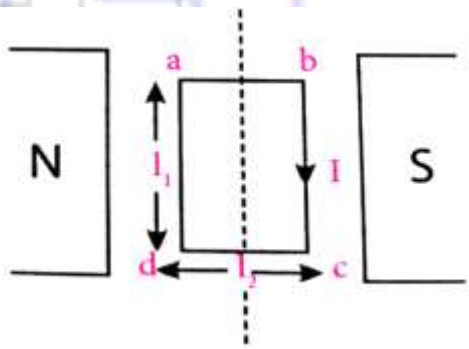
b) point (Y) located on the nearest distance from the wire

c) point (X) and point (Y) located on the same distance from the Wire.

d) insufficient information

80. A rectangular coil of the length (L_1) and width (L_2) carries an electric current of intensity (I) and placed parallel to magnetic flux of density (B). express by an equation the force acting on:

Choice	Side ab	Side bc
(a)	Zero	Zero
(b)	L2IB	Zero
(c)	Zero	LIB
(d)	L2IB	LIB



81. A sensitive galvanometer is connected to a shunt resistance (X) of 0.05Ω , a then this shunt is replaced by another shunt resistance (Y) of 0.5 Ω with the same galvanometer. In which case, the ammeter is able to measure a higher range current intensity?

a) shunt resistance (X)

b) shunt resistance (Y)

c) both give the same range

d) none

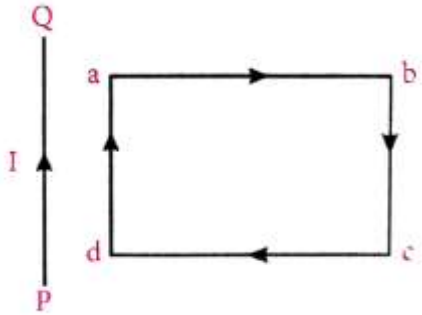
82. A free rectangular current carrying loop ABCD is placed as shown, near a long straight conductor PQ carrying a current I. The plane of the loop is the same as the plane containing the straight conductor and two sides of the loop are parallel to the straight conductor. The loop will

a) rotate clockwise

b) rotate anticlockwise

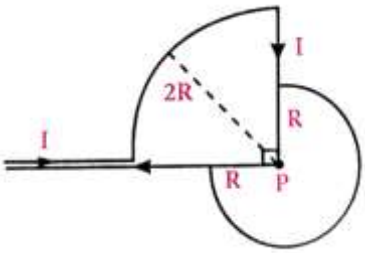
c) move towards the straight conductor

d) move away from the straight conductor

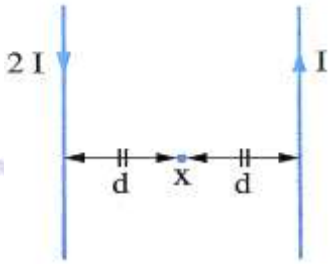


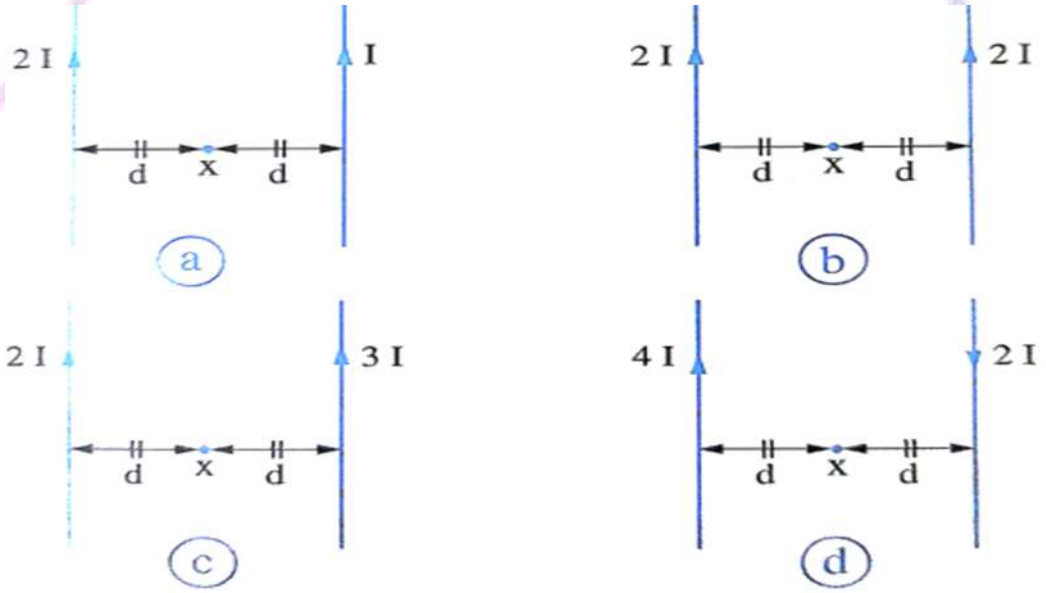
83. A segment of wire is formed into the shape shown in the opposite figure carries a current I of 1 A. What is the magnitude of the resulting magnetic field at the point P if R = 10 cm?

Choice	The value of magnetic flux density at P	The direction of magnetic field at point P
a)	$1.75\pi\times10^{-6}$T	Into the page
b)	$1.25\,\pi\times10^{-6}$T	Out of the page
c)	$2\,\pi\times10^{-6}$T	Into the page
d)	$5.75\,\pi\times10^{-6}$T	Out of the page

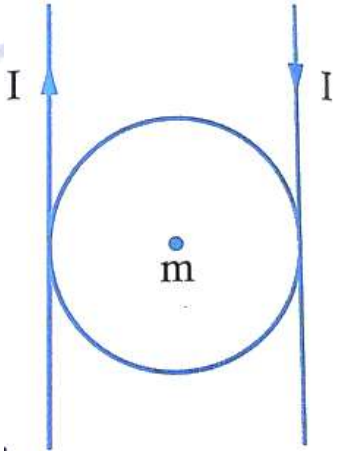


84. Two parallel straight wires carry electric currents as shown in the opposite figure, the magnetic flux density at the midpoint between them is directed out of the page and has a magnitude B, so if the current intensities, directions or both of them get changed in one or both wires, in which of the following cases the magnetic flux density at the midpoint between the two wires becomes directed into the page and has a magnitude 2 B?



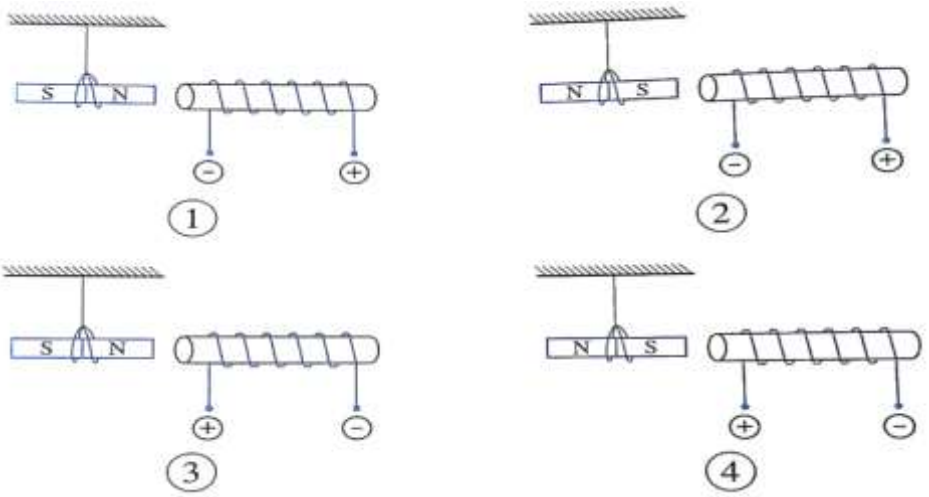


85. In the opposite figure, two straight insulated wires are placed parallel to each other and tangent to a circular coil, each wire carries an electric current I and each current produces a magnetic field B at the center of the coil (m). When an electric current is set up in the coil, the magnetic field at the center (m) of the coil becomes zero, so....



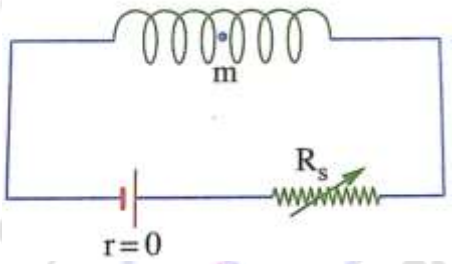
Choice	The direction of the electric current in the coil	The magnetude of magnetic field due to the current in the coil
A	Clockwise	B/2
B	Anti-Clockwise	B/2
B	Clockwise	2B
C	Anti-Clockwise	2B

86. In the following figures, a permanent bar magnet is hung next to a current-carrying solenoid:



In which two figures of them bar magnet gets attracted to the solenoid?

87. In the opposite circuit, a solenoid is connected to a variable resistance (R_s) and a battery of negligible resistance, if the resistance R is increased, the magnitude of the magnetic field due to the solenoid at its center (point m) will.....



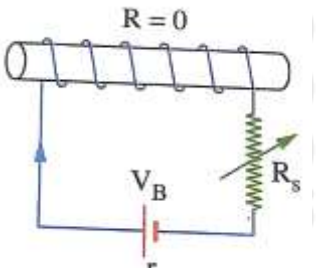
A) increase

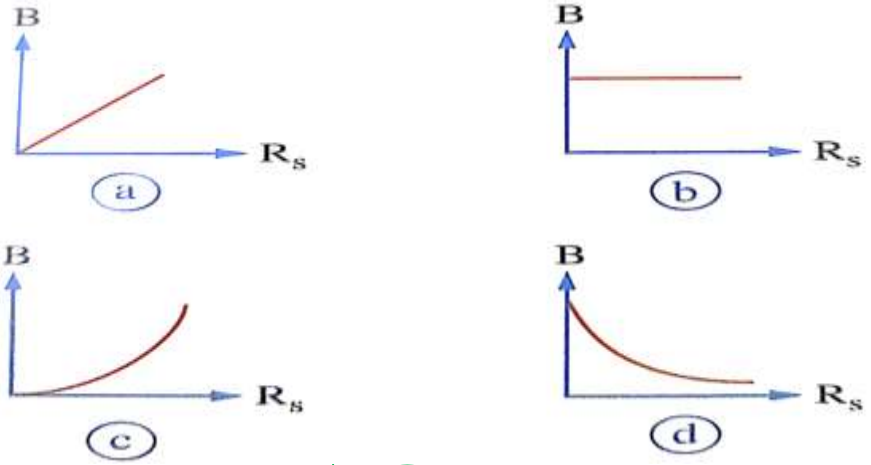
B) decrease

C) not change

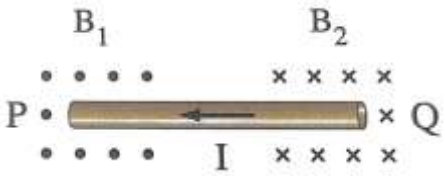
D) vanish

88. The opposite figure shows a solenoid of negligible resistance connected in an electric circuit, so which of the following graphs represents the variation of the magnetic field (B) at the center of the solenoid versus the value of the variable resistance (R_s)





89. The opposite figure represents a straight wire PQ which is free to move. If the wire is in the plane of the page and it carries an electric current of intensity I while two magnetic fields are acting on its terminals, then which of the following choices shows the directions of motion of the terminals of the wire?



Choice	The direction of motion of the terminals P	The direction of motion of the terminals Q
A	Perpendicular out of page	Perpendicular into the page
B	Perpendicular into the page	Perpendicular out of page
B	In the plane of the page upwards	In the plane of the page downwards
C	In the plane of the page downwards	In the plane of the page upwards

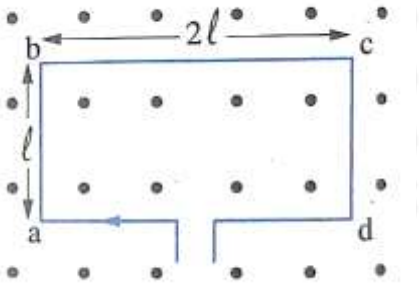
90. The opposite figure shows a rectangular current-carrying coil abcd that is placed perpendicular to a magnetic field, so the ratio between the magnetic force that affects segment ab and the magnetic force that affects segment (F_{ab}/F_{bc}) is .....

A) greater than one

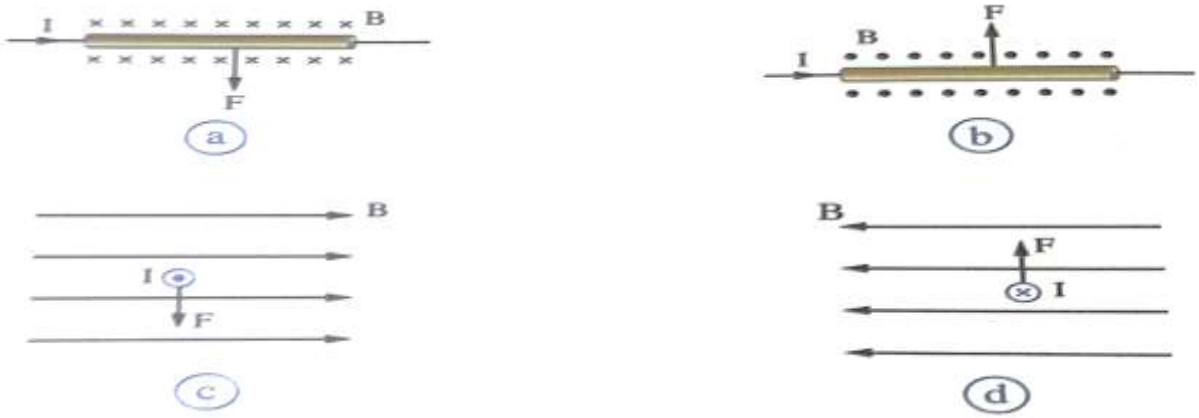
B) less than one

C) equal to one

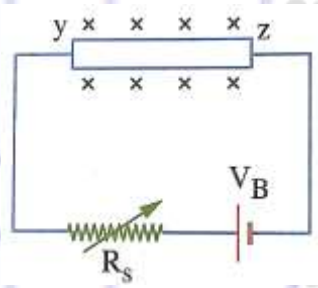
D) indeterminable

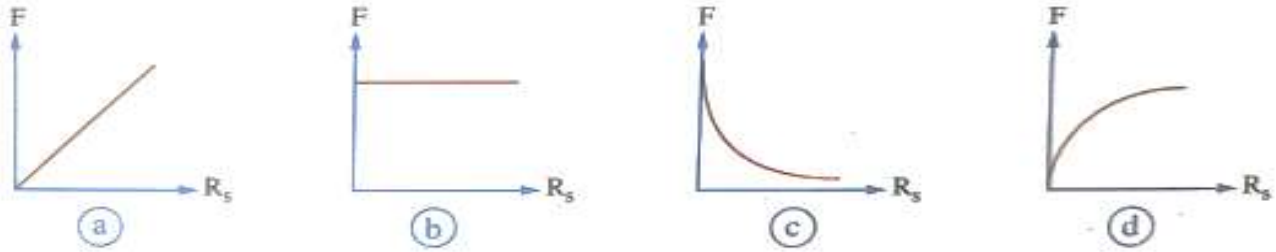


91. Which of the following figures represents correctly the direction of the initiated magnetic force on a straight wire that c arries a current I while being perpendicular to a magnetic field B?

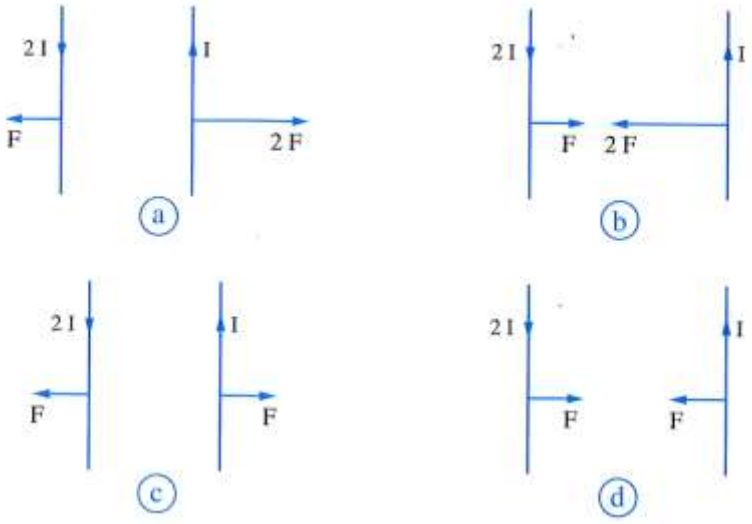


92. A metallic straight rod zy is placed perpendicular to a magnetic field while being connected in an electric circuit as shown in the opposite figure, so which of the following graphs represents the variation of the magnetic force (F) that affects the rod zy versus the resistance resistance (R_s)?

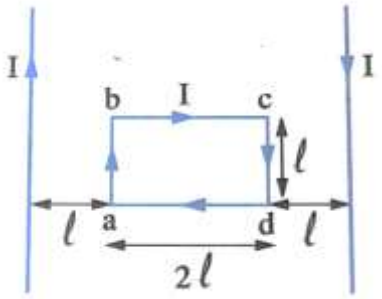




93. Which of the following figures represents the correct magnitude and direction of the magnetic forces with which each one of two straight current-carrying and parallel wires affects the other?



94. A metallic rectangular frame abed is placed in the same plane between two long, straight and parallel wires, if currents of equal intensity I are set up in each of them as shown in the opposite figure, the coil (frame) will.....



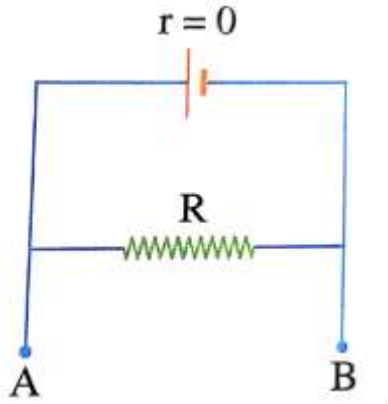
A) rotate about an axis that is parallel to the two wires

B) rotate about an axis that is perpendicular to the two wires

C)move upwards in a direction parallel to the two wires

D) not be affected by a torque

95. Two voltmeters X and Y contain identical galvanometers connected with different multiplier resistances, what is the correct statement that describes the motions of the pointers of both voltmeters when each of them is connected individually between the two terminals A, B in the opposite circuit?

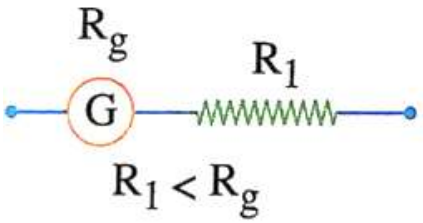


A) The pointer of voltmeter X deflects with greater angle.

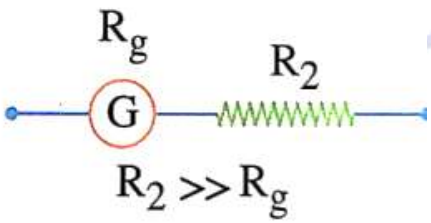
B) The pointer of voltmeter Y deflects with greater angle.

C) The pointers of the two voltmeters deflect with the same angle.

D) The pointers of the two voltmeters do not deflect.



Voltmeter X



Voltmeter Y

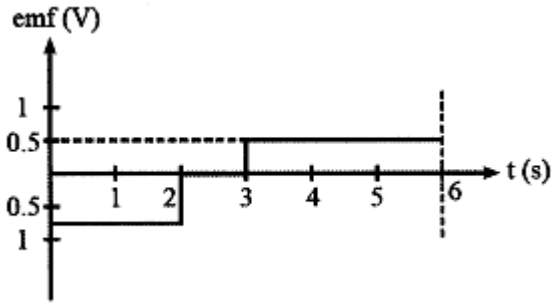
96. From the shown graph, a relation between the induced emf and time for a coil its number of turns is 250 turns, so the change in a magnetic flux that penetrating the coil during the last three seconds is……..wb

(A) 0.5

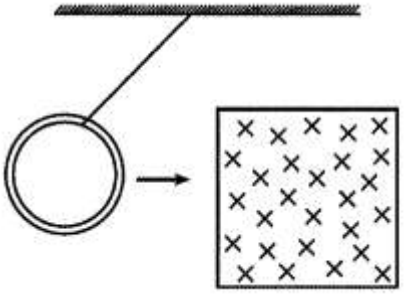
(B) 6×10^{-3}

(C) -6×10^{-3}

(D) Zero



97. A metallic ring is connected to a bar that swing freely like a simple pendulum, when a magnetic field is placed as shown in the figure, where the ring swing through the field, so it……



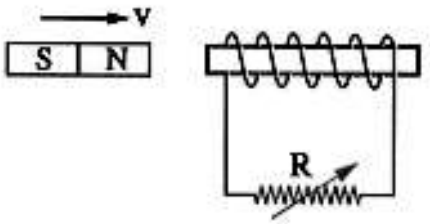
(A) Continues swinging with the same periodic time.

(B) Continues swinging with less time.

(C) continues swinging with greater time

(D) stops in small time

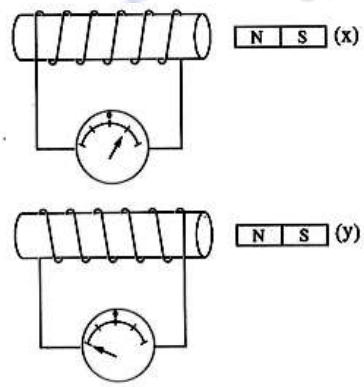
98. A magnet moves with a uniform velocity v towards a fixed solenoid of number of turns N that is made of a wire of negligible resistance and connected to a variable resistor R as in the figure. Which of the following changes for the number of turns (N) and the resistance (R) is required to increase the repulsion force between the solenoid and the magnet?



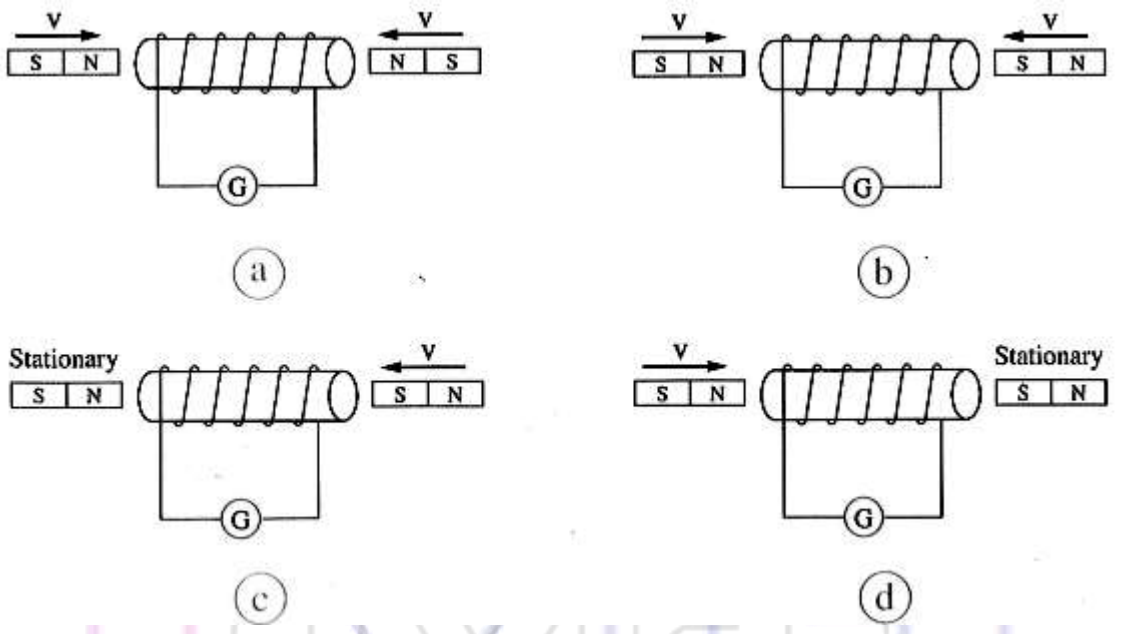
	The number of turns (N)	The resistor R
(a)	Doubles	Doubles
(b)	Doubles	Gets halved
(c)	Gets halved	Doubles
(d)	Gets halved	Gets halved

99. A student used two similar magnets (x), (y) to carry out Faraday's experiment twice, once by moving the magnet (x) with a uniform velocity (v_x) and another time by moving the magnet (y) with a uniform velocity (v_y) along the axis of a solenoid whose terminals are connected to a galvanometer having its zero at the middle of its scale. He noticed that the galvanometer pointer in each time was as in the opposite figure. According to this observation, it's clear that the speed of magnet (x) is……..

(A) greater than the speed of magnet (y) and in its direction
(B) greater than the speed of magnet (y) and opposite to its direction
(C) smaller than the speed of magnet (y) and in its direction
(D) smaller than the speed of magnet (y) and opposite to its direction



100. A stationary solenoid is connected to a galvanometer whose zero point is in the middle of its scale. The solenoid is placed in the mid-distance between two bar magnets of equal strengths. In which of the following cases the galvanometer pointer gives the greatest deflection on its scale, given that the moving magnets have equal constant speeds v?

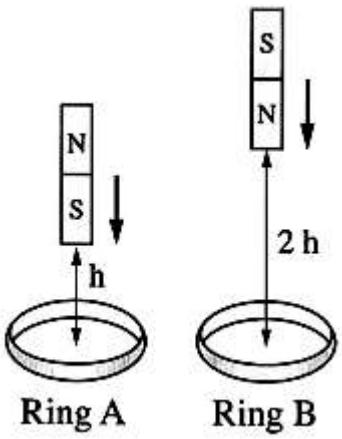


101. The opposite figure represents two similar bar magnets that are falling freely starting from two different heights 2 h, h along the two axes of two similar metal rings A, B respectively, so while the magnets approach the coils determine with explanation:

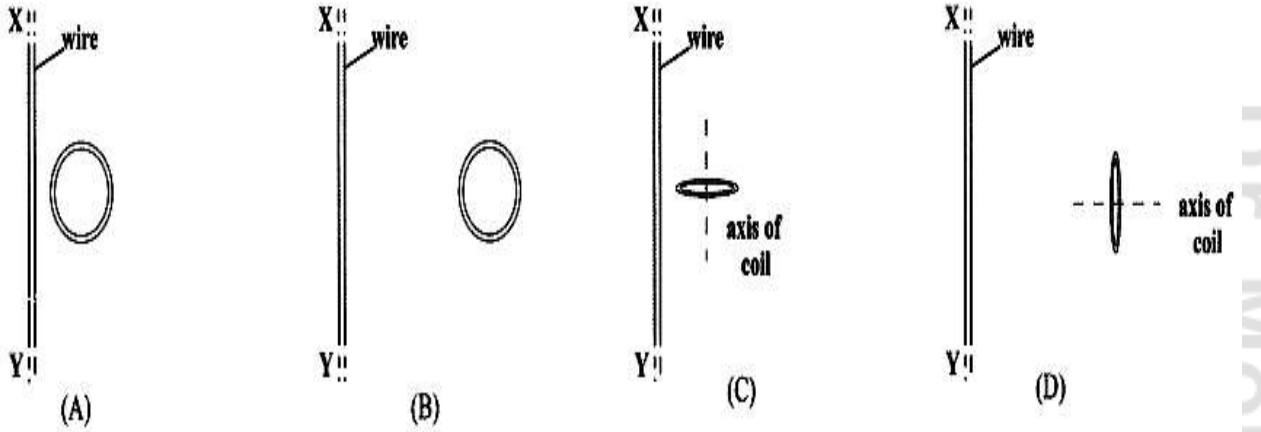
a. The direction of the induced current in the upper face for each of the two rings A, B.

b. In which of the two rings, the average value of the induced current is greater?

Answer:

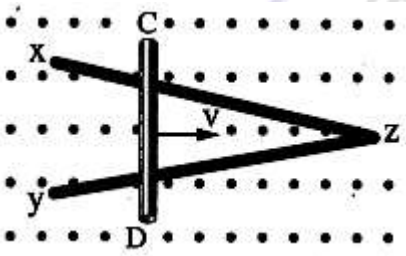


102. A small circular ring placed near to a straight wire passing through it a variable current Edit colors Shapes (XY), which of the following conditions gives a maximum induced emf in the coil.....



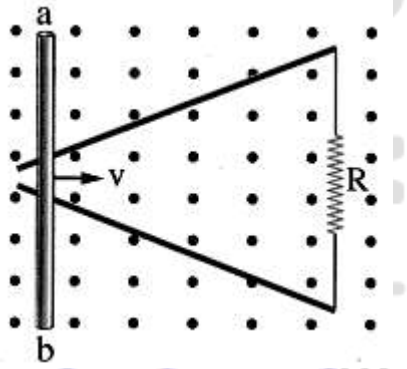
103. A metal rod (CD) of uniform cross-section and resistance R moves with constant velocity v perpendicular to a uniform magnetic field of density B touching wire xzy of negligible resistance as in the opposite figure, then the intensity of the current which is passing in the rod during its motion……..

(A) equals zero
(B) remains constant
(C) increases gradually
(D) decreases gradually



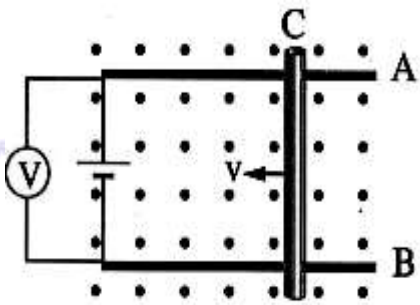
104. The opposite figure shows a metal rod (ab) of negligible resistance sliding perpendicular to a uniform magnetic field on two metal rails of negligible resistance with a constant velocity v. The two rails are connected together through a resistor R. During the motion of the rod, what happens to each of the induced emf between the ends of rod ab and the electric current intensity that passes in resistor R?

	The induced emf between the terminals of the rod ab	The electric current intensity passing in the resistor R
(a)	Gets increased	Gets increased
(b)	Gets increased	Remains constant
(c)	Remains constant	Gets increased
(d)	Remains constant	Remains constant

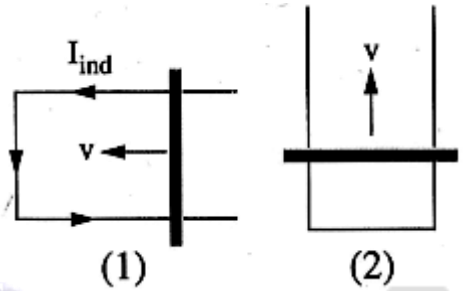


105. The opposite figure shows a metal rod C that slides on two metal rails A, B perpendicular to a uniform magnetic field with a constant velocity v. The resistance of each of the two rails A, B is R and they are connected to a battery of emf 10V and internal resistance r. If the induced emf in the rod C is 4V, then the reading of the voltmeter during the motion of the rod……..

(A) gets increased
(B) gets decreased
(C) remains constant
(D) becomes zero

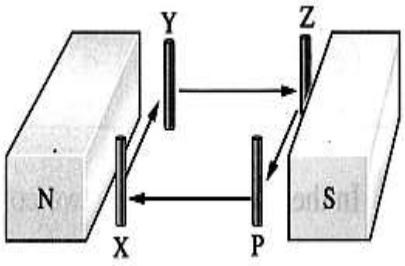


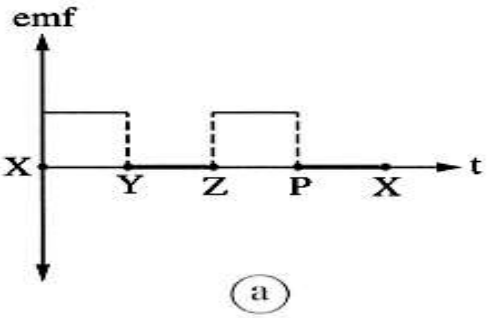
106. Two rods slide on two similar U-shape metal frames with a speed v in the same uniform magnetic field B. Which of the following choices represents the direction of the magnetic flux lines in figure (1) and the direction of the induced current in figure (2)?



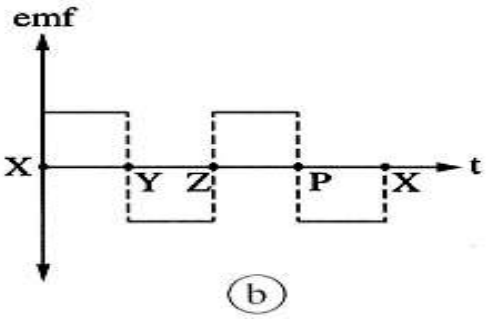
	The direction of the magnetic flux lines in figure (1)	The direction of the induced current in figure (2)
(a)	Perpendicular into the page	In the clockwise direction
(b)	Perpendicular out of the page	In the clockwise direction
(c)	Perpendicular into the page	In the anti-clockwise direction
(d)	Perpendicular out of the page	In the anti-clockwise direction

107. In the opposite figure, a straight copper wire moves in a uniform magnetic field with a constant speed v in a square path from point X to Y to Z to P to X again, which of the following graphs represents the induced electromotive force between the terminals of the wire during its motion?

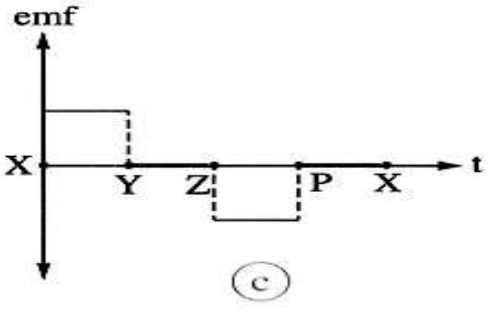




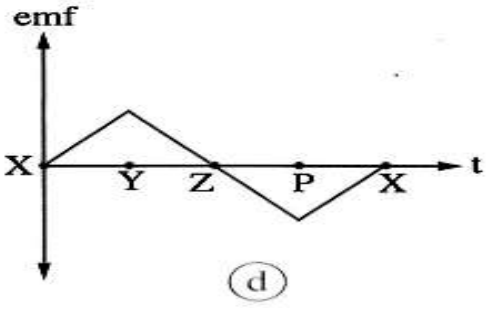
(a)



(b)

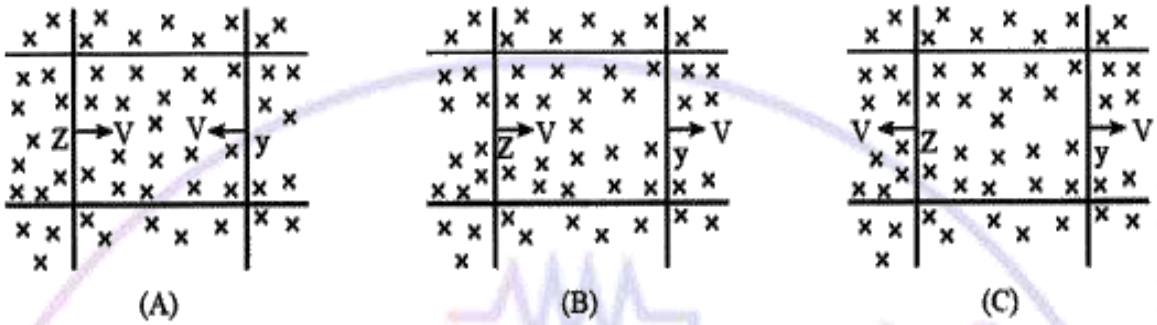


(c)



(d)

108. In the opposite figure, 3 circuits (A), (B) and (C) so the arrangement of the total induced emf in the closed paths when the two conductors (Y) and (Z) move with same velocity is……



(A) $E_A > E_B > E_C$

(B) $E_A = E_C > E_B$

(C) $E_A = E_B = E_C$

(D) $E_B > E_A = E_C$

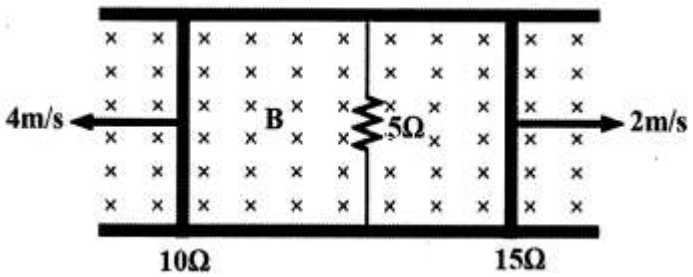
109. Two parallel rails with negligible resistance are 10cm apart and are connected by a 5Ω resistor. The circuit also contains two metal rods having resistances of 10Ω and 15Ω sliding along the rails. The rods are pulled away from the resistor at constant speeds of 4m/s and 2m/s, respectively. A uniform magnetic field of magnitude 0.01T is applied perpendicular to the plane of the rails. The current in the 5Ω resistor is……A

(A) 1.33×10^{-4}

(B) 4×10^{-4}

(C) 2.67×10^{-4}

(D) 5.33×10^{-4}



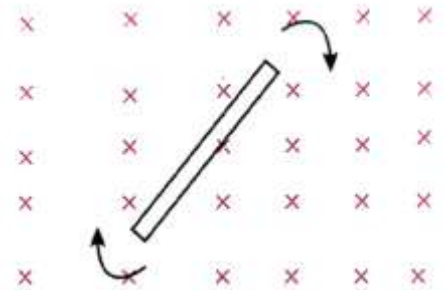
110. A metal bar of length I rotates at an angular velocity w about an axis through its center in a uniform magnetic field B which is directed vertically downwards as shown in the diagram. The emf induced between the two ends of the bar is.....

a) constant and proportional to the product Bl2w

b) constant and propulsion to the product BL2w/4

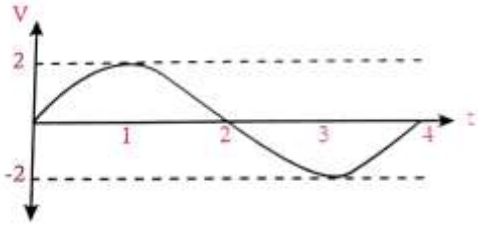
c) constant and proportional to the product Bl2w/2

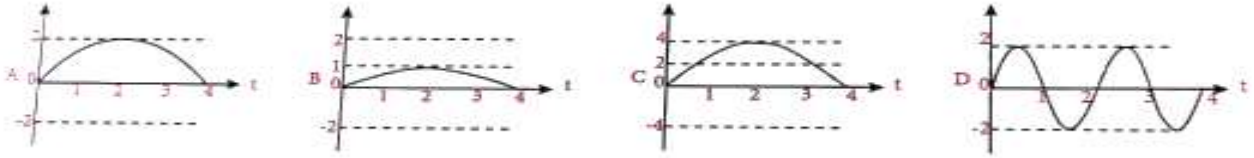
d) Zero.



111. A simple A.C generator produces a voltage which varies with time as shown in the diagram.

Which the graph shows how the voltage varies with time when the speed of rotation is halved?





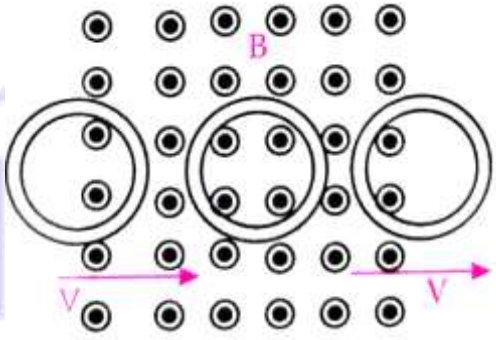
112. The image shows a ring traveling to the right toward a region with a magnetic field directed outside of the page. Use Lenz's Law to determine the direction of the induced current in the ring

a) Clockwise, Clockwise, Anticlockwise

b) Clockwise, Anticlockwise, Anticlockwise

c) Anticlockwise, no induction, Clockwise

d) Clockwise, no induction, Anticlockwise



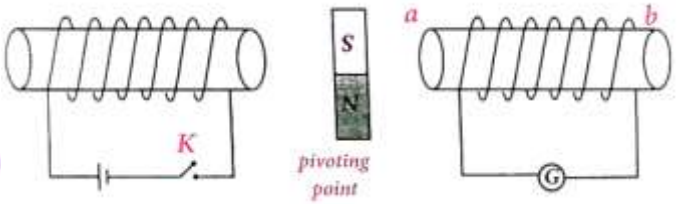
113. The opposite figure represents a magnet moves around its rest point and is placed between electromagnet and induction coil connected to galvanometer, determine the direction of rotation of the magnet in terms of the direction of the clock at the moment of closing the switch (K), then determined the type of the formed pole at terminal (A).

a) Anticlockwise, North

b) Clockwise, North

c) Anticlockwise, South

d) Clockwise, South



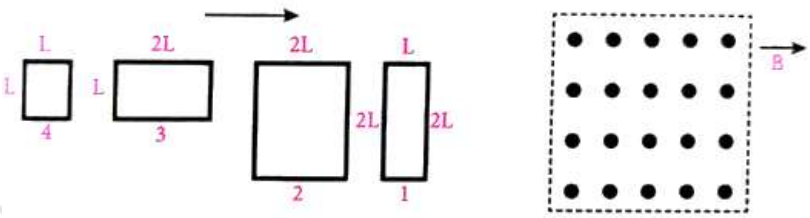
114. the figure Shows four wire loops, with edge lengths of either L or 2L. All four wires move toward a region of uniform magnetic field B (directed out the page) at the same constant velocity. As they enter the magnetic field, in which loop(s) is the greatest induced emf?

a) 1 and 2

b) 3 and 4

c) 1 only

d) 2 only



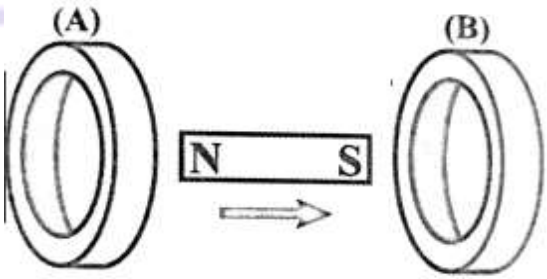
115. The opposite figure shows a bar magnet is moving along the common axis of two coils A&B towards A. current is induced in....

a) Only A

b) Only B

c) both A& B in same direction

d) both A & B in opposite direction



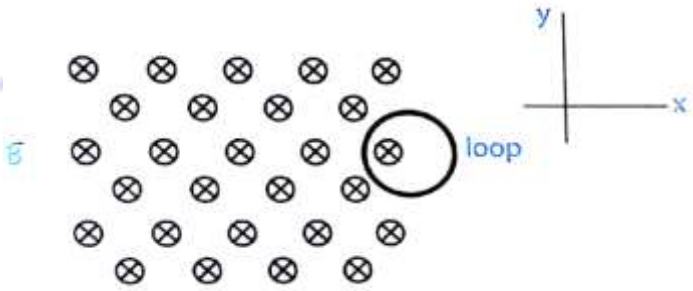
116. A circular loop of wire is positioned half in and half out of a square region of constant uniform magnetic field directed into the page, as shown. To induce a clockwise current in this loop:

a) move it in +x direction

b) move it in +y direction

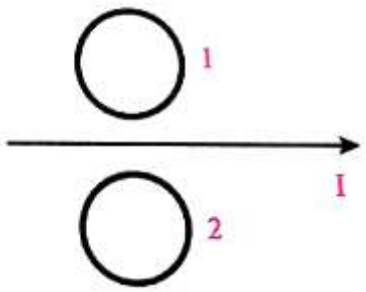
c) move it in-y direction

d) move it in -x direction



117. What is the direction of induced currents in metal rings 1 and 2 when current I in the wire is increasing steadily?

Choice	Ring 1	Ring 2
a)	Clockwise	Clockwise
b)	Anti-Clockwise	Clockwise
c)	Clockwise	Anti-Clockwise
d)	Anti-Clockwise	Anti-Clockwise



118. Two different coils have self-inductance L_1= 8 mH, L_2 = 2mH. The current in one coil is increased at a constant rate. The current in the second coil is also increased at the same rate. At a certain instant of time, the power given to the two coils is the same. At that time the current and the induced voltage in the first coil are I_1 and V_1, respectively. Corresponding values for the second coil at the same instant are I_2, and V_2, respectively. Which of the following relations is correct?

a) $I_1 = 4I_2$, and $V_1 = 4V_2$

b) $I_1 = 0.25\ I_2$, and $V_1=4V_2$

c) $I_1= 4I_2$, and $V_1 = 0.25V_2$

d) $I_1 = 0.25I_2$, and $V_1= 0.25V_2$

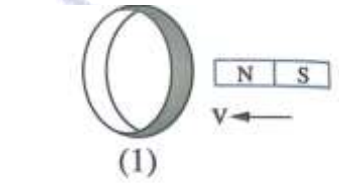
119. Figure (1) represents a magnet that moves a certain distance with a uniform velocity v towards a static circular coil, so an electromotive force of magnitude emf is generated in the coil. If the coil and the magnet are moved in the same direction by the same distance where each of them moves at a constant velocity of magnitude v as in figure (2), so the magnitude of the induced electromotive force in the coil becomes

a) 0

b) emf/2

c) emf

d) 2 emf



(1)

(2)

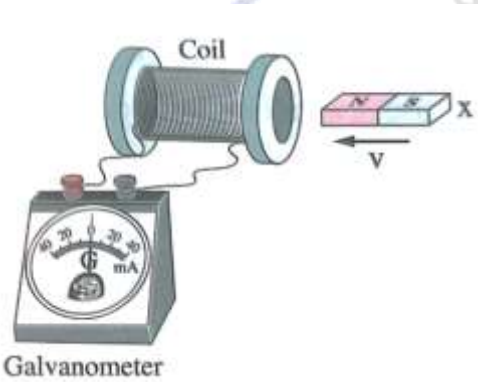
120. The opposite figure represents a solenoid of 20 turns and cross-sectional area 4 x 10^{-2} m^2 whose resistance is 1.5 Ω The solenoid is connected to a galvanometer of resistance 8.5Ω bar magnet x is moved towards the solenoid and along the extension of its axis with uniform velocity v, so an average induced current of 40 mA is generated in the Galvanometer solenoid within one second. When the bar magnet is changed by another one y and moved with the same velocity for the same distance in the same direction along the extension of the solenoid axis, an average induced current of 30 mA is generated within one second. What's the difference between the magnitudes of the change in the magnetic flux density which induce the current in the two cases?

(A) 1T

(B) 0.75T

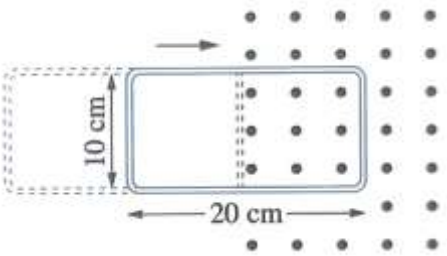
(C) 0.4 T

(D) 0.125 T

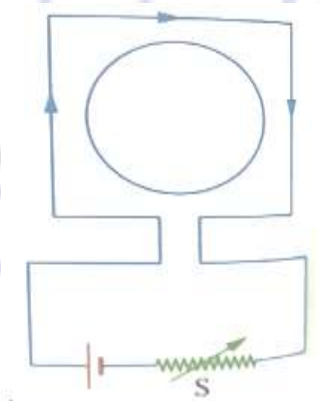


121. In the opposite figure, a rectangular coil of length 20 cm and width 10 cm consists of 25 turns of wire. If the coil is moved till half its area becomes inside a uniform magnetic field of flux density 0.16 T whose direction is perpendicular to the plane of the coil through a time interval t, an average induced electromotive force of 0.4 V is generated in the coil, then the time interval t is equal to

(A) 0.1 s
(B) 0.4s
(C)0.2s
(D) 1 s



122. In the opposite figure, a square metal frame is connected to an electric cell and a variable resistor (S). A metal ring is placed inside the frame and in its plane, then during the increase of resistance S,



a) no electric current is produced in the ring

b) an electric current is produced in the ring in clockwise direction

C) an electric current is produced in the ring in counterclockwise direction

d) an AC electric current is produced in the ring

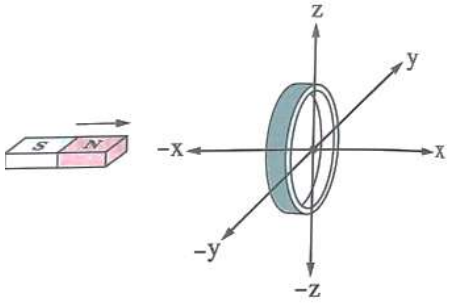
123. in the opposite figure, the north pole of a bar magnet is moving in the positive direction of the X-axis perpendicular to the plane of a circular metallic ring. Which of the following directions represents the direction of the magnetic field that is generated at the center of the ring due to the induced current?

A) The positive direction of the X-axis.

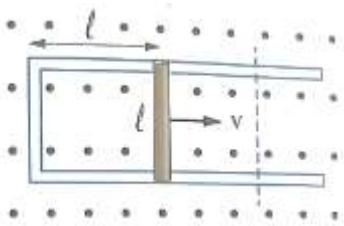
B) The negative direction of the x-axis.

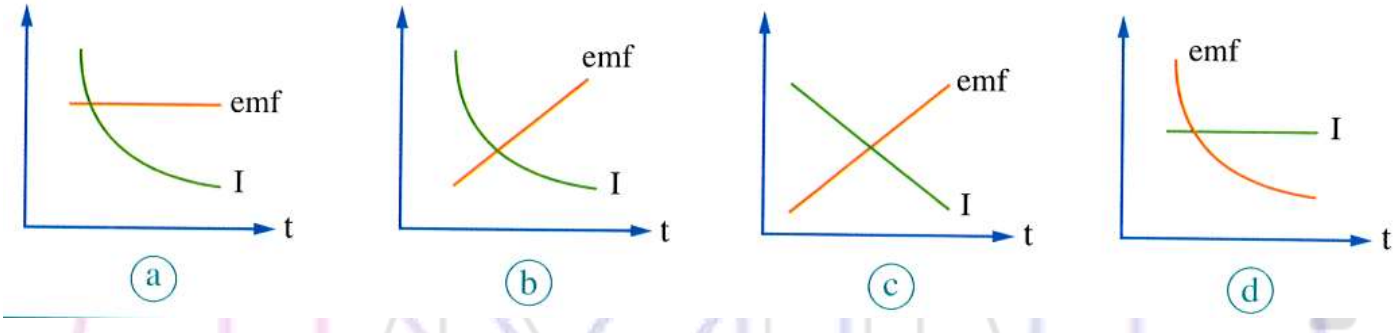
C) The positive direction of the y-axis.

d) The positive direction of the z-axis.

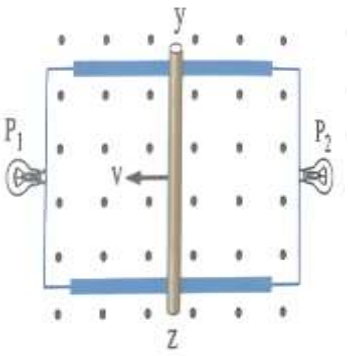


124. The opposite figure represents a metal rod of length l and resistance R. It moyes with a uniform velocity v while its ends are touching a metal frame of the same material of the rod and having the same cross-sectional area. The group is placed in a uniform magnetic field of flux density B that is perpendicular to the direction of motion of the rod. Which of the following graphs represents the relation between both of the induced electromotive force (emf) and the induced current intensity (I) versus time (t)?



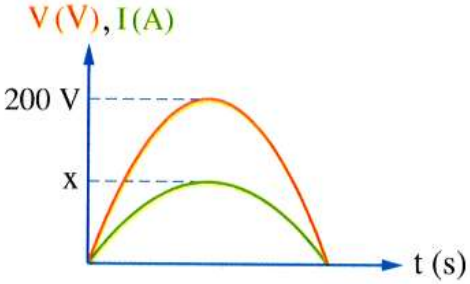


125. The opposite figure represents a metal rod yz of resistance R placed on two frictionless rails, each of resistance 2 R, two similar electric bulbs P1 and P2 are connected to the terminals of the two rails from each side. This group is placed perpendicular to a uniform magnetic field offlux density B. What happens to the brightness of each of the two bulbs during the motion of the rod with uniform velocity v in the shown direction?



choise	Brightness of bulb P1	Brightness of bulb P2
a	Decreases	Decreases
b	Decreases	Increases
c	Increases	Decreases
d	Increases	Increases

126. The opposite graph represents relation between both of the voltage (V) and the current (I) which are produced from an AC dynamo within half cycle and time (t). If the produced power from the dynamo is 175 W, then the value of current x on the graph equals



a) 2.5 A

b) 1.75 A

c) 1A

d) 0.25 A

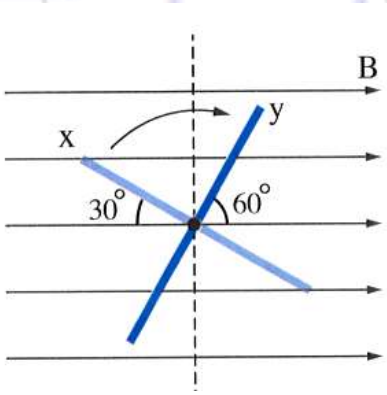
127. The opposite figure represents a dynamo's coil that rotates with a uniform velocity about an axis that is perpendicular to a uniform magnetic field, so the ratio between the generated electromotive force in the coil at position × and the generated electromotive force in the coil at position y ((emf_x/(emf_y) equals……

a) $\frac{\sqrt{3}}{1}$

b) $\frac{\sqrt{2}}{1}$

C) $\frac{1}{\sqrt{2}}$

d) $\frac{1}{\sqrt{3}}$



128. The opposite two figures represent two models for the coils of an AC dynamo (1) and (2) of number of turns 10 and 20 turns respectively. The flux density that acts on each of the two coils is B and each of them rotates such that the linear velocity of the side that is parallel to the axis of rotation is V, then the ratio (emf $_{max\ 1}$/emf $_{max2}$)

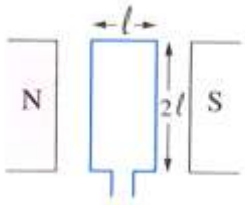


Figure (1)

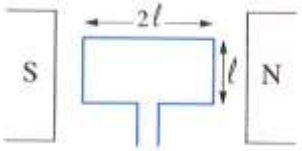


Figure (2)

A) 1/4

B) 1/2

C) 1/1

D) 2/1

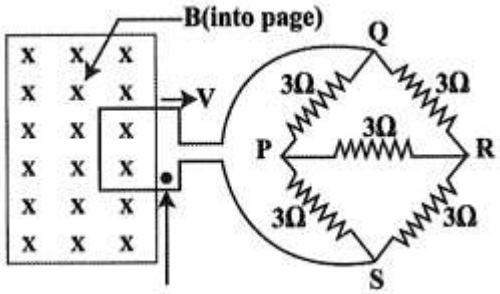
129. In the figure a wire in the form of a square of side length 10cm and resistance 1Ω moves with a uniform velocity (v) in a magnetic field perpendicular to its plane into the page of flux density 2T and connected with a resistors as shown in the figure, if the total current 1mA, so the velocity at which the square is moving is……..cm/s

(A) 1

(B) 2

(C) 3

(D) 4



130. A wire of length 180 cm has been used to generate an induced electromotive force in two different methods, the first is by moving it perpendicular to a magnetic field of flux density 0.8T at a speed of 150cm/s while the second is by reshaping the wire in the form of a circular coil of radius $4/\pi$ cm, then putting it perpendicular to a variable magnetic field such that the flux cuts the coil in a rate of 7.5×10^{-4} Wb every 0.02 min., so the average induced emf……

	Generated in the case of the wire	Generated in the case of the coil
(a)	1.2 V	0.45 V
(b)	1.2 V	0.014 V
(c)	2.16 V	0.45 V
(d)	2.16 V	0.014 V

131. In an experiment to study the mutual induction between two coils, an induced emf is generated in the secondary coil its direction is in the same direction of the emf in the primary coil at the moment of……

(A) Increasing the current intensity in the primary coil.

(B) Decreasing the current intensity in the primary coil.

(C) Closing the circuit of the primary coil

(D) Decreasing the rheostat in the primary coil.

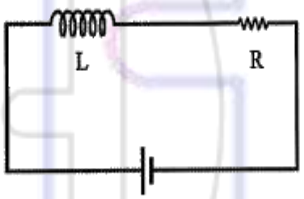
132. The opposite graphical relation represents the rate of current growth and the current intensity in the circuit shown, from the graphical relation the slope is……..

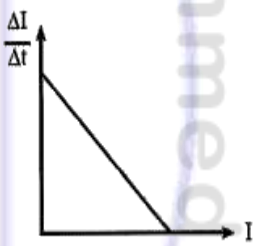
(A) –L/R

(B) –R/L

(C) –E/L

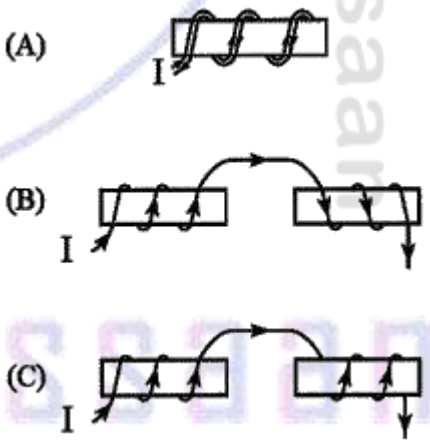
(D) –E/R



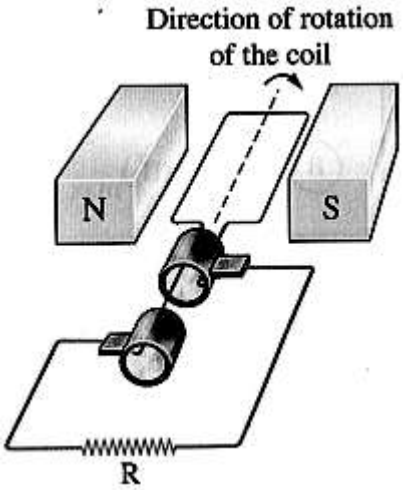


133. The wire is wounded as shown in the figures, the figure in which the self-induction of the coil is vanished is.....and the direction of the magnetic field in the coils is in two opposite directions is…….

	Self-induction vanished	**Direction of field in 2 opposite direction**
A	Figure A	Figure B
B	Figure C	Figure B
C	Figure A	Figure A
D	Figure C	Figure A

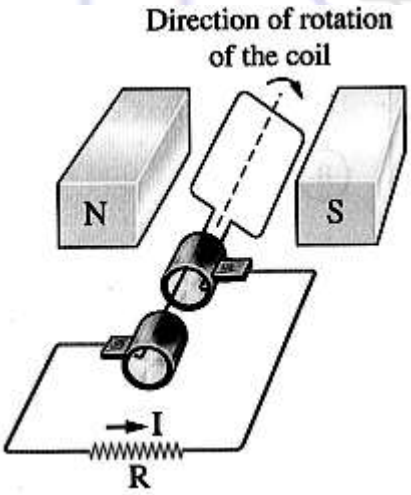


134. Starting from the position that is shown in the opposite figure for an AC dynamo, through one and a half cycle of the coil, the current I that passes through the resistance R changes its direction……..



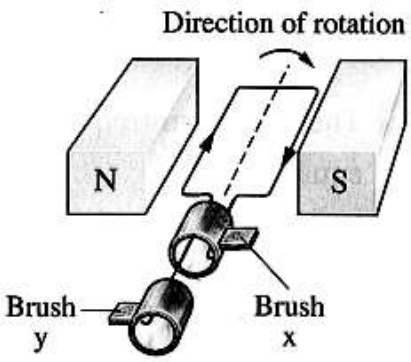
(A) twice
(B) three times
(C) four times
(D) five times

135. Starting from the position that is shown in the opposite figure for an AC dynamo, through one and a half cycle of the coil, the current I that passes through the resistance R reaches its maximum value……..



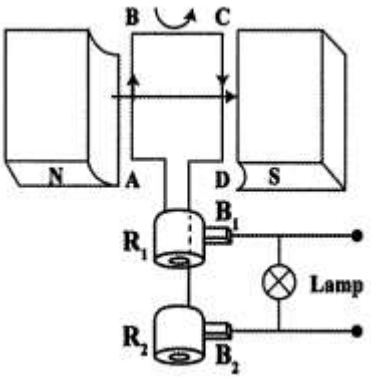
(A) twice
(B) three times
(C) four times
(D) five times

136. The opposite graph illustrates one of the positions of an AC dynamo coil at which the potential of brush x is higher than that of brush y by 10V, so the potential of brush x becomes less than that of brush y by 10V after the coil rotates with an angle of……..



(A) 90°
(B) 180°
(C) 270°
(D) 360°

137. If the two slip rings are replaced in the electric dynamo by a commutator with constant rate of the coil's rotation, so the brightness of the bulb……



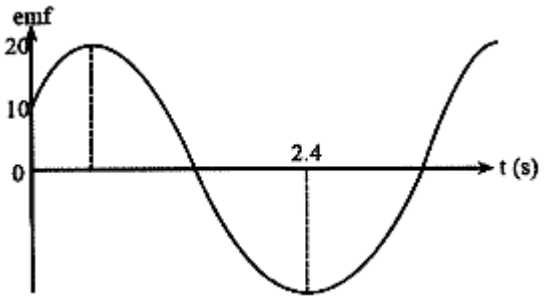
(A) Increases.

(B) Decreases.

(C) Remains the same.

(D) equals zero

138. A square coil of side length 10cm of number of turns 1000 turn rotates in a uniform magnetic field and the graph between the emf and time as in figure, so the magnetic flux density effect on it is…….



(A) 1.2T

(B) 1.52T

(C) 1.145T

(D) 2.1T

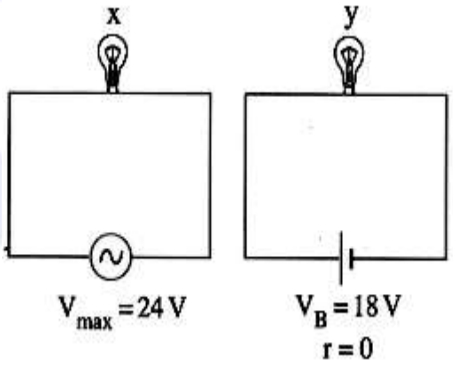
139. The opposite figure shows two similar light bulbs x, y, one of them is connected to an AC source of 24V while the other is connected to a DC source of 18V, if the internal resistance is negligible for the two sources, then the bulb that glows brighter is……..

(A) Bulb x

(B) Bulb y

(C) both bulbs have the same brightness

(D) the answer is indeterminable



140. A circuit of an AC source, if the potential and the current are given according to the relation $V = V_o \sin\omega t$, $I = I_o \sin\left(\omega t - \frac{\pi}{2}\right)$, so the consumed power in the circuit is…….

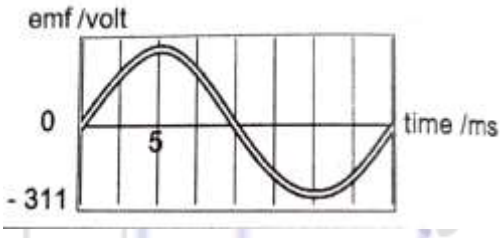
(A) $V_o I_o/2$

(B) $V_o I_o/4$

(C) $2V_o I_o$

(D) Zero

141. In the given output voltage of an a.c generator for a complete cycle, the frequency of such signal and the number of times for the current to reach the zero value in one second are respectively equals……



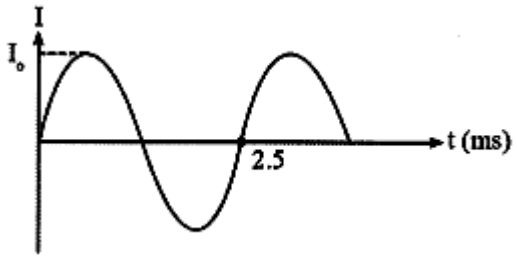
(A) 50 Hz, 101

(B) 50 Hz, 100

(C) 25 Hz, 101

(D) 25 Hz, 100

142. In the graph, a relation between the current intensity and the time in a dynamo, so the instantaneous current intensity determined from the relation……..



(A) $I = I_o \sin(5\pi t)$

(B) $I = I_o \sin(0.8\pi t)$

(C) $I = I_o \sin\left(\frac{\pi t}{0.0025}\right)$

(D) $I = I_o \sin(800\pi t)$

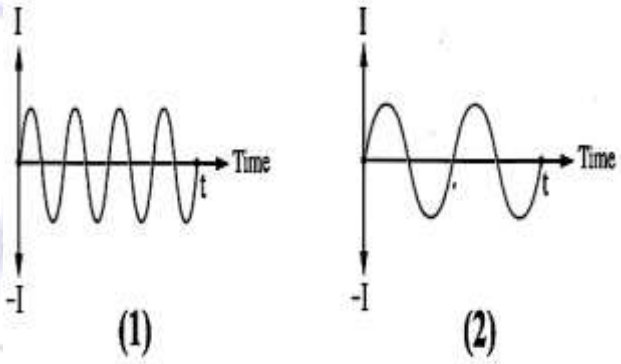
143. The two following graphs represent number of vibrations of two AC currents which are produced from two different electric generators during the same time interval (t), which of the following statements describes the average value of the AC current in the two cases during this interval of time (t) correctly?

(A) It is greater in case (1) because the current frequency is higher.

(B) It is greater in case (2) because the periodic time is longer

(C) It is greater in case (2) because it has greater maximum value.

(D) It equals zero in the two cases.



144. A rectangular coil its number of turns is 100 turns, the cross-sectional area of each one is $0.02m^2$ is placed perpendicular to a uniform magnetic field of flux density 0.3T, so the average induced emf when the coil rotates around the axis which is placed parallel to its length by angle 180° during the time interval 0.15sec is……..

(A) 4V

(B) 8V

(C) 16V

(D) – 4V

145. A coil rotates with a uniform velocity in a magnetic field of density (B), if the ratio between the instantaneous emf after rotating 1/8 cycle from the parallel position to the average emf during rotating 1/8 cycle from perpendicular position is……

(A) 8

(B) 9

(C) 1.89

(D) 0.53

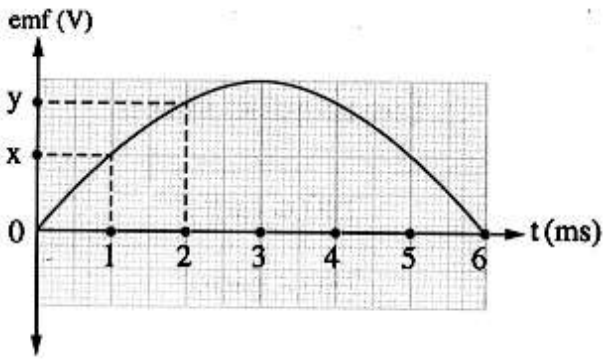
146. The opposite graph represents the change in the induced (emf) in the coil of an AC dynamo through half cycle, then the ratio (x/y) equals……

(A) 1/2

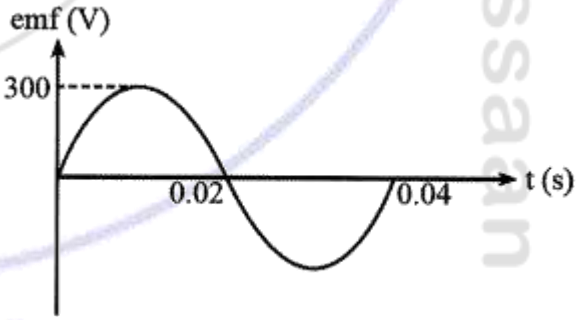
(B) $\sqrt{2}/2$

(C) 1/3

(D) $\sqrt{3}/3$



147. An electric generator, the relation between the instantaneous induced electromotive force with time given from the shown graphical relation, so the average electromotive force during the period from (t = 0) to (t = 1/50s) is……V



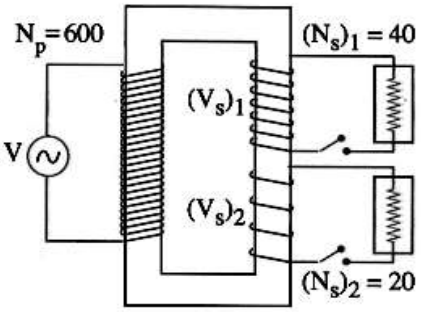
(A) 63.7

(B) 124

(C) 191

(D) Zero

148. The opposite figure represents an ideal transformer that has two secondary coils, then when operating each of them separately the values (V_{s1}) and (V_{s2}) become……



	$(V_s)_1$	$(V_s)_2$
a	40 V	10 V
b	40 V	30 V
c	20 V	10 V
d	20 V	30 V

149. The opposite figure represents the change in the produced current from an AC dynamo with time: From this current how can you get both currents in the two graphs in figures (1) and (2)?

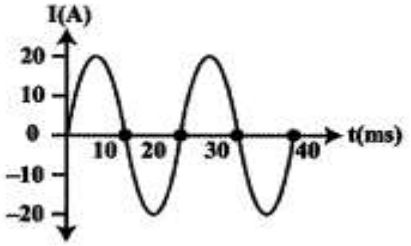
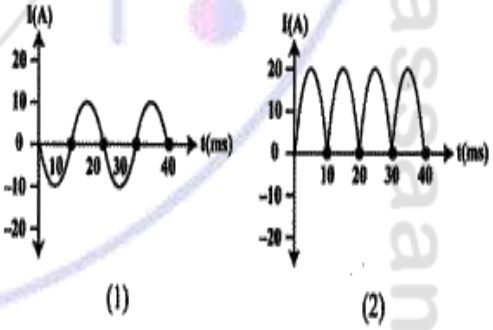


	Figure (1)	Figure (2)
A	Step up transformer	Commutator
B	Step down transformer	Diode
C	Step up transformer	Diode
D	Step down transformer	Commutator



150. A power station of power 400 Kilo-Watt was transferred to a consumer far away from it 5Km, if the voltage at the station 2000V and the resistance per kilometer is 0.1Ω, so the transmission efficiency is…….And when transformers are used to step-up the voltage to 20000V the efficiency becomes……..

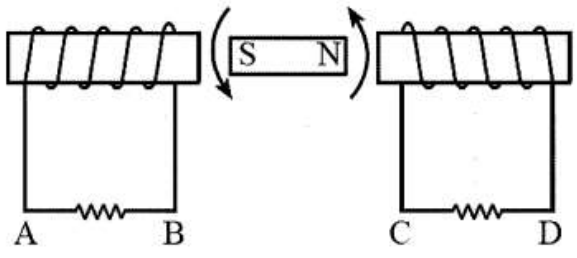
(A) 90% - 80%

(B) 90% - 99.9%

(C) 99.9% - 90%

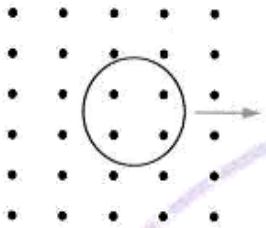
(D) 98% - 90%

151. A strong magnet rotates between two coils as shown in the figure, determine the direction of the induced current in the two resistors.

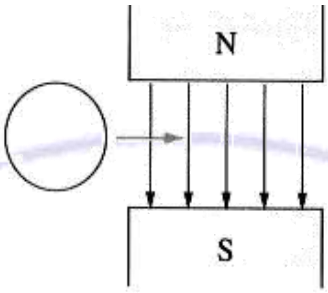


Answer:

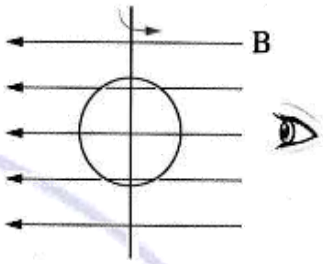
152. What is the direction of the induced current in the shown face of the ring in each of the following cases if there is any? **Explain**?



(1) Moving the ring rightwards the page to get out of the magnetic field.



(2) Entering the ring between the poles of the magnet.

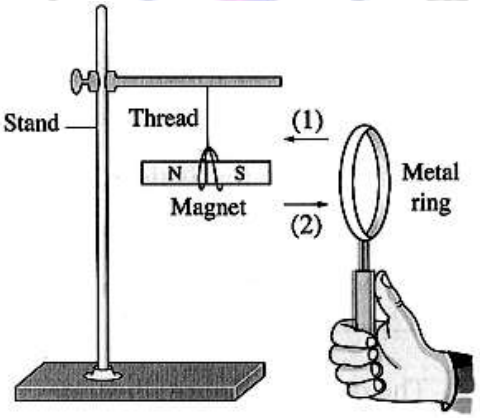


(3) Rotating the ring for a quarter cycle about an axis in its plane in the shown direction.

Answer:

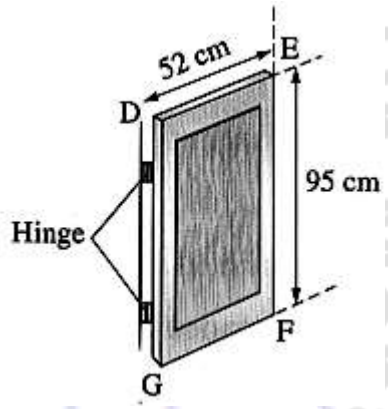
153. A student moved a metal ring equipped with a handgrip towards and backwards from a bar magnet that is hung by a thread to a stand as in the figure. In which case the direction of motion of the magnet becomes in the same direction of motion of the ring? **And why?**

Answer:



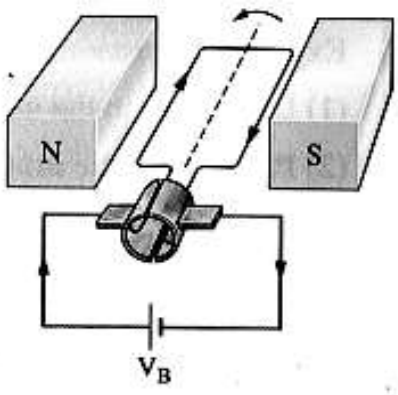
154. The opposite figure illustrates the dimensions of an aluminum frame of a vertical window DEFG whose plane is perpendicular to the horizontal component of the Earth magnetic field that has a magnitude of 1.8×10^{-5} T. If the window is opened and rotated about the vertical side DG by an angle of 90° within a time interval of 0.6 s, calculate the induce emf in the frame.

Answer:

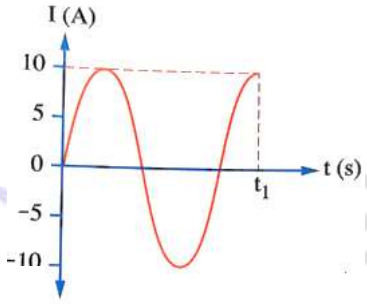


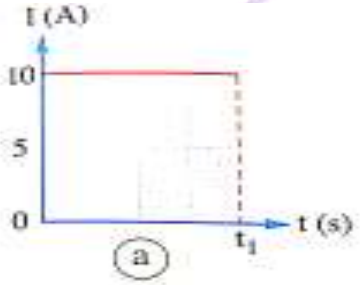
155. A rotatable coil of resistance (R) is placed between the poles of a strong magnet and its terminals are connected to the terminals of an electric cell of emf (V_B) and negligible internal resistance as in the opposite figure. Explain why a current of intensity less than (V_B/R) passes in the coil during its rotation.

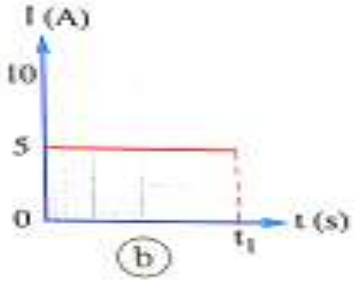
Answer:

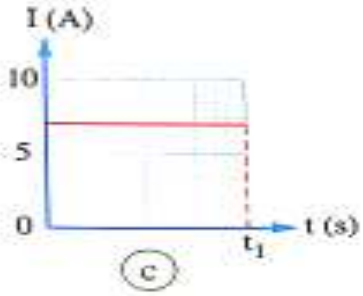


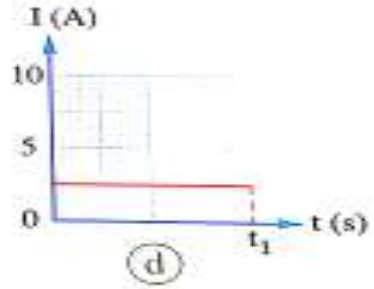
156. The opposite graph represents the relation between the instantancous value of the AC current (I) which passes through an ohmic resistance (R) and time (0) within a time interval t,. Which of the following graphs represents the intensity of the DC current (D) which produces the same electric energy in the resistor (R) wi thin the same tim e interval (t,)?



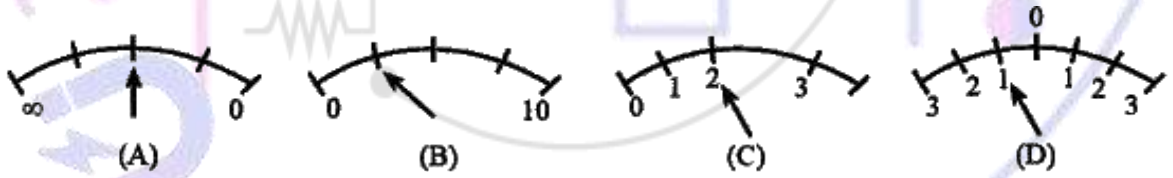








157. The figure shown the scale of some electric measuring devices scale, so these devices are……..



	Galvanometer	Voltmeter	Hot wire ammeter	Ohmmeter
A	D	A	C	B
B	A	B	C	D
C	D	B	C	A
D	B	D	C	A

158. If the resistance of RL circuit is 10Ω and the highest current can be pass is (I_o) when it is connected with DC source of emf (E_o), when it replaced with AC source with same emf and of angular frequency 20rad/s a current Io/$\sqrt{2}$ pass through it, the value the self-induction coefficient (L) is…….H

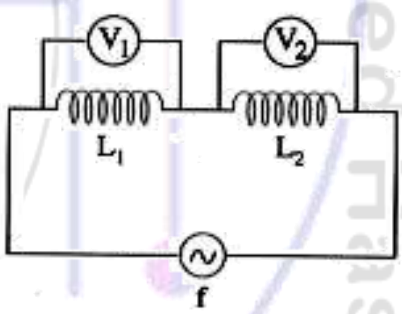
(A) 0.5

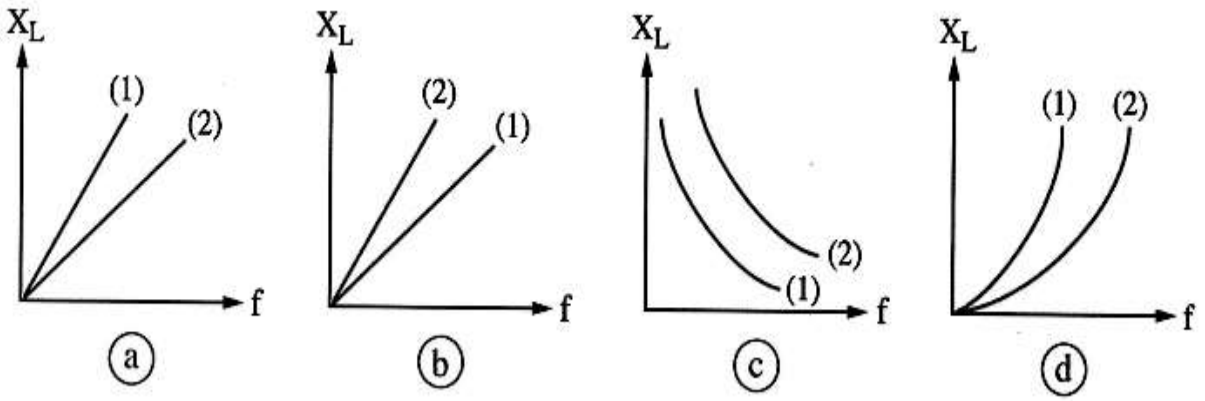
(B) 2

(C) 1

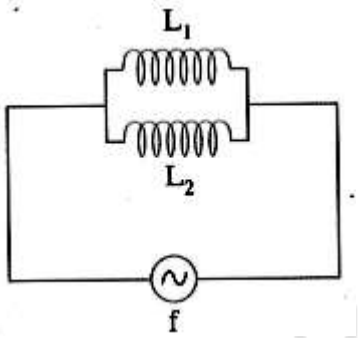
(D) 3

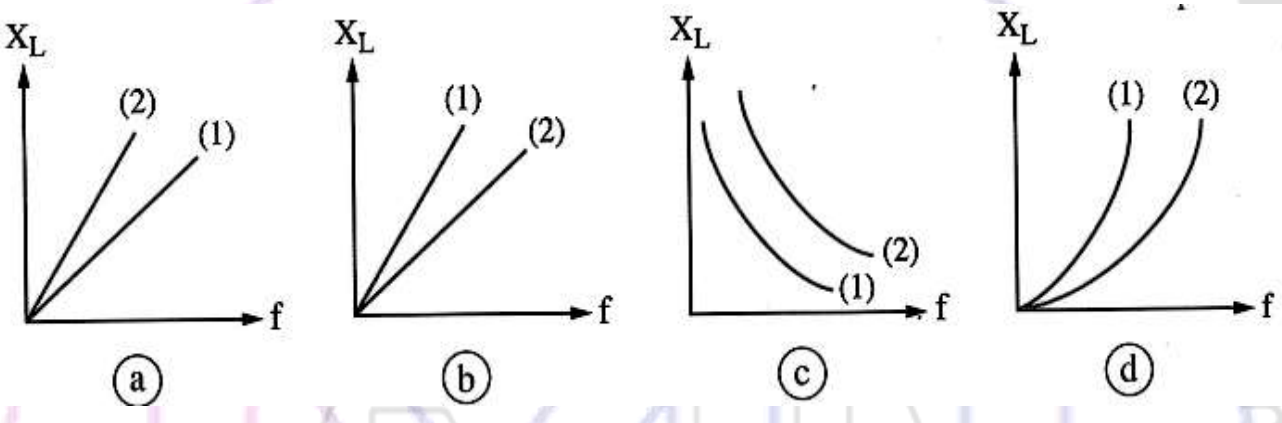
159. In the opposite electric circuit, if the reading of the voltmeter V_1 is greater than the reading of the voltmeter V_2, then which of the following graphs represents the relation between the inductive reactance for the two coils and the frequency of the electric source?



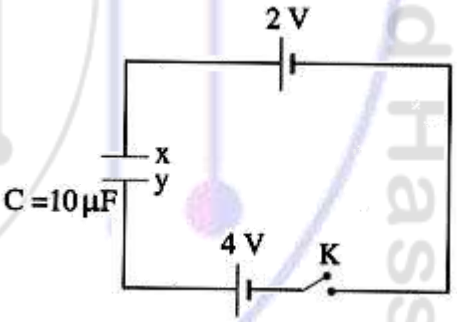


160. In the opposite circuit, if the value of the current in coil L_1 is less than its value in coil L_2 then which of the following graphs represents the relation between the inductive reactance for the two coils and the frequency of the electric source?



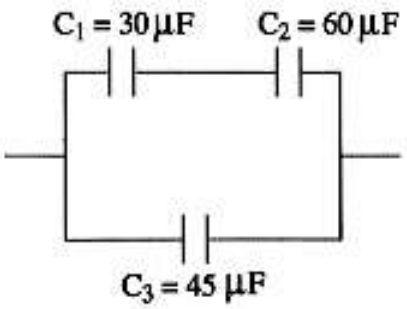


161. In the opposite electric circuit, after a while of closing switch K……..



	Charge type on plate (x)	Charge value on plate (y)
(a)	negative	20 μC
(b)	negative	40 μC
(c)	positive	20 μC
(d)	positive	40 μC

162. Three capacitors of capacitances C_1, C_2 and C_3 are connected together as shown in the figure, how does the total capacitance of the group of capacitors change when the two capacitors C_2, C_3 switch places with each other?



(A) It decreases by 18 µF

(B) It decreases by 33.3 µF

(C) It decreases by 47 µF

(D) It increases by 13 µF

163. A group of capacitors are connected in such a way to have a total capacitance of 24µF. If their total capacitance is required to be decreased to 8µF by adding a capacitor to this group, so the capacitance of the capacitor which is required to be added and its method of connection are…….

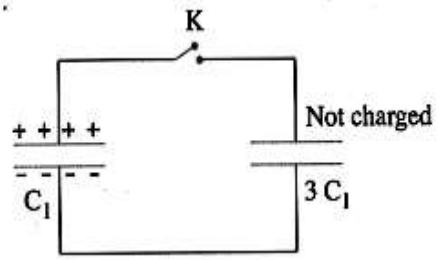
(A) 6 µF, in series

(B) 8 µF, in parallel

(C) 12 µF, in series

(D) 16 µF, in parallel

164. A charged capacitor of capacitance C_1 is connected to an uncharged capacitor of capacitance $3C_1$ through a switch K as in the opposite figure. When the switch K is closed, the charge of the capacitor C_1……..



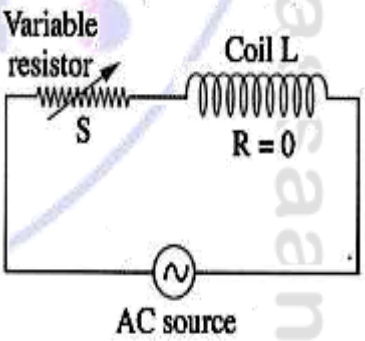
(A) Doubles

(B) decreases to its half

(C) decreases to its one third

(D) decreases to its one fourth

165. In the opposite electric circuit, what happens when the value of the resistance that is taken from S increases?



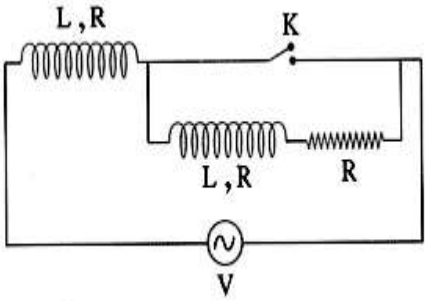
(A) The phase angle between the potential difference across the resistance (S) and the current increases.

(B) The phase angle between the potential difference across the coil (L) and the current decreases.

(C) The phase angle between the potential difference across the electric source and the current increases.

(D) The phase angle between the potential difference across the electric source and the current decreases

166. Two similar coils having the same self-inductance L and the same ohmic resistance R, are connected together with an AC source of voltage V, switch K and an ohmic resistor R as in the opposite figure. When the switch K is closed, the effective value of the current and the phase angle between the total voltage and current respectively……..



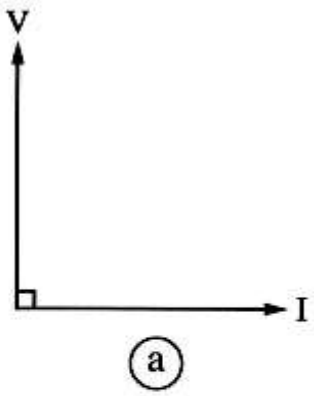
(A) increases, increases

(B) increases, decreases

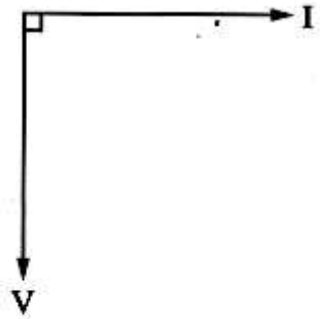
(C) decreases, increases

(D) decreases, decreases

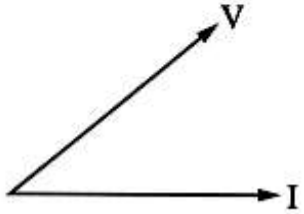
167. Which of the following could be representing a phasor diagram for the total voltage (V) and the current (I) in an AC circuit that contains a capacitor, an ohmic resistance and an induction coil of zero resistance where $X_L \neq X_C$?



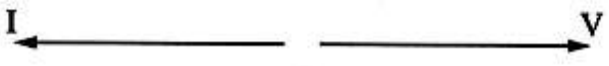
(a)



(b)



(c)



(d)

168. Figure (1) represents the graph of electric charge (Q) that is accumulated on one of the plates of each of three capacitors ×, y and z versus potential difference (V) between the two plates of each of them, then if the three capacitors are connected as in figure (2), the equivalent capacitance between the points a and b equals

a) 6 μF

b) 8 μF

c) 10 μF

d) 12 μF

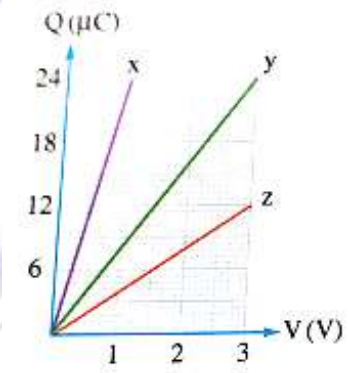


Figure (1)

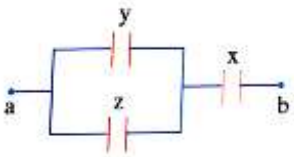


Figure (2)

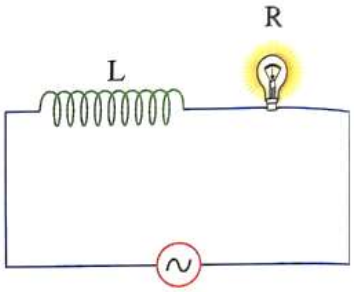
169. In the opposite electric circuit, a lightbulb of resistance R is connected in series with a coil of inductance L and an AC source of constant potential difference and changeable frequency. What is the action which lowers the brightness of the lightbulb?

a) Connecting a similar coil with the coil in parallel.

b) Inserting an iron core inside the coil.

c) Moving the turns of the coil away from each other.

d) Decreasing the frequency of the electric source.



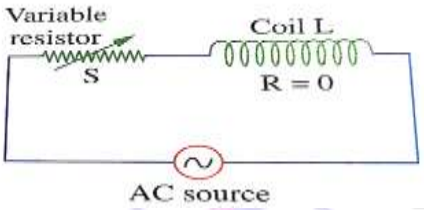
170. In the opposite electric circuit, what happens when the value of the resistance taking from S increases?

a) The phase angle between the potential difference across Cont L R=0 the resistance (S) and the current increases.

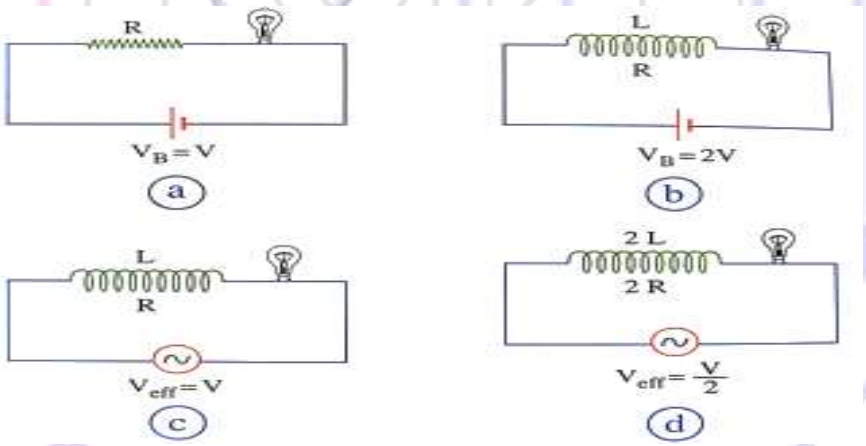
b) The phase angle between the potential difference across AC source the coil (L) and the current decreases.

c) The phase angle between the potential difference across the electric source and the current increases.

d) The phase angle between the potential difference across the electric source and the current decreases.



171. An electric bulb of resistance R is connected in electric circuits with different power sources of zero internal resistance as follows, so in which of the following circuits the brightness of the bulb becomes maximum?



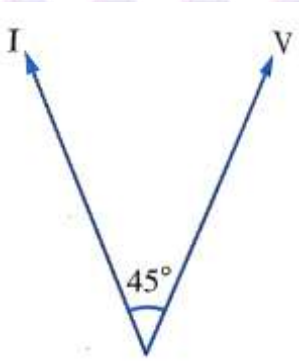
172. The opposite figure represents the vectors of the total voltage (V) and current (D) in an AC circuit that consists of a capacitor (C) and an ohmic resistance (R), then the total impedance of the circuit (Z) is given by the relation

A) $Z=2X_c$

B) $Z=2R$

C) $Z=R^2 + X^2_c$

D) $Z= \sqrt{2}X_c$



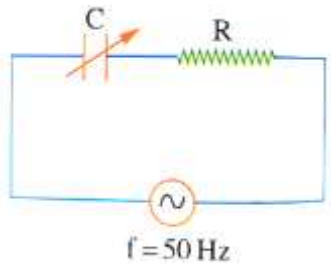
173. In the opposite circuit the phase angle between the current and the total voltage was 30° when the capacitance of the capacitor was C, and becomes 60° when the capacitance of the capacitor gets changed to C, then

a) $C_2=C_1/3$

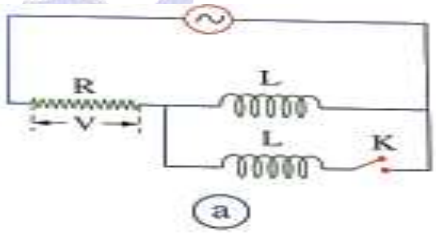
b) $C_2=2C/3$

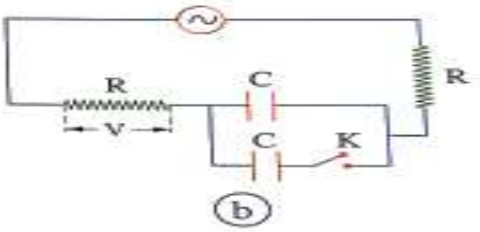
c) $C_2=2C/5$

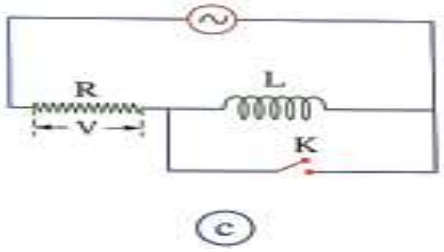
d) $C_2=3C/5$

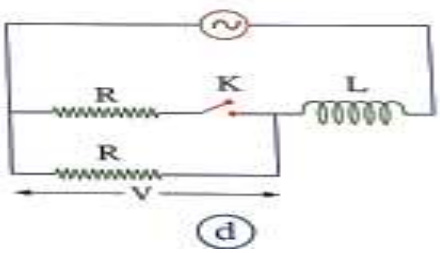


174. In which of the following circuits when the switch (K) is closed the value of the potential difference V decreases?









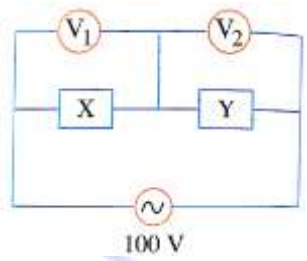
175. In the opposite electric circuit, if (V_1= 60 V and V_2= 40 V), then the two components X, Y could be

a) capacitor and an ohmic resistance

b) an ohmic resistance and hot wire ammeter

c) capacitor and an induction coil

d) an ohmic resistance and a coil



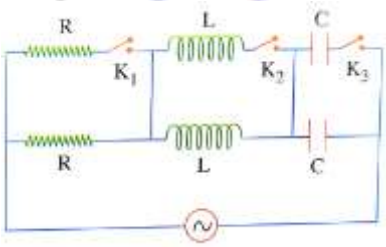
176. In the opposite electric circuit when opening the three switches together, the total voltage lags the current by an angle 45° and when closing one or all of the switches K_1, K_2 ,$K_3$the phase angle becomes equal to zero, so what happened is closing….

A) switch K_1only

B) switch K_2 only

C) switch K_3 only

d) closing the three switches together



177. in a resonance circuit, if the capacitance of the capacitor is decreased to its half and the inductance of the coil is doubled, then what is the required change in the frequency of the source to return the circuit to its resonance state?

a) It must decrease to its quarter.

b) It must decrease to its half,

c) It must increase to its double.

d) It must remain unchanged,

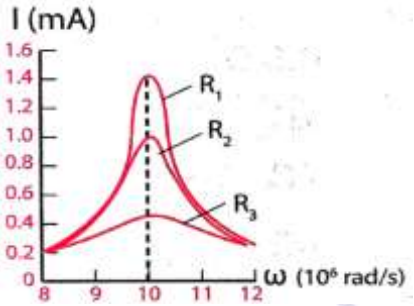
178. The opposite graph shows the relation between the effective value of current (I_{mA}) and the angular velocity (ω x10 ^{6} rad / s) for a series RLC circuit for three values of R. Which is correct?

a) $R_1 > R_2 > R_3$

b) $R_2 > R_1 > R_3$

c) $R_3 > R_2 > R_1$

d) $R_2 = R_3 = R_1$



179. Explain why the wire of a hot-wire ammeter is mounted on a plate of a material having the same expansion coefficient as the wire.

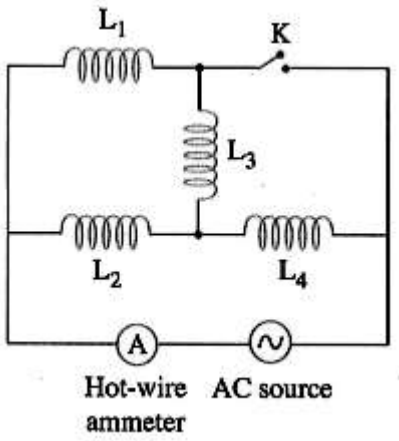
Answer:

180. When using a hot-wire ammeter in measuring a DC current intensity, does that require calibrating the ammeter scale to be uniform before starting the measuring process? And why?

Answer:

181. In the opposite electric circuit, multiple identical coils are connected together with an AC source and a hot-wire ammeter. What happens to the reading of the hot-wire ammeter when switch K is closed? Explain.

Answer:

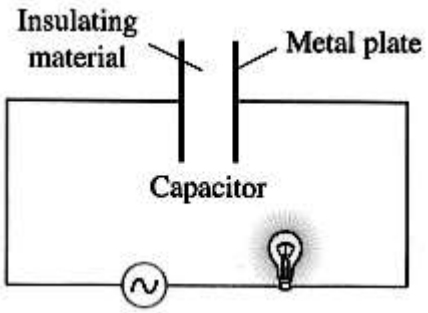


182. Explain why an instantaneous electric current passes in the circuit of a capacitor when its plates are connected to a DC source.

Answer:

183. In the opposite electric circuit, explain why the electric bulb lights in spite of the presence of the insulating material between the two plates of the capacitor.

Answer:



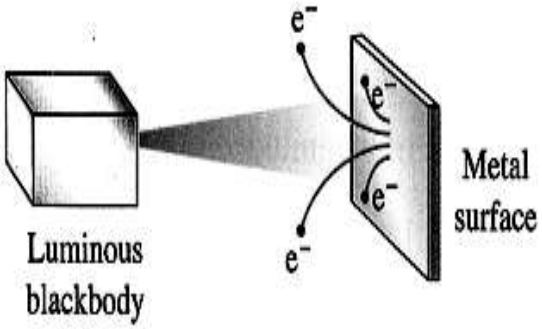
184. The opposite figure illustrates a luminous blackbody placed in front of a metal surface such that the produced radiation from the blackbody causes electrons emission from the metal surface, so if the temperature of the blackbody is increased, the maximum kinetic energy for the emitted electrons from the metal surface will……

(A) increase, due to the increase of the peak wavelength

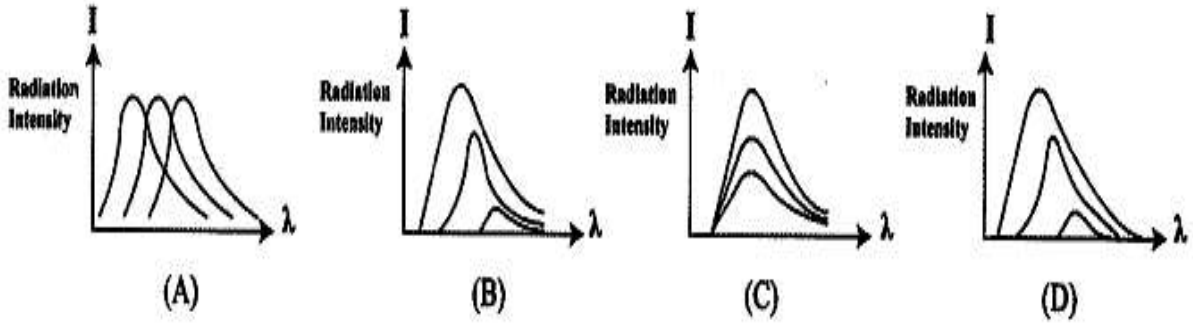
(B) increase, due to the decrease of the peak wavelength

(C) decrease, due to the increase of the peak wavelength

(D) decrease, due to the decrease of the peak wavelength



185. When cooling a hot iron piece gradually until becomes yellow. Which of the following graphs represents the emitted radiation from it during the cooling?



186. Four photons x, y, z and k of energies 6eV, 5eV, 4eV and 3eV respectively, have fallen one at a time on a metallic surface of work function E_w, so three electrons are emitted from that surface then the work function E_w of this surface is……

(A) $6eV > E_w > 6eV$

(B) $5eV > E_w > 4eV$

(C) $4eV > E_w > 3eV$

(D) $3eV > E_w$

187. The de-Broglie wavelength of particle of mass 1gm moving with a velocity of 1 ms^{-1}, in terms of Planck's constant h, is given by (in metre)

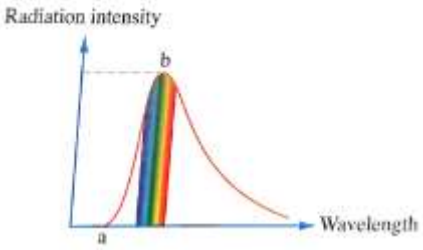
a) 10^5 h

b) 10^6 h

c) 10^{-3} h

d) 10^3 h

188. The opposite graph represents Planck's distribution for the emitted radiation due to a Radiation intensity glowing body.Which of the following statements agree with the quantum theory postulates in explaining the part AB from the graph?



a) As the energy of each of the emitted photons gets higher, a fewer number of them get emitted.

b) As the energy of each of the emitted photons gets higher, a greater number of them get emitted.

C) As the energy of each of the emitted photons gets lower, a fewer number of them get emitted.

d) Equal numbers of photons of different energies are emitted

189. A Star (X) radiate photon of momentum (P_L) at maximum intensity of radiation, while that of star (Y) is (1.2 P_L), which of the following represents the relation between their temperature?

a) Tx=1.2 Ty

b) Ty=1.2Tx

c) Ty=Tx

d) There is no indication

190. Electron microscope is used to observe a body of minimum length (L), if the potential difference between its cathode and anode is doubled, which of the following ranges of lengths can be observed?

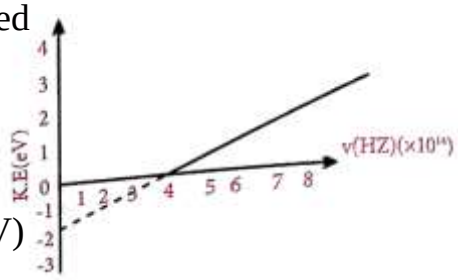
a) From zero to L

b) 0.7 Land more

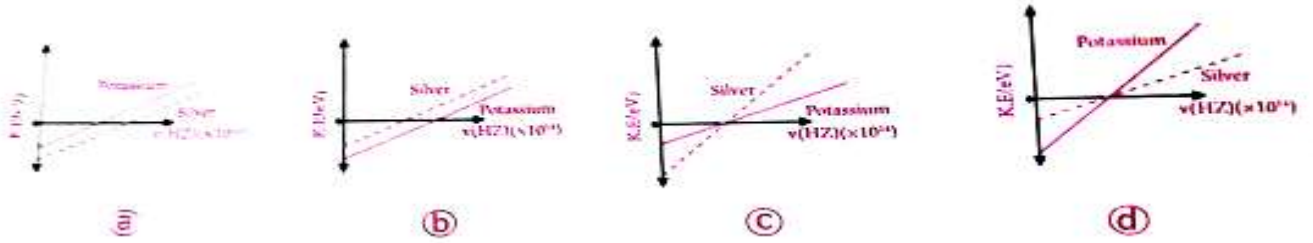
c) From zero to 2L

d) 0.07L and more

191. This graph shows "the maximum kinetic energy for the emitted electrons from potassium metal at number of frequencies



Which of the following graphs shows the correct comparison when replacing the potassium with silver of work function (4.73eV)



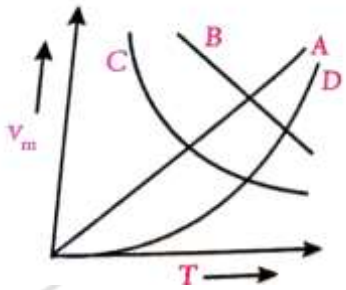
192. For a black body radiation if υ_{max} represents the maximum frequency corresponding Max to the maximum radiation at temperature T, the curve between υ_{max} and T is …..

a) A

b) B

c) C

d) D



193. A, B,C are three hot black bodies having the same surface area, The power radiated by these bodies at different temperatures, are Qa,Qb and Qc If the wavelengths corresponding to maximum intensity are 300 nm, 400 nm, and 500 nm, respectively. Which of the following statements is correct?

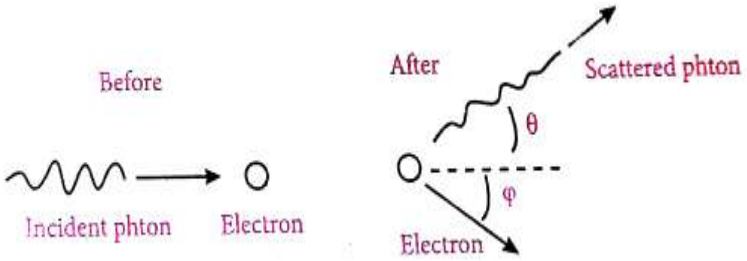
a) $Q_A > Q_B > Q_C$

b) $Q_A < Q_B < Q_C$

c) $Q_B > Q_C > Q_A$

d) $Q_C > Q_A > Q_B$

194. The opposite diagram shows Compton Effect, Which of the following statements correctly states the effect on the wavelength of the scattered photon and why?



a)The wavelength of the scattered photon decreases because the photon transfers energy to the electron in the interaction.

b) The wavelength of the scattered photon decreases because the photon transfers momentum to the electron in the interaction.

C)The wavelength of the scattered photon increases because the photon is acting as a wave during the collision. photon transfers

D)The wavelength of the scattered photon increases because the energy to the electron in the interaction.

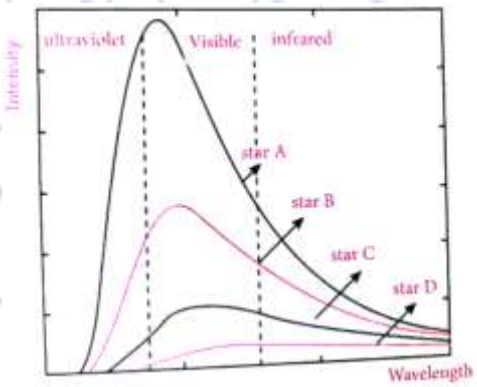
195. Which star has the highest surface temperature in the opposite figure?

a) Star A

b) star B

c) Star C

d) Star D



196. Two particles (a), (b). If the mass of particle (a) is double the mass of particle (b) and the ratio of their velocities ($v_b / v_a = \sqrt{2}$). The ratio between their wavelengths (λ_a, λ_b) is……

(A) $\sqrt{2}$

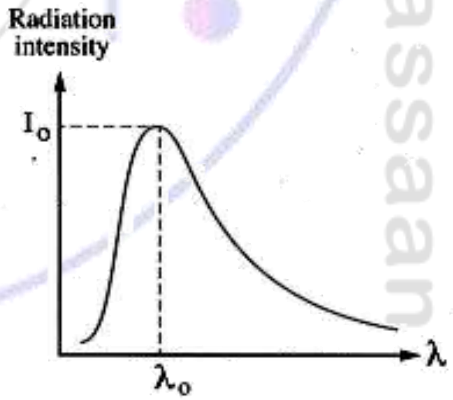
(B) 2

(C) 1/2

(D) $1/\sqrt{2}$

197. The opposite graph represents Planck's distribution curve for the blackbody radiation, so if the temperature of the body increases, then the value of I_o, λ_o…….

	I_o	λ_o
(a)	increases	increases
(b)	decreases	increases
(c)	increases	decreases
(d)	decreases	decreases



198. When an electromagnetic radiation (a) of a single wavelength has fallen on a surface of a metal of work function E, electrons of maximum kinetic energy (E) are emitted and when another electromagnetic radiation (b) of a single wavelength has fallen on the surface of the same metal, electrons of maximum kinetic energy 2E are emitted, so the ratio between the wavelengths of the two radiations (λ_a/λ_b) equals……

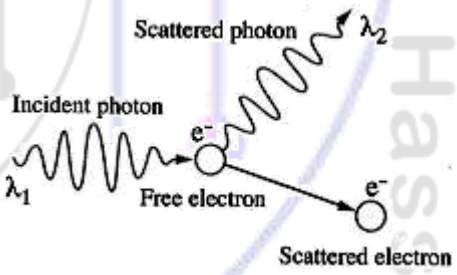
(A) 1/2

(B) 2/1

(C) 2/3

(D) 3/2

199. The opposite figure illustrates Compton's phenomenon. If the ratio between the wavelength of the incident photon and that of the scattered photon (λ_1/λ_2) equals 8/9, then the photon after being scattered loses…….from its energy before collision.



(A) 1/8

(B) 1/9

(C) 8/9

(D) 2/9

200. A photon of gamma ray (γ) of wavelength (λ) is incident on electron (A), the photon is scattered and its wavelength is increased by (3λ), when the same ray is incident on another electron (B), the photon is scattered and its wavelength is increased by (2λ), so the ratio between the energy gained by the electron (A) to (B) is……

(A) 9/8

(B) 3/2

(C) 4/3

(D) 3/4

201. If the kinetic energy of a particle has increased to 25 times its initial value, then the percentage of the change in the wavelength which is associated with the particle motion is……

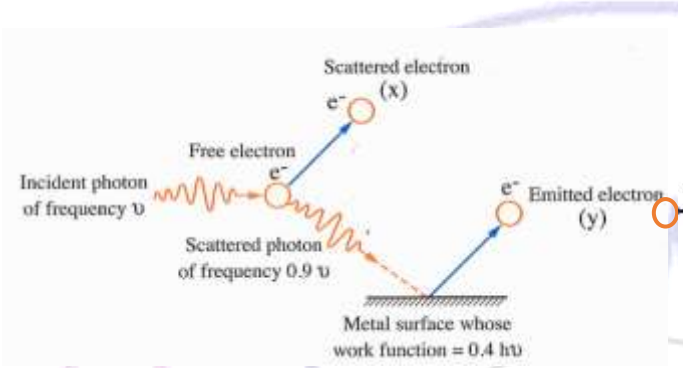
(A) 80%

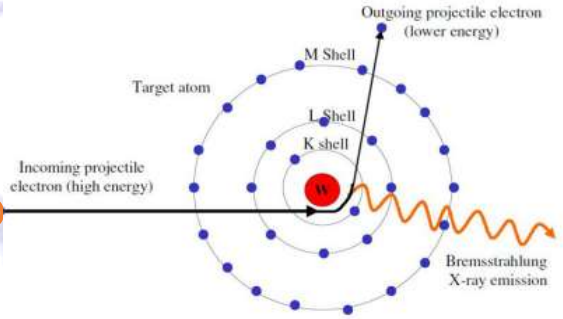
(B) 60%

(C) 40%

(D) 20%

202. Suppose that the scattered photon in Compton's phenomenon has fallen on a metallic surface, so electron (y) has emitted from it if the electrons y was released towards the target as a result of its dispersion, the wavelength of the continuous X-ray photon produced in this case is as in the opposite figure, then





	Ratio between the kinetic energies gained by the two electrons x, y $\frac{\Delta K.E_x}{\Delta K.E_y}$	The maximum frequency of the continuous X-rays spectrum is
A	1/5	$\upsilon_{X\text{-rays}}=0.5\upsilon$
B	1/3	$\upsilon_{X\text{-rays}}=0.25\upsilon$
C	5/1	$\upsilon_{X\text{-rays}}=0.5\upsilon$
D	5/1	$\upsilon_{X\text{-rays}}=0.5\upsilon$

203. A photon beam has photons (n) and of frequency (υ_1), it has the same energy of another beam has photons (n_2) and of frequency (υ_2), so the ratio is…….

(A) $(n_1/n_2) = 1$

(B) $(n_1/n_2) = (\upsilon_1/\upsilon_2)$

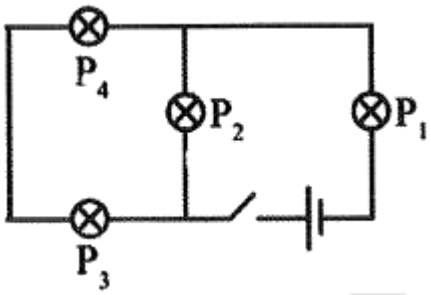
(C) $(n_1/n_2) = (\upsilon_2/\upsilon_1)$

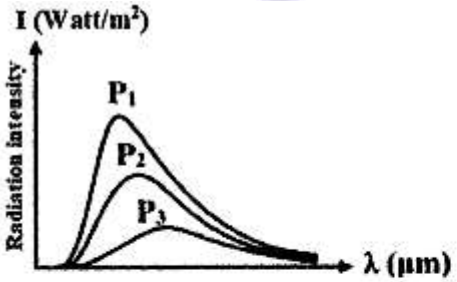
(D) $(n_1/n_2) = (\upsilon_1^2/\upsilon_2^2)$

204. The opposite table shows the radiation intensity of some frequencies (A, B and C) in a specific spectral range. If each of them separately is used to illuminate a metallic surface its work function is 3.056×10^{-19} J, so which of the radiations (A, B and C) can free greatest number of electrons per second?

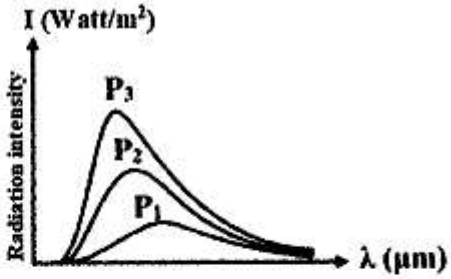
	Frequency (Hz)	**Intensity**
A	3.5×10^{14}	High
B	5.5×10^{14}	Medium
C	7.5×10^{14}	Low

205. The opposite circuit contains four identical lamps, which of the following graphs represents the relation between the radiation intensity and the wavelength of the emitted light from the lamps (P_1, P_2 and P_3) on closing the switch?

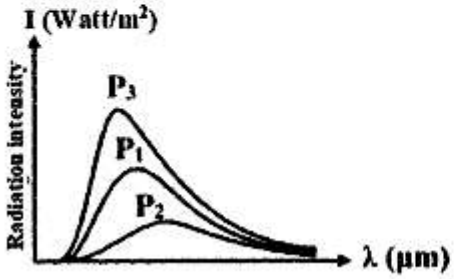




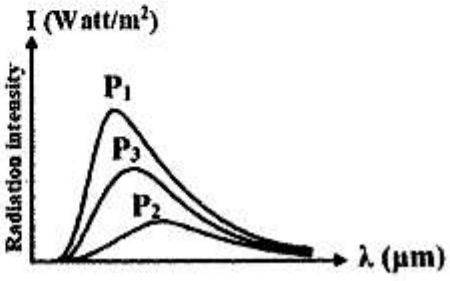
(A)



(B)



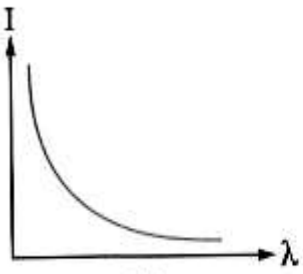
(C)



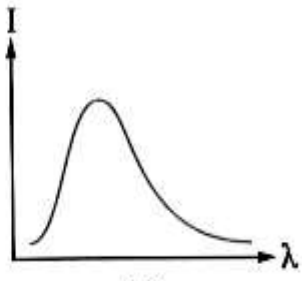
(D)

206. Which of the following graphs represents correctly the relation between the intensity of radiation (I) emitted from a luminous body and the wavelength (λ) of the radiation? And explain why the other graph is unsuitable for representing this relation.

Answer:

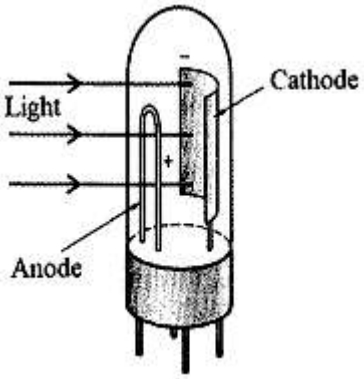


(1)



(2)

207. From the opposite figure, answer these questions:



a. What is the name of the shown device?

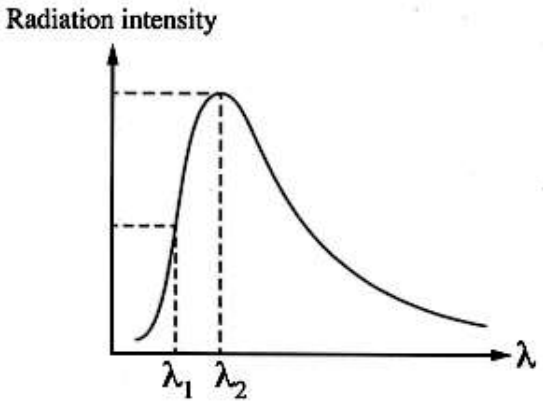
b. What is the scientific basic of its working?

c. In which that device is used?

d. Why the anode wire is thin while the cathode is concave wide surface?

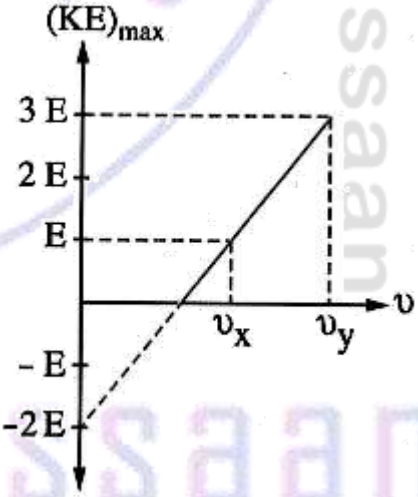
Answer

208. The opposite graph represents Planck's distribution curve for the spectrum of the Sun, explain why the intensity of the radiation whose wavelength is λ_1 is less than the intensity of the radiation whose wavelength is λ_2.



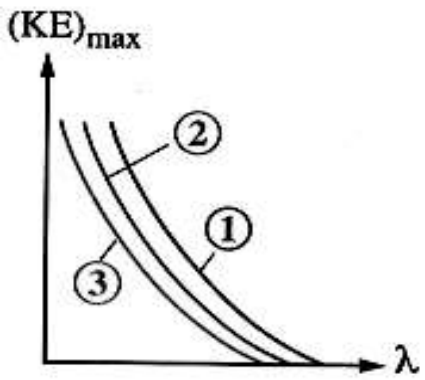
Answer:

209. The opposite graph represents the relation between the maximum kinetic energy (KE_{max}) for the emitted electrons max from the surface of a metal and the frequency (υ) of the incident electromagnetic radiation on that surface, find the ratio between the two frequencies (υ_x/υ_y).



Answer:

210. The opposite graph represents the relation between the maximum kinetic energy (KE_{max}) for the emitted electrons from max the surfaces of three metals (1), (2) and (3) and the wavelength (λ) of the incident photons on each of them, arrange in a descending order the three metals according to their work functions, with explaining your answer.



Answer:

211. A photon of frequency U collided with a free electron so that the electron speed is increased 2 by v and the photon frequency is decreased by 0.5U if the experiment is repeated using photons having the same frequency. Find the change in the speed of electron if the frequency value is decreased after collision by a value of 0.25U

(A) $\sqrt{\frac{3}{2}}v$

(B) $\frac{1}{\sqrt{2}}$

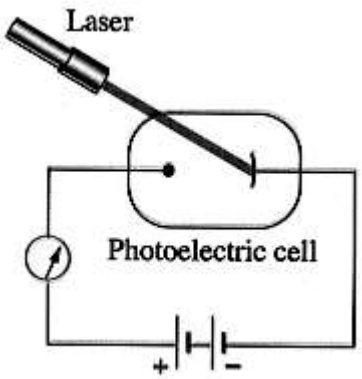
(C) $\frac{3}{\sqrt{4}}$

(D) $\frac{1}{2}v$

212. A beam of photons, the momentum of each photon is 1.4×10^{-27} kg.m/s, is incident normal on a reflecting surface in a rate of 10^{22} photons/s, what is the magnitude of the force by which the photons beam affects the surface when the beam gets reflected from it?

Answer:

213. The opposite figure shows a photoelectric cell such that a laser ray of wavelength 550nm and power 0.2mW is incident on its cathode. If the longest wavelength required for the emission of electrons from this cathode is longer than 550nm and assuming that every incident photon makes an electron get emitted, calculate the maximum photocurrent intensity in the circuit.



Answer:

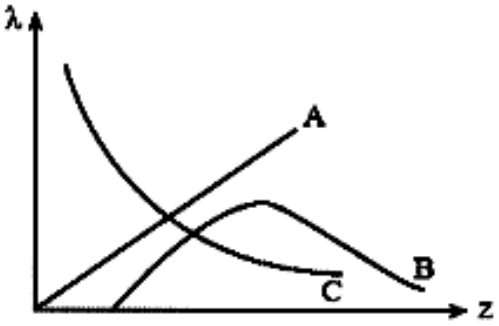
214. A hydrogen atom that is in the ground state has absorbed a photon of energy E. so the atom becomes excited and after its lifetime has elapsed, it has emitted a photon that has the longest wavelength in Balmer series, so the energy E of the absorbed photon by the hydrogen atom equals……..eV

(A) 1.9
(B) 10.2
(C) 12.1
(D) 13.6

215. If the potential difference between the anode and cathode in a Coolidge tube to generate X-rays is 13255V, then the wavelength of the wave associated with the motion of the fastest electron (λ_1) and the shortest wavelength for the produced X-rays (λ_2) are……

	λ_1	λ_2
(a)	0.1 Å	0.94 Å
(b)	0.1 Å	1.2 Å
(c)	0.2 Å	0.94 Å
(d)	0.2 Å	1.2 Å

216. The graphic relation between the wavelength (λ) of the characteristic X-rays and the atomic number of the target material is……



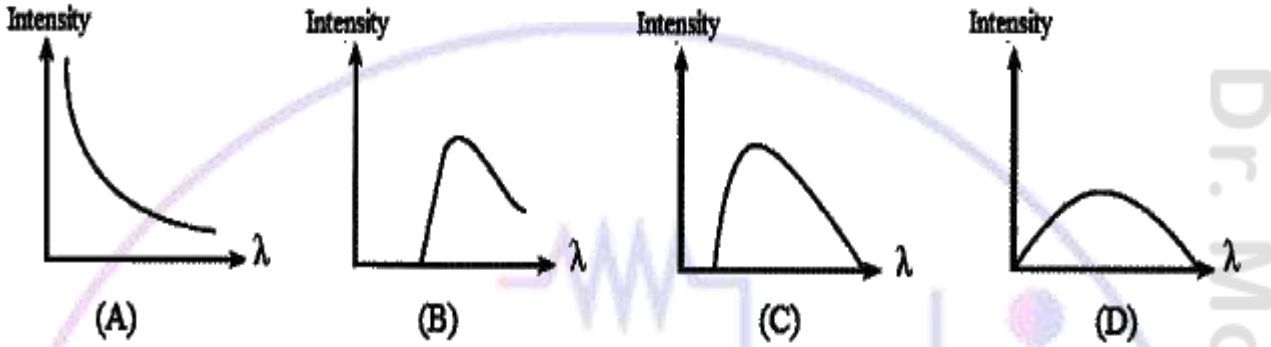
(A) Line (A)

(B) Line (B)

(C) Line (C)

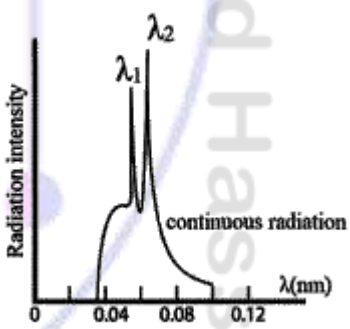
(D) None of them

217. The diagram that represents the relation between the intensity of the continuous X-rays (soft radiation) which generated from the tube and the wavelength is figure…….



218. The opposite figure represents the line spectrum of X-rays using a target made from Molybdenum resulting from falling electrons from the levels (n = 2) and (n = 3) to the level (n=1), so……

	From (n = 2) to (n = 1)	From (n = 3) to (n = 1)
A	λ_1	λ_1
B	λ_2	λ_1
C	λ_1	λ_2
D	λ_2	λ_2



219. X-ray tube operates on potential difference of 4×10^4V and the current intensity is 5mA. If the efficiency of the tube is 2%, calculate:

a. The minimum wavelength of the produced X-rays.

b. The number of the emitted electron per second.

c. The used electrical energy each second.

d. The energy of the produced X-ray each second.

e. The produced heat energy each second.

Answer:

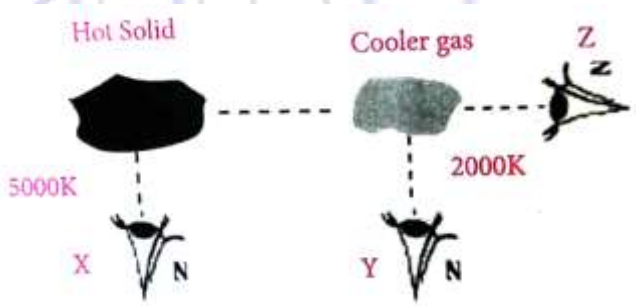
220. The diagram below shows a hot solid, at a temperature of 5000 K, emitting a continuous spectrum. (li) State the type of spectrum observed from: Position Z

a) Emission continuous spectrum

b) Absorption continuous spectrum

c) Emission line spectrum

d) Absorption line spectrum



221. An excited electron in hydrogen atom, excited to energy Level (O) , and can transfer to any lower level, then the number of wave lengths that probability can be obtained is

a) 1 wave length

b) 5 wave lengths

c) 4 wave lengths

d) 10 wave lengths

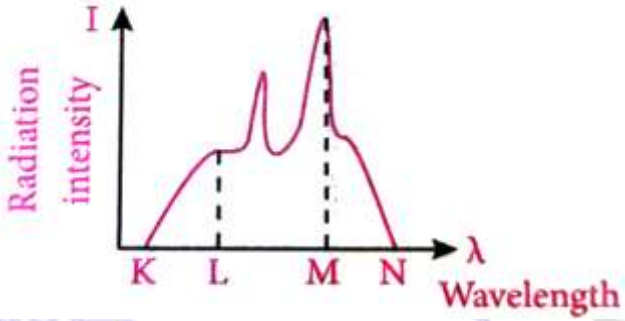
222. The graph represents X-rays spectrum produced from Coolidge tube. Which wavelength (K, L, M, or N) can be determined by the relation: Where (A E) is the energy difference between two levels in the target atom.

a) Wavelength at K

b) Wavelength at L

c) Wavelength at M

d) Wavelength at N



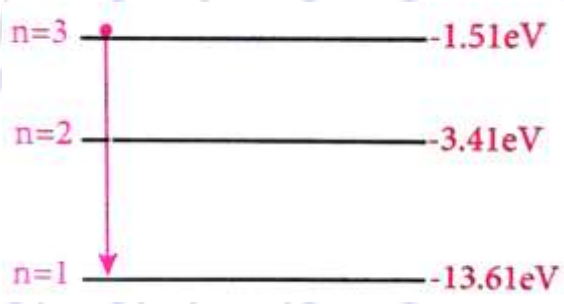
223. The figure represents one of electron transitions in hydrogen atom. Calculate the wavelength of the emitted photon (Knowing: h = 6.625x1 034 J.s " c = $3x10^8$ m/s and e =$1.6x10^{-19}$)

a) 1.02×10^{-7} m

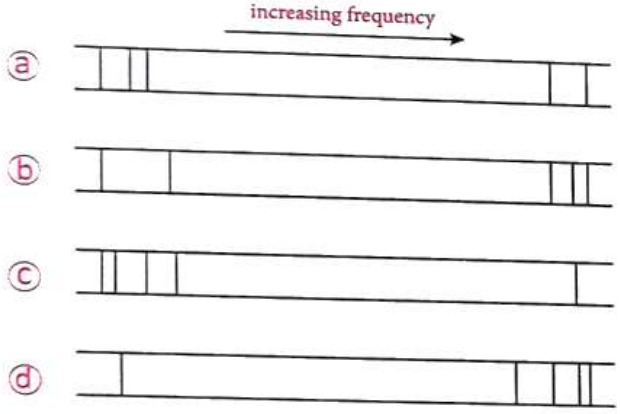
b) $1,93 \times 10^{-7}$ m

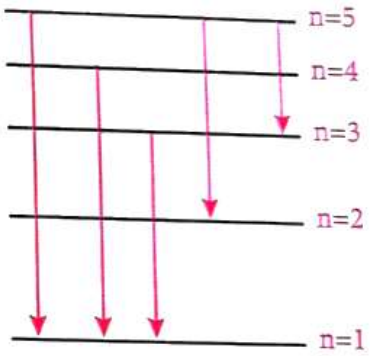
c) 247×10^{-7} m

d) 4.37×10^{-7} m



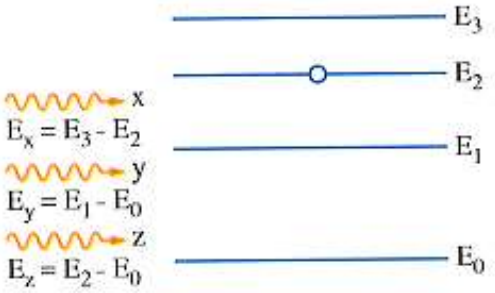
224. The five energy levels of an atom are shown in the scale drawing the indicated lines represent five possible transitions between the energy levels. A photon of definite energy and frequency is produced by each transition. Which of the spectra best corresponds to the transitions?





Answer by your self

225. The opposite figure illustrates three incident photons x, y and z falling on an excited atom before its lifetime elapses which of these photons can cause an induced emission for the atom? Explain your answer.



Answer

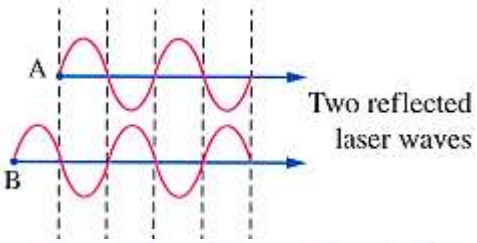
Photon Z can cause an induced emission in the atom, because its energy equals the energy difference between the excitation energy level (E_2) and one of the lower energy levels (E_0).

226. In the opposite figure, how will the reflected light rays from the body be different than the incident light rays on it?

Answer

The incident rays on the body are parallel having the same intensity and have no path or phase difference (in phase), while the reflected rays from the body are not parallel, have different intensities and carry some information from the surface that has reflected them in the way of having path differences that represent the topography of the surface.

227. The opposite figure illustrates two laser waves reflected from two points A and B lying on a body during 3D hologram recording, if the path difference between them is 3164Å, find the wavelength of the laser.



Answer

$$\text{Phase difference} = \text{Half wave} = \pi$$

$$\text{Phase difference} = \frac{2\pi}{\lambda} \times \text{path difference}$$

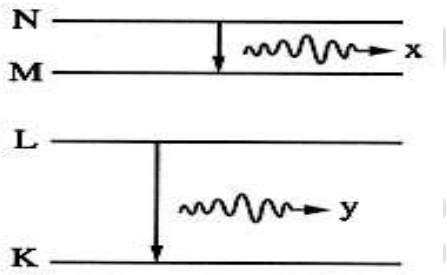
$$\therefore \pi = \frac{2\pi}{\lambda} \times 3164 \quad , \quad \lambda = 6328\ \text{Å}$$

228. The opposite diagram illustrates the emission of two photons x and y as a result of two electron transitions in a hydrogen atom, find the ratio between:

a. The wavelengths of the two photons (λ_x/λ_y).

b. The masses that are equivalent to the two photons (m_x/m_y).

Answer:

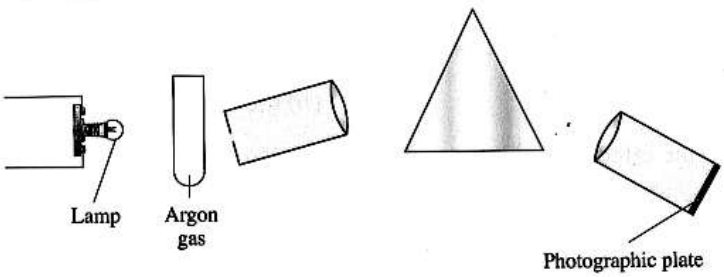


229. In the following figure, when operating the light source, describe what appears on the photographic plate in the case of:

a. The presence of an argon gas tube between the lamp and the spectrometer.

b. Removing the argon gas tube from between the lamp and the spectrometer.

Answer:

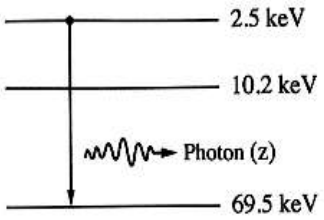


230. Two X-ray photons (z and y) are emitted from a Coolidge tube, photon z is emitted due to the transition of an electron between two energy levels in a tungsten atom as shown in figure (1), while photon y is emitted due to the pass of an electron near the tungsten atom as in figure (2):

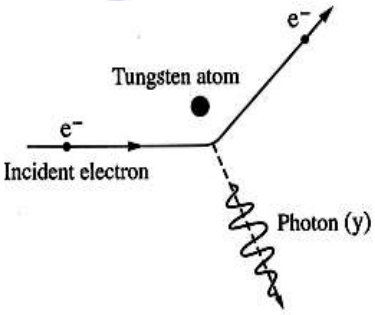
a. Which of the two photons belongs to the continuous spectrum region? And which of them belongs to the linear spectrum?

b. Calculate the wavelength of photon z.

Answer:



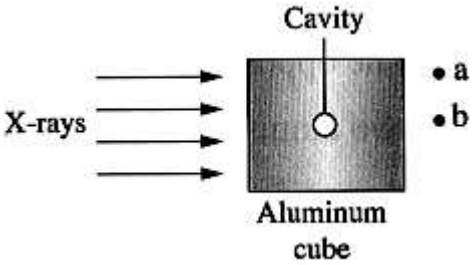
(1)



(2)

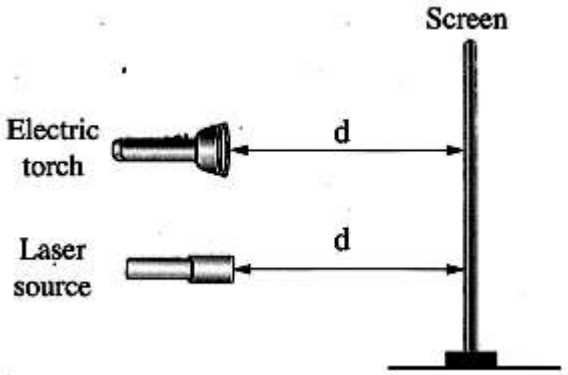
231. X-rays are set to get incident on an aluminum cube containing a gas cavity, compare between the intensities of X-rays at points a and b, then show how this could be useful in detecting gas cavities when pouring molten metals.

Answer:

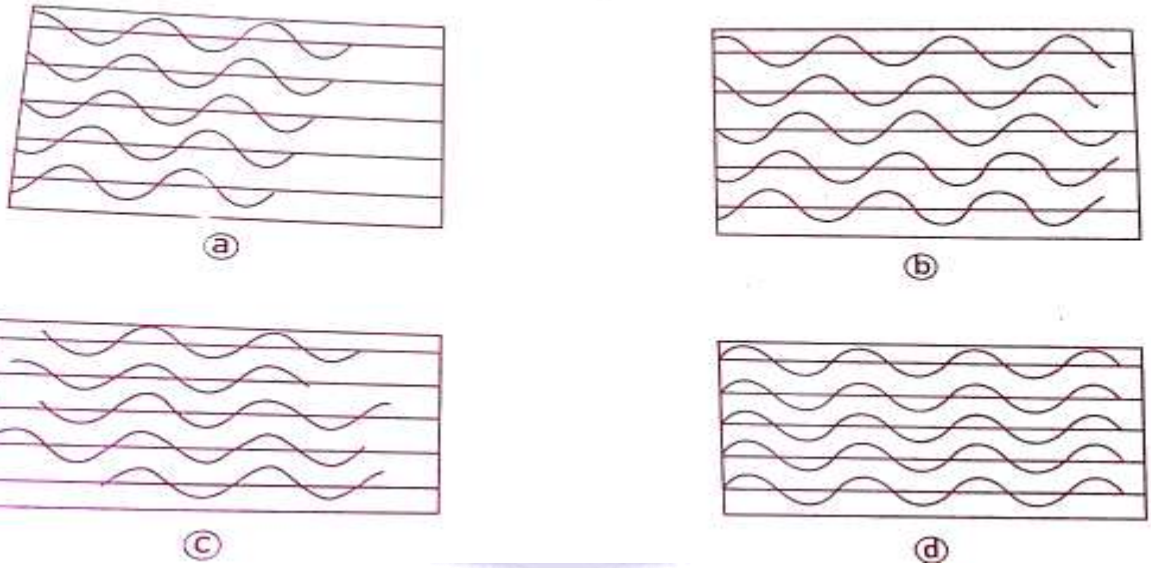


232. The opposite figure shows a laser source and an electric torch having the same power and placed at the same distance from a screen, so compare between the laser light intensity and the torch light intensity at the screen explaining your answer.

Answer:



233. Which of the following figures shows photons are coherent?(d)



234. Coherent photons in the optical ray means:

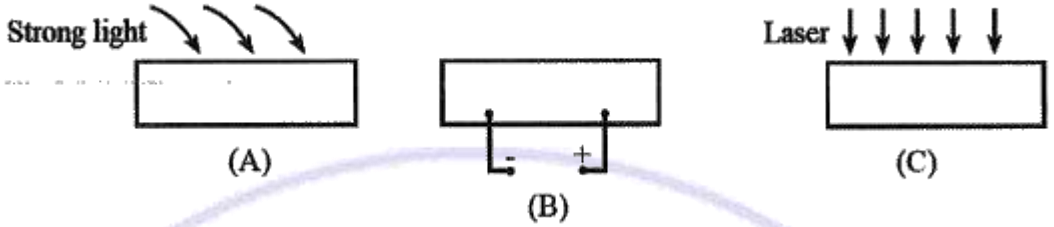
a) Emitted by variable phase difference

b) Moving in parallel beams

c) Emitted by constant phase difference

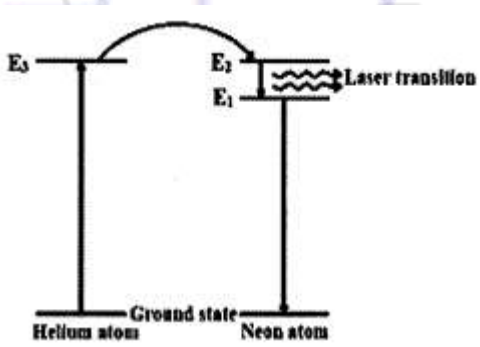
d) Does not obey inverse square law

235. In the figures (A, B and C) three resonant cavities, the active medium is……..



(A) (A) solid medium- (C) gas medium.
(B) (B) gas medium- (A) liquid dye medium.
(C) (B) gas medium- (C) liquid dye medium.
(D) (A, B) gas medium- (C) liquid dye medium.

236. The opposite figure shows the energy level diagram for (He -Ne) laser, the energy transferred……..due to the collision between He and Ne atoms.



(A) from (He) atom to an excited (Ne) atom
(B) from (Ne) atom to an excited (He) atom
(C) from (He) atom to unexcited (Ne) atom
(D) from (Ne) atom to unexcited (He) atom

237. The spectral purity of laser beam means constant of all the following except……..

(A) The intensity of long distances.
(B) The path difference/ The phase difference
(C) The wavelength.
(D) The speed of its photons/ The frequency of its photons

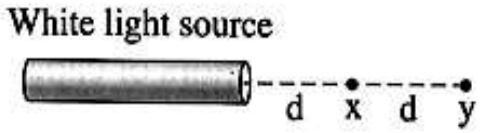
238. In the opposite figure, if the light source is switched on, the ratio between the intensity of the light beam at x and that at y (I_x/I_y) becomes…….

(A) 1/1

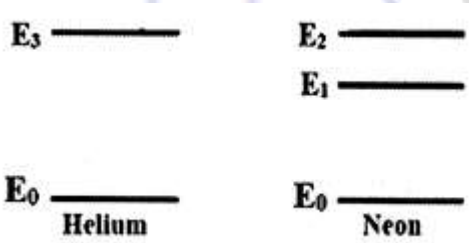
(B) 4/1

(C) 1/4

(D) 2/1



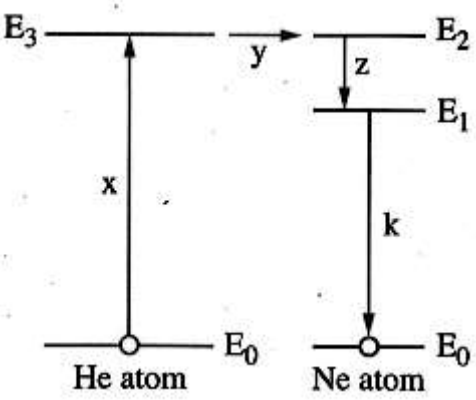
239. In the following figure, a diagram of the energy levels of helium and neon atoms in the He-Ne laser, so:



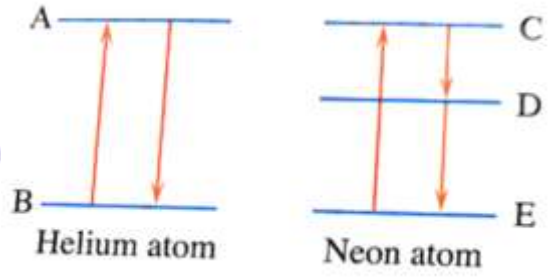
	The excited helium atoms collide with the neon atoms that in	The neon atoms transfer to
A	(E_2) Level	(E_1) Level
B	(E_0) Level	(E_2) Level
C	(E_0) Level	(E_1) Level
D	(E_2) Level	(E_0) Level

240. The opposite figure shows some transitions x, y, z and k in the helium- neon laser, arrange these transitions according to the order of their occurrence?

Answer:



241. The opposite schematic diagram represents the energy levels in helium-neon laser, so which two of the shown energy levels almost have equal energies?



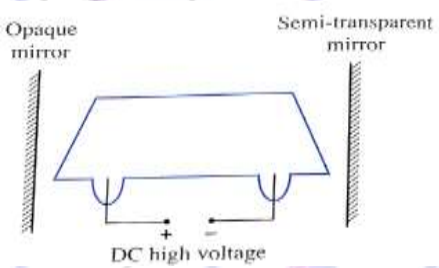
(a) Level A and level B.

(b) Level A and level C.

(c) Level C and level D.

(d) Level D and level B.

242. The opposite diagram shows a helium-neon laser.Opaque mirror What's the correct order for what happens inside the tube?



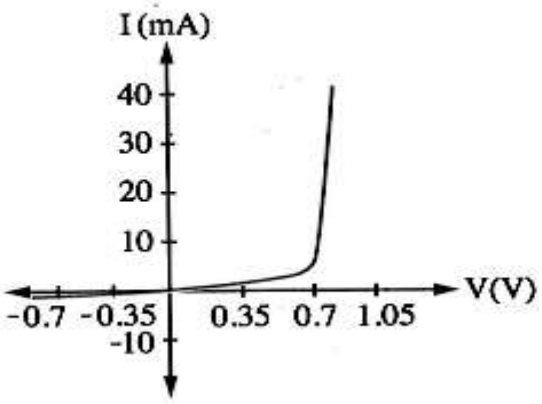
a) Excitation of neon atoms → Excitation of helium atoms. → Population inversion for helium atoms

b) Excitation of helium atoms. → - Population in version for helium atoms → Excitation of neon atoms

c) Excitation of helium atoms → Excitation of neon atoms → Population for helium atoms

d) Excitation of helium atoms → Excitation of neon atoms. → Population inversion for neon atoms

243. The opposite graph represents the relation between the intensity of the current (I) that passes through a diode and the potential difference (V) between its terminals, so the potential barrier for this diode is…….



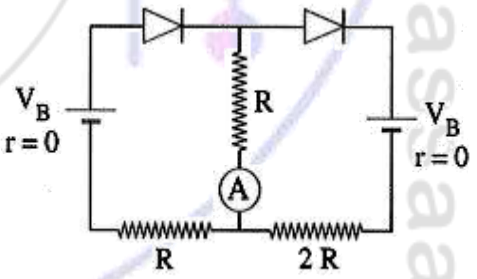
(A) 1.2V

(B) 0.8V

(C) 0.7V

(D) Zero

244. In the shown electric circuit, if the resistance of the diode is negligible in the case of forward connection and infinite in the case of the reverse connection, then the reading of the ammeter is…….



(A) $V_B/3R$

(B) $V_B/2R$

(C) $2V_B/3R$

(D) $3V_B/2R$

245. A diode has a barrier voltage of 0.3V when it is not connected and its resistance can be considered 1.5Ω in the case of forward biasing and infinite in reverse biasing. If the diode is connected in a circuit as shown in figure (1), the passing current in the circuit becomes as shown in figure (2), so which of the following graphs shows the input voltage (V_{in}) in the diode circuit?

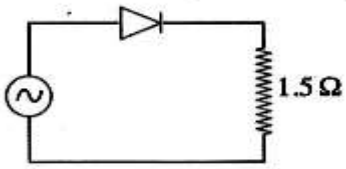


Figure (1)

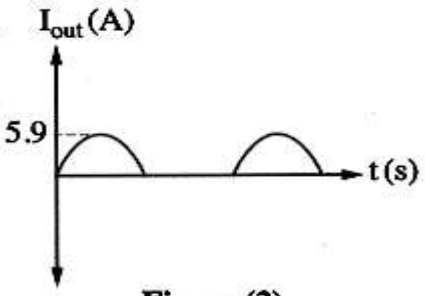
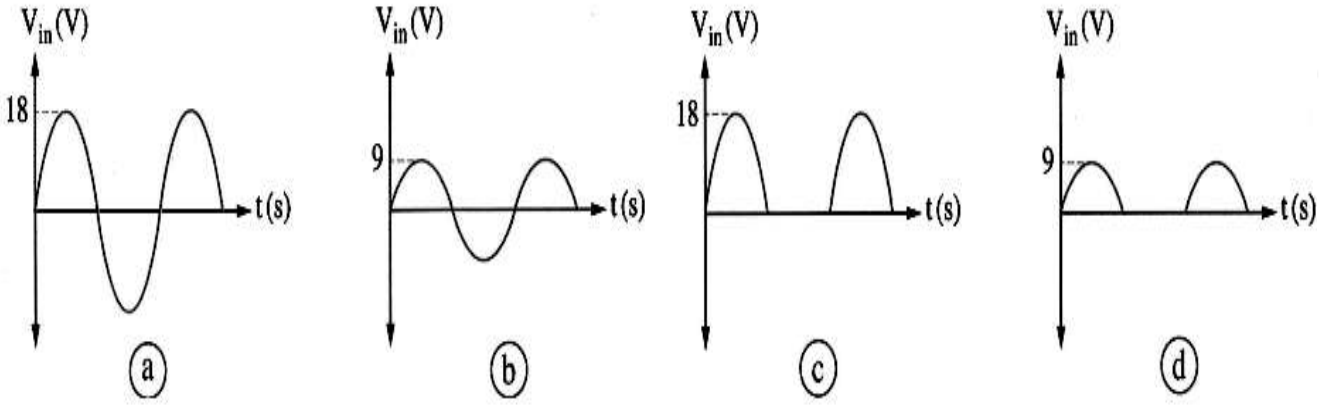


Figure (2)



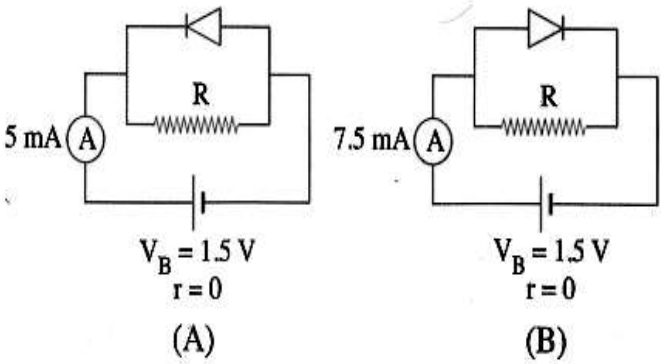
246. In the opposite electric circuits (A) and (B), the resistance of R and the resistance of the diode in the case of forward biasing are..... , ... respectively. (Consider that the resistance of the diode in the case of reverse biasing is infinite)

(A) 300Ω, 600Ω

(B) 300Ω, 200Ω

(C) 200Ω, 600Ω

(D) 200Ω, 300Ω



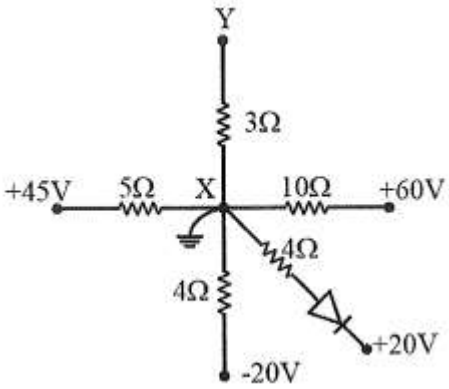
247. In the figure the point (X) is grounded, so the potential of point (Y) is……

(A) 30V

(B) 15V

(C) – 15V

(D) – 30V



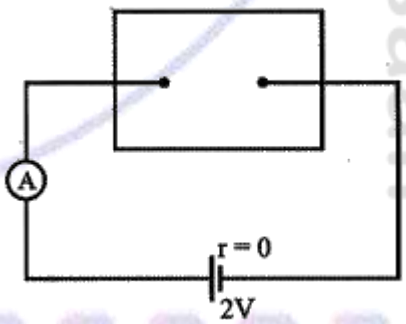
248. An ohmic resistance and diode are connected together inside a box with two terminals appears, if it connected to a circuit as in the figure, a current passes of 40mA and when the battery poles are reversed a current 20mA will pass, so the value of the diode is.....and resistance is…….

(A) 50Ω, 50Ω

(B) 50Ω, 100Ω

(C) 100Ω, 100Ω

(D) 100Ω, 50Ω

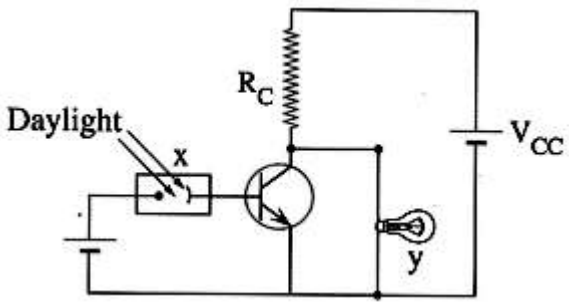


249. The concentration of either free electrons or holes in each of two identical intrinsic (pure) silicon crystals x, y is 10^{12} cm^{-3}, so if crystal x gets doped with antimony atoms in a concentration of 10^{14} cm^{-3} while crystal y gets doped with aluminum atoms in a concentration of 10^{14} cm^{-3}, what will be the ratio of holes concentrations in each of them (p_x/p_y)?

Answer:

250. In the opposite electronic circuit, a photocell (x) is connected to the base of an npn transistor whose emitter and collector terminals are connected to a light bulb (y), explain why the light bulb glows when the daylight is gone.

Answer:

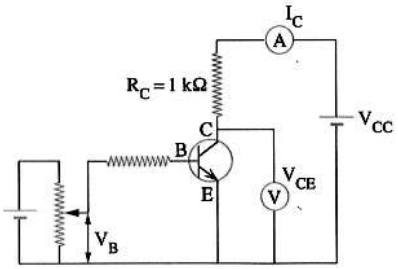


251. For the transistor circuit shown in figure (1), the relation between the ammeter reading (I and the voltmeter reading (V_{CE}) are represented as shown in graph (2):

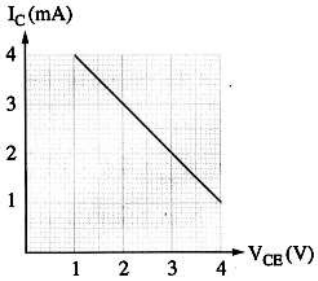
a. Show how we had been able to change the voltmeter reading in this circuit from 2V into 4V.

b. Find the potential difference between the terminals of the battery V_{cc}

Answers:



(1)

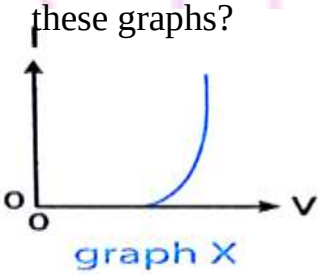


(2)

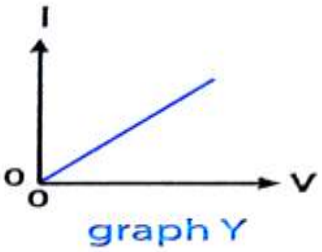
252.

253.

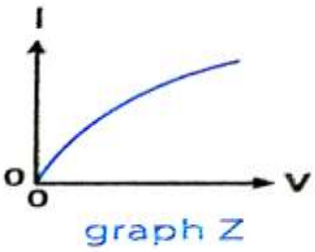
254. The graphs show the variation with potential difference V of the current I for three circuit elements. The three circuit elements are a metal wire at constant temperature, a semiconductor diode and a filament lamp. Which row of the table correctly identifies these graphs?



graph X



graph Y



graph Z

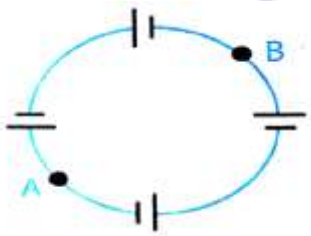
Choice	Metal wire at constant Temperature	Semiconductor filament	Diode lamp
A	X	Z	Y
B	Y	X	Z
C	Y	Z	X
D	Z	X	Y

255. How is electricity transmitted over large distances and why is transmitted in this way

Choice	How	Why
A	At high voltage	For safety
B	At high voltage	To reduce energy loss
C	At low voltage	For safety
D	At low voltage	To reduce energy loss

256. Four identical cells each having e.m.f. E and internal resistance zero are shown in the figure. The potential difference between points A and B is.....

a) 4E
b) 2E
c) E
d) zero



257. The opposite figure represents a section of conductor passing through it an electron current from point (a) to point (b), so:

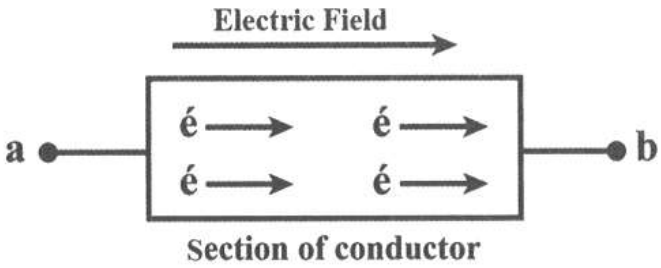
(A) The electrons move in straight line and during the motion they collide with each other.

(B) The direction of the electrons motion represents the traditional current direction passing in the conductor.

(C) The conductor affected by external electric field cause pushing the electrons from point (a) to the point (b).

(D) The potential of point (b) is negative.

Answer:



258. The opposite figure represents the graphical relation between the current intensity (I) passing through a conductor and time of passing (t), so the electric charge passing through the section of the conductor during 5 seconds is .....

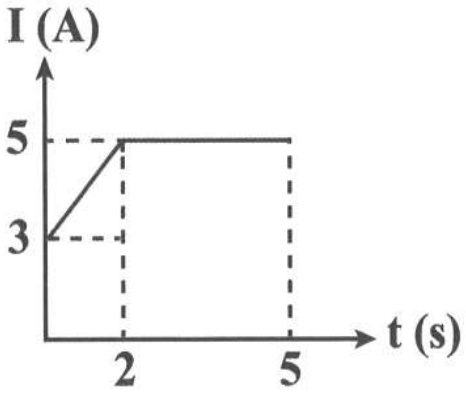
(A) 19C

(B) 23C

(C) 25C

(D) 27C

Answer:



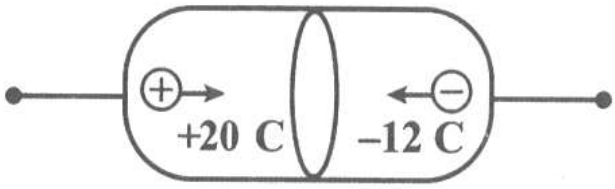
259. The opposite figure represents an electrical discharge tube passing through it in time of 8sec, electric charge –12C from right to left and electric charge +20C from left to right, so the electric current intensity passing in the tube and its direction are .....

(A) 1A, ←

(B) 2A, ←

(C) 4A, →

(D) 1A, →



Answer:

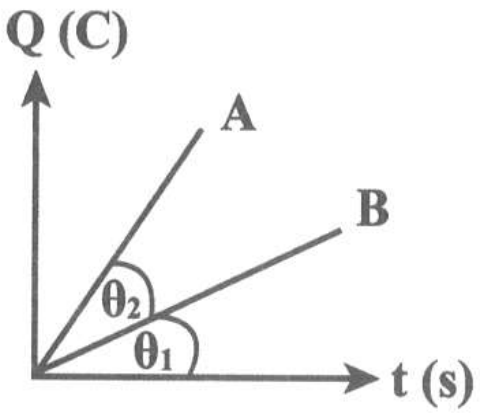
260. The opposite figure represents the relation between the quantity of electric charge (Q) passing through a section of two conductors (A, B) and time (t), so the ratio between the electric current intensity passing through the two wires $\frac{I_A}{I_B}$ is .....

(A) $\frac{\tan\theta_2}{\tan\theta_1}$

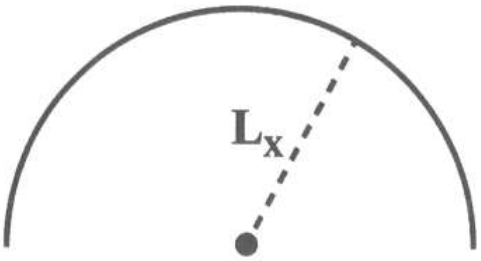
(B) $\frac{\tan\theta_1}{\tan(\theta_1-\theta_2)}$

(C) $\tan(\theta_1+\theta_2)$

(D) $\frac{\tan(\theta_1+\theta_2)}{\tan\theta_1}$



261. In the opposite figure a uniform conductor of cross-sectional area (A) and specific resistance (ρ_e) shaped as half circle as in figure, if the electric resistance of the conductor equals $\frac{X\rho_e L_x}{A}$, so the value of the constant (X) equals .....



(A) $\frac{\pi}{4}$

(B) $\frac{\pi}{2}$

(C) π

(D) 2π

Answer:

262. The opposite table represents the specifications of three conductors (X), (Y) and (Z) of a uniform section made of an element, so the relation between the three conductors is .....

Conductor	The Length	The Cross-section	The Temperature
X	L	A	$2t^o$ (C)
Y	2L	2A	t^o (C)
Z	4L	4A	t^o (C)

(A) $R_Y = R_Z = R_Z$

(B) $R_X = R_Y < R_Z$

(C) $R_X < R_Y = R_Z$

(D) $R_Z = R_Y < R_X$

Answer:

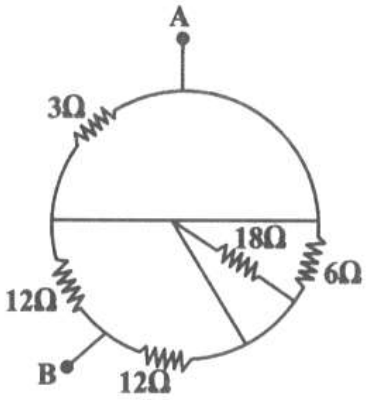
263. In the opposite figure, the equivalent resistance between (A, B) is .....

(A) 4Ω

(B) 2Ω

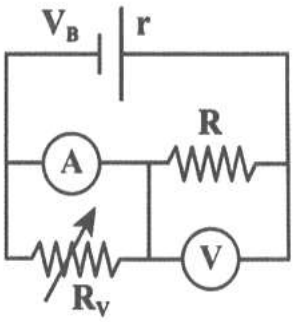
(C) 4.5Ω

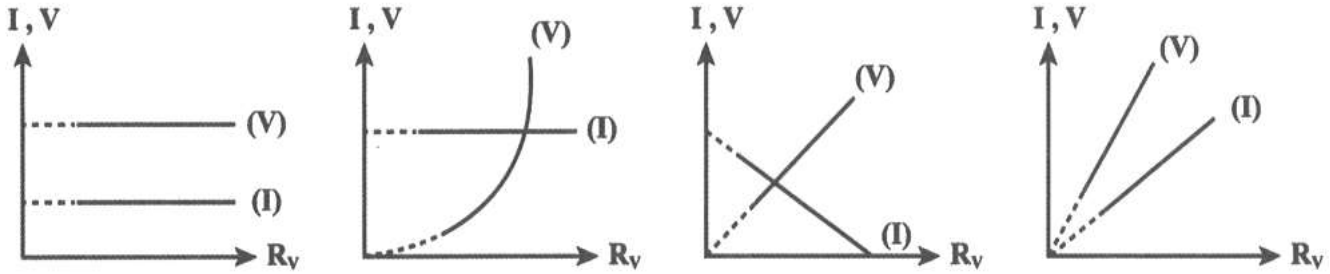
(D) 6Ω



Answer:

264. In the electric circuit shown in the opposite figure, which of the following graphs represents the relation between the readings of the ammeter (I) and voltmeter (V) on increasing the variable resistance (R_V):





(A) (B) (C) (D)

Answer:

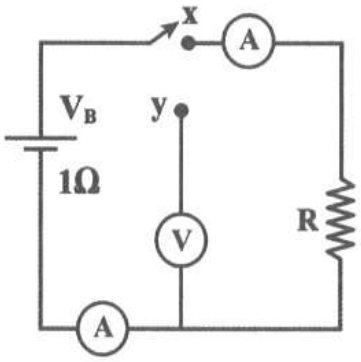
265. In the electric circuit shown in the opposite figure, on closing the switch (x) the ammeter reads current intensity 1A and on closing the switch (y) the voltmeter reads potential difference 6V, so the value of the resistance (R) is .....

(A) 3Ω

(B) 4Ω

(C) 5Ω

(D) 6Ω



Answer:

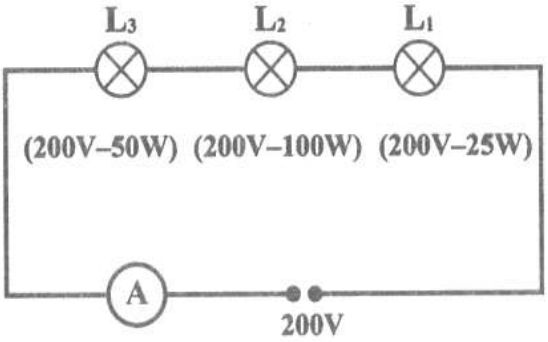
266. The opposite figure contains three bulbs (L_1), (L_2) and (L_3) (written on each of them the voltage and the electric power for which each bulb has made) connected with voltage source of electromotive force 200V, so the reading of the ammeter and the bulb of maximum brightness are: (Neglecting the internal resistance of the battery)

(A) (1/14)A, The bulb (L_1)

(B) (3/16)A, The bulb (L_2)

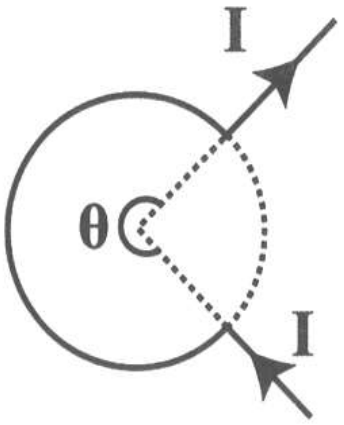
(C) (3/10)A, The bulb (L_3)

(D) None of the above



Answer:

267. An electric current passes through a metalic conductor, it is a part of the circular ring its raduis is (r) and the conductor faces a radial angle of $\left(\frac{3\pi}{2}\right)$, so the magnetic flux density at the center is:



(A) $\frac{\mu I}{r}$

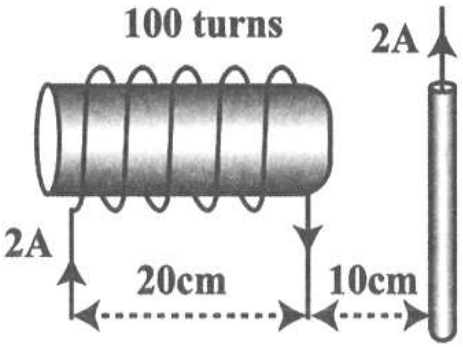
(B) $\frac{\mu I}{2r}$

(C) $\frac{2\mu I}{r}$

(D) $\frac{3\mu I}{8r}$

Answer:

268. The figure shows a straight wire placed beside a solenoid and the current of intensity 2A is passin through each of them. By using the data shown in the figure. The net magnetic flux density at the middl of the axis of the solenoid is ……..



(A) 1.25×10^{-3}T

(B) 12.56×10^{-3}T

(C) 35.47×10^{-3}T

(D) Zero

Answer:

269. A straight wire is placed vertically so that it is tangent to a circular coil consists of one turn. A free moving magnetic needle is placed in a horizontal plane at the center of the coil, when a current of intensity 0.12A passes through the circular coil, so the electric current intensity which passes through the wire and doesn't cause any deflection of the needle equals .....

(A) 0.377A

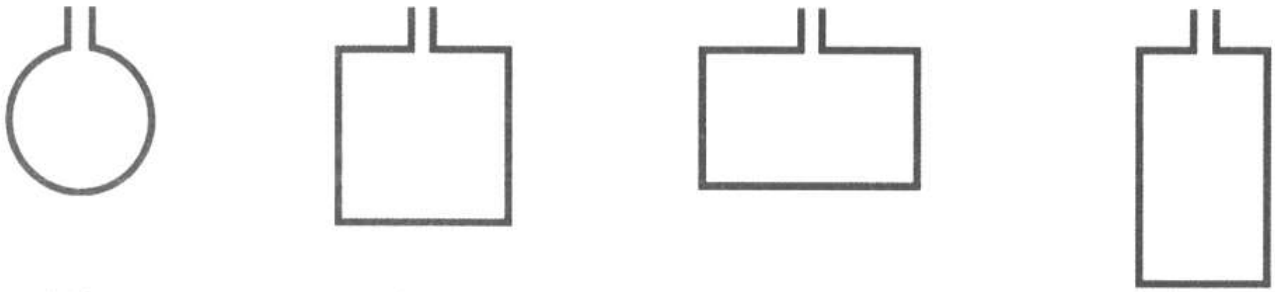
(B) 0.531A

(C) 0.98A

(D) 0.24A

Answer:

270. The figure shows four coils that are placed perpendicular in a magnetic field, the same electric current is passing through each of them. If you know that each coil made from a wire of length 40m. Which of the following coils is affected by the largest value of the torque?

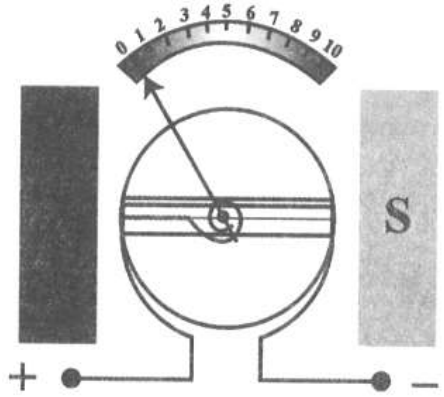


(A) (B) (C) (D)

Answer:

271.

The figure shows a galvanometer coil is placed between the two poles of the magnet, its poles are straight, so the magnetic flux density which affected on a coil when it used to measure the weak direct current .....



(A) increases.

(B) decreases.

(C) does not change.

(D) vanishes.

Answer:

272.

Galvanometer (X) consists of 200 turns and its resistance is 100Ω, galvanometer (Y) consists of 100 turns and its resistance 40Ω, and the other quantities are the same in each of them. In this case the ratio between $\frac{\text{Sensitivity of galvanometer (X)}}{\text{Sensitivity of galvanometer (Y)}} =$ .....

(A) $\frac{1}{2}$

(B) $\frac{2}{1}$

(C) $\frac{1}{5}$

(D) $\frac{5}{1}$

273.) Two galvanometers (X) and (Y), an electric current of intensity 3μA passes through galvanometer (X), while an electric current of intensity 6μA passes through galvanometer (Y) and they have the same angle of deflection, so the ratio $\frac{\text{Sensitivity of galvanometer (X)}}{\text{Sensitivity of galvanometer (Y)}} = \ldots\ldots\ldots\ldots$

(A) $\frac{1}{2}$

(B) $\frac{2}{1}$

(C) $\frac{1}{1}$

(D) $\frac{4}{1}$

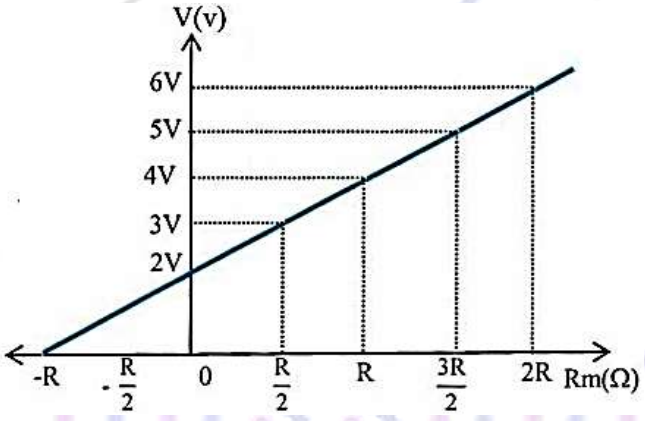
274. The given graph represents the relation between the maximum voltage measured by a voltmeter (V) and the resistance of the multiplier potential (Rm), from graph the galvanometer resistance is.....

(A) $\frac{R}{2}$

(B) **R**

(C) 1.5R

(D) 2R



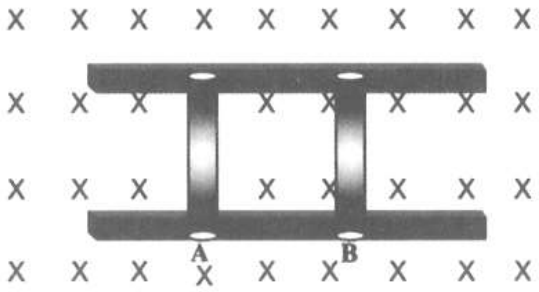
275. In the opposite figure, two rods (A) and (B) are movable on two parallel wires perpendicular to a uniform magnetic field. If the magnetic field decreases gradually, so the movement of the two (rods) are:

(A) Rod (A) moves to the right, and rod (B) moves to the left.

(B) Rod (A) moves to the left, and rod (B) moves to the right.

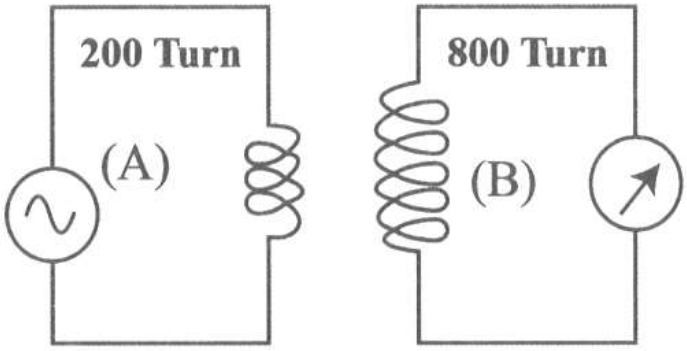
(C) Both rods (A) and (B) move to the right.

(D) Both rods (A) and (B) move to the left.



Answer:

276. In the opposite figure, an electric current of intensity 2A starts to pass in the coil (A) produces a flux of 2.5×10^{-4}wb through the coil (A) and a flux of 1.8×10^{-4}wb through the coil (B), so:



	The self-inductance of coil (A)	The average induced emf which generated in coil (B) when the current in coil (A) vanishes in 0.03s
(A)	0.015H	4.8V
(B)	0.025H	4.8V
(C)	0.015H	3.6V
(D)	0.025H	3.6V

277. An electric motor, the resistance of its coil is 4Ω is connected by DC source its emf 80V. If the intensity of the current required to operate the motor is 5A, so the current intensity at the moment of closing the key is ……., and the value of the resistance must be connected with the coil of the motor (at the start of the rotation then be taken off) to make the final current equal the initial one is …….

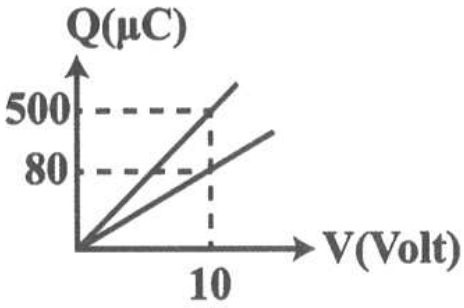
	The current intensity	The resistance
(A)	5A	16Ω
(B)	20A	16Ω
(C)	5A	12Ω
(D)	20A	12Ω

278. An induction coil is connected with a hot wire ammeter and AC source in series, what happened to the reading of the hot wire ammeter when:

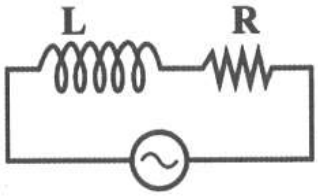
	Inserting iron core in the coil	Decreasing the source frequency	Cutting off quarter the coil and connecting the remaining part with same source
(A)	Increases	Decreases	Increases
(B)	Increases	Increases	Decreases
(C)	Decreases	Increases	Increases
(D)	Decreases	Increases	Decreases

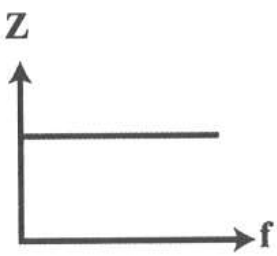
279. The opposite graph represents the relation between the potential difference and the total charge of two capacitors (A) & (B) are connected once in series and another in parallel as shown, so which of the following choices represents the values of the capacitance of each capacitor (A) & (B)?

	The capacitance of capacitor (A)	The capacitance of capacitor (B)
(A)	40μF	10μF
(B)	60μF	40μF
(C)	50μF	8μF
(D)	20μF	30μF

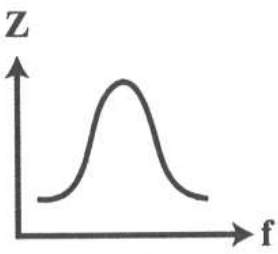


280.) Which of the following graphs represents the relation between the frequency of AC source and the impedance of the opposite electric circuit?

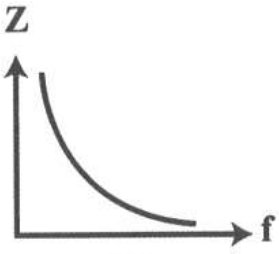




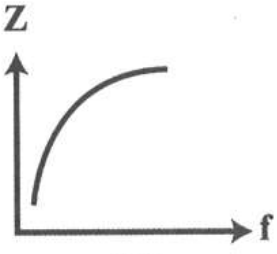
(A)



(B)



(C)



(D)

281. If we connect an electric lamp of (120V, 100W) with AC source of (240V, 50Hz) by one of th following methods:

a) With an ohmic resistance in series.

b) With a capacitor in series.

c) With an induction coil of resistance 10Ω in series.

So the value of each of the (ohmic resistance, capacitor capacitance, and coil inductance) are:

	Ohmic resistance	Capacitor capacitance	Coil inductance
(A)	576Ω	2.17×10^{-5}F	0.87H
(B)	576Ω	2.17×10^{-5}F	0.78H
(C)	144Ω	1.27×10^{-5}F	0.78H
(D)	144Ω	1.27×10^{-5}F	0.87H

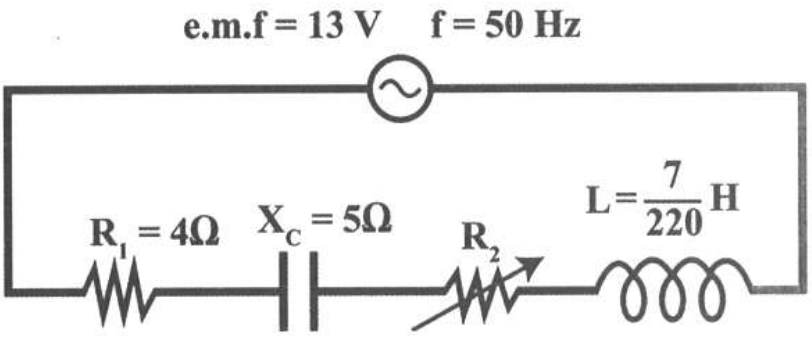
282. In the given circuit, the current passing through the coil is 1A, so the value of the variable resistance (R_2) equals .....

(A) 1Ω

(B) 9Ω

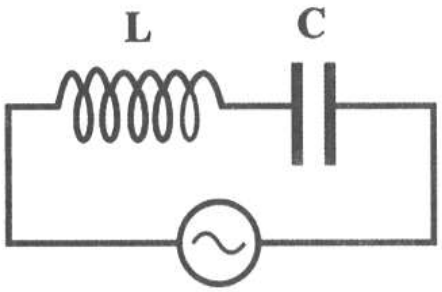
(C) 8Ω

(D) 10Ω



Answer:

283. In the opposite electric circuit represented in the figure, the total potential difference (V), the potential difference across the coil (V_L) and the potential difference across the capacitor (V_C), so the relation between their voltages is .....



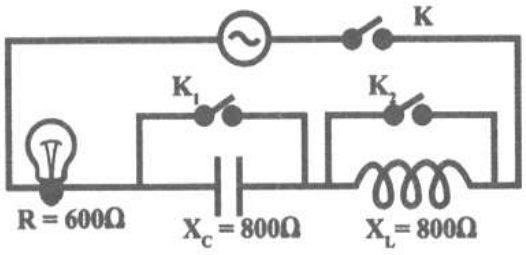
(A) $V < V_L + V_C$

(B) $V > V_L + V_C$

(C) $V = V_L + V_C$

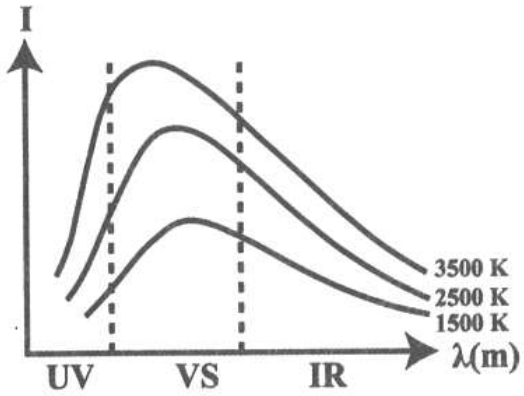
(D) $V = V_L = V_C$

284. The opposite electric circuit contains an AC source of emf 220V, a capacitor of capacitive reactance 800Ω, a coil of inductive reactance 800Ω and a bulb of ohmic resistance 600Ω are connected in series, so the value of the current intensity when:

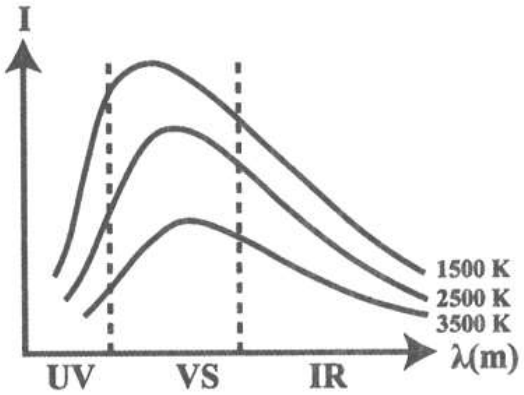


	The switch (K) is closed	The switches (K and K_1) are closed
(A)	0.37A	0.22A
(B)	0.37A	0.32A
(C)	0.45A	0.22A
(D)	0.45A	0.32A

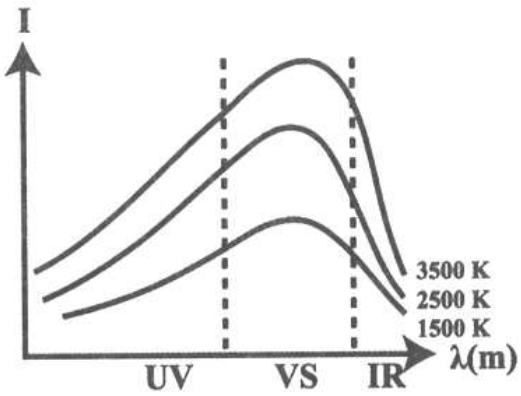
285. Which of the following graphs represents the correct relation between the radiation intensity and the wavelength of a blackbody at the different temperatures shown in graph?



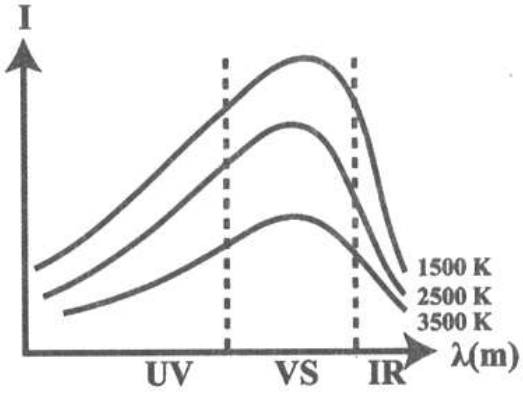
(A)



(B)



(C)



(D)

286. When ultraviolet rays of wavelength (λ & λ/2) incident on a metal surface, electrons are released with kinetic energy (1.8eV & 4eV) respectively, so what is the work function of the metal in (eV)?

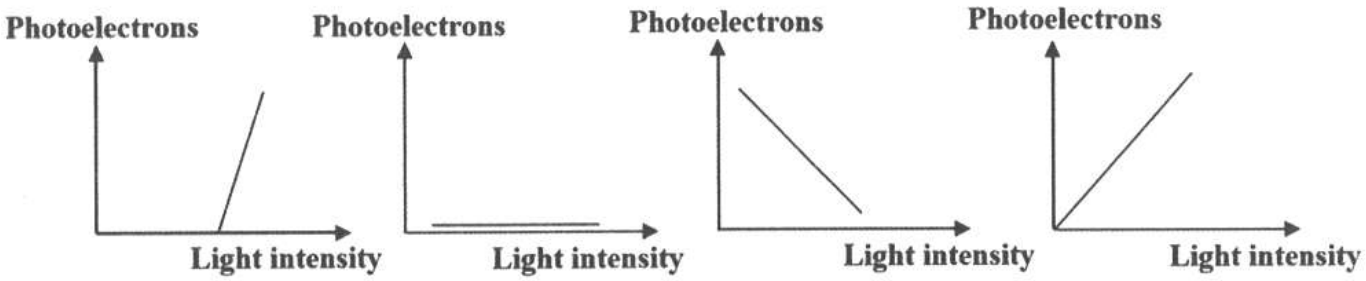
(A) 8eV

(B) 0.4eV

(C) 2.2eV

(D) 6.2eV

287.) In the photoelectric effect, if frequency of the incident light is greater than the critical frequency, which of the following graphs represents the relations between the photoelectrons and light intensity?



(A) (B) (C) (D)

288.) In photoelectric effect, the incident photon that has frequency greater than the critical frequency will:

(A) Totally disappear.

(B) Reflect from the metal with higher frequency.

(C) Reflect from the metal with lower frequency.

(D) Reflect from the metal with same frequency.

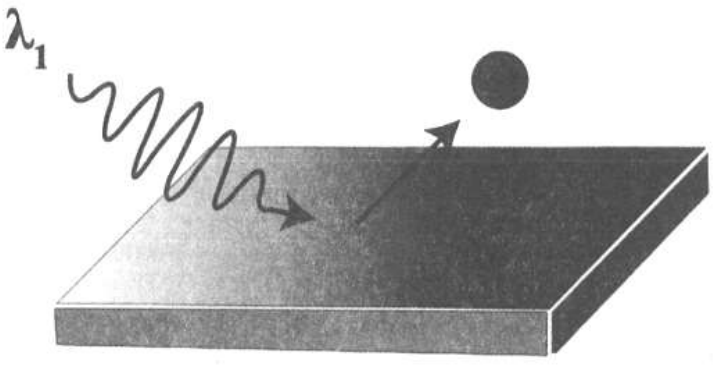
289. A photon of wavelength (λ_1) is incident on a metal surface with energy greater than the work function of the metal, when another photon of wavelength (λ_2) is incident on the same metal but with momentum 1.5 from the first one, so:

(A) $\lambda_2 = \frac{2\lambda_1}{3}$

(B) $\lambda_2 = \frac{3\lambda_1}{2}$

(C) $\lambda_2 = \frac{4\lambda_1}{9}$

(D) $\lambda_2 = \frac{9\lambda_1}{4}$



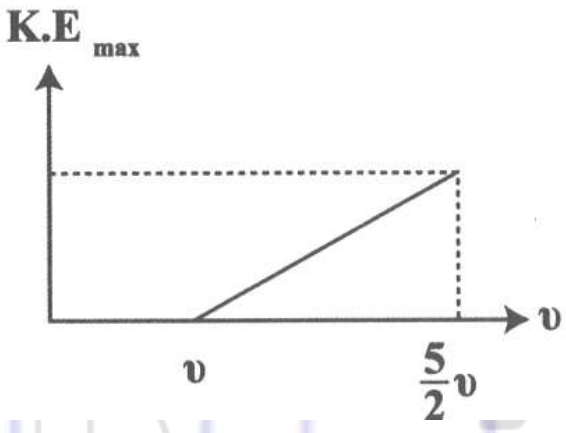
290. The opposite graph represents the relation between the maximum kinetic energy ($K.E_{max}$) of the emitted electrons from a metal surface of work function (E_W) in the phootolecetric effect and the frequency o the incident light (υ), when a light of frequncy $\left(\frac{5}{2}\upsilon\right)$ is incident, so the maximum kinetic energy equals:

(A) $\frac{5E_w}{2}$

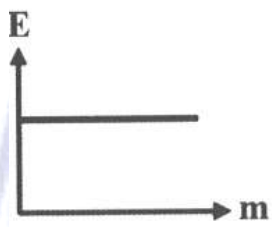
(B) $\frac{3E_w}{2}$

(C) E_w

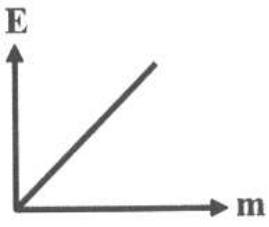
(D) $\frac{E_w}{2}$



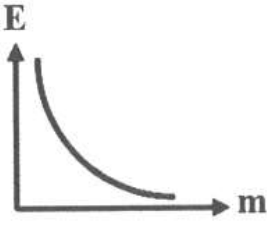
291. Which of the following graph represents the correct relation between the energy of a photon and its mass?



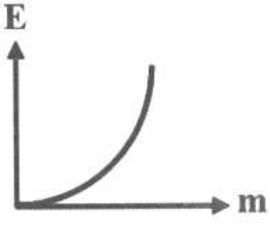
(A)



(B)



(C)



(D)

292. Monochromatic light incident of photon energy (5.8eV) on a metal surface which emits photoelectrons with maximum kinetic energy (1.2eV), using the table, the frequency of light's photons incident on the metal surface is .....

Metal	Sodium	Zinc	Potassium	Tungsten
E_w (eV)	2.36	2.65	2.28	4.6

	The frequency of light's photons incident on the metal surface	The name of the metal which photoelectrons emitted from its surface
(A)	1.4×10^{-15} Hz	Sodium
(B)	1.4×10^{15} Hz	Potassium
(C)	1.4×10^{-15} Hz	Tungsten
(D)	1.4×10^{15} Hz	Tungsten

293. The mass of a proton at rest is (m_o), when it moves with a velocity equals half the speed of light in space, so its linear momentum is calculated from the relation:

(A) $\frac{2m_oc}{\sqrt{3}}$

(B) $\frac{m_oc}{\sqrt{3}}$

(C) $\frac{m_oc}{2}$

(D) $\frac{3m_oc}{4}$

294. The wavelength associates to an electron equals 1835 times the wavelength of a proton, so the ratio between $\frac{\text{the velocity of the electron}}{\text{the velocity of the proton}} = ...$

Let: (Mass of proton = 1.6515×10^{-27}Kg & Mass of electron = 9×10^{-31}Kg)

(A) $\frac{1}{1}$

(B) $\frac{1}{2}$

(C) $\frac{2}{1}$

(D) $\frac{3}{1}$

295. Two beams of white light, one of them falls on gas (A) and the other on gas (B), the produced spectra from them are indicated as in the figure. **Then**:

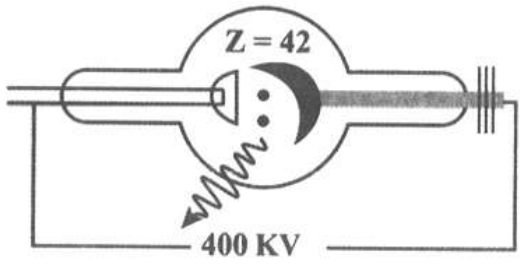
(A) (A) and (B) are same gas, but (A) is absorption and (B) is emission spectrums.

(B) (A) and (B) are different gases, but (A) is absorption and (B) is emission spectrums.

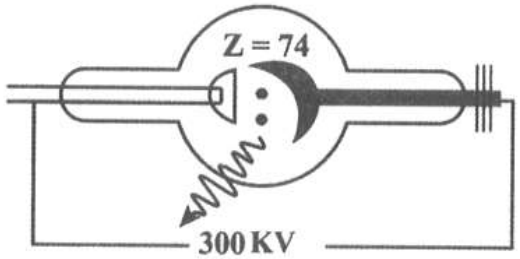
(C) (A) and (B) are same gas, but (A) is emission and (B) is absorption spectrums.

(D) (A) and (B) are different gases, but (A) is emission and (B) is absorption spectrums.

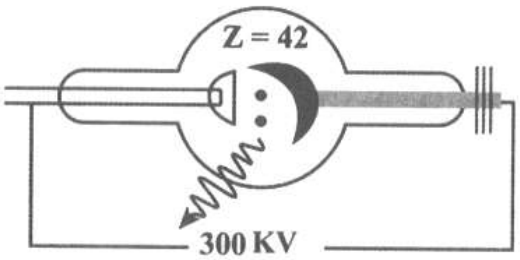
296. The following four figures represent diagrams for Coolidge tubes, differ in the target material and the used potential difference. From which of these tubes we can obtain maximum wavelength of the characteristic radiation and minimum wavelength of the continuous radiation?



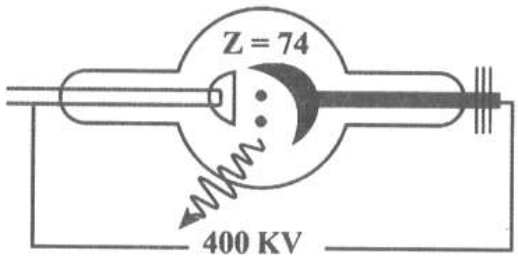
(A)



(B)



(C)



(D)

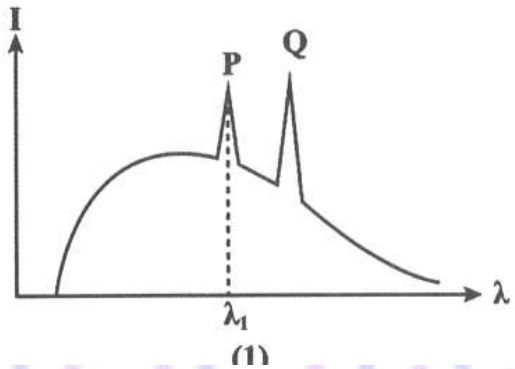
297. The following graph (1) represents the relation between the wavelength and the intensity of the x-rays in a Coolidge tube for producing x-rays, and on changing the atomic number for the target material and draw the relation between the atomic number (Z) and the wavelength (λ_1) .Which of the following lines in figure (2) is correct:

(A) A

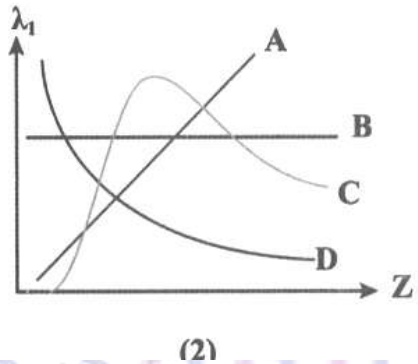
(B) B

(C) C

(D) D

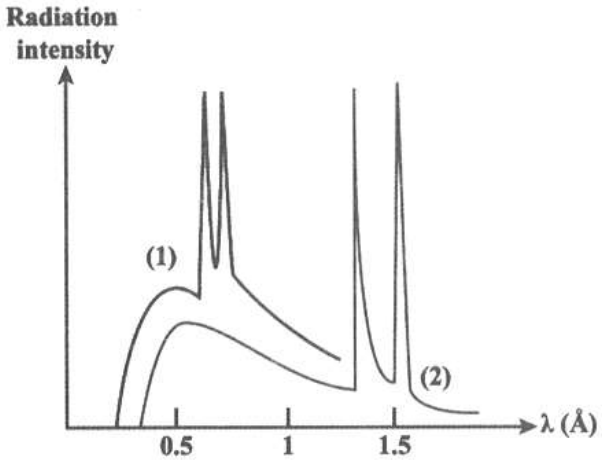


(1)



(2)

298.) On drawing relation of the radiation intensity and the wavelength for the X-rays radiation produced from two devices for x-rays production. The first works on potential difference (V_1) and the atomic number of the used target in it is (Z_1), while the second works on potential difference (V_2) and the atomic number of the used target in it is (Z_2), so:



(A) $(V_1 > V_2), (Z_1 > Z_2)$

(B) $(V_1 < V_2), (Z_2 > Z_1)$

(C) $(V_1 < V_2), (Z_1 > Z_2)$

(D) $(V_1 > V_2), (Z_2 > Z_1)$

Answer:

299. The ability of gamma and x-rays to penetrate the bodies is more than the ultraviolet rays, because the photons of gamma and x-rays:

(A) Have less energy.

(B) Have longer wavelengths.

(C) Have less frequencies.

(D) Have more energy.

300. A metallic mass is subjected to x-rays with different wavelengths. Which wavelength from the following has the highest penetration power?

(A) 2Å

(B) 4Å

(C) 6Å

(D) 8Å

301. The reason of the use of the x-rays in studying the structure of the crystals is:

(A) X-rays are monochromatic.

(B) X–rays have high power.

(C) Their wavelength is nearly equally to the spaces between the atoms in the crystals.

(D) Their wavelength is nearly equally to the dimensions of the nucleus of the atom.

302. The penetration power of the x-rays can be increased by:

(A) Increasing the applied potential difference on the tube.

(B) Decreasing the applied potential difference on the tube.

(C) Increasing the intensity of the cathode's filament.

(D) Decreasing the intensity of the cathode's filament.

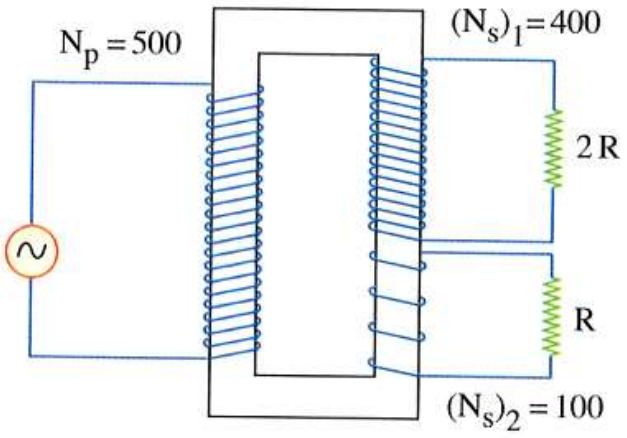
303. The opposite figure represents an ideal transformer having two secondary coils, so the ratio between the consumed power in the two secondary P_{s1}/p_{s2} coils equals.....

(A) 8/1

(B) 1/8

(C) 4/1

(D) 1/1



304. A hot-wire ammeter of resistance R shows a reading I, when its terminals are connected to an AC source of maximum voltage V_o and when its terminals get connected to a DC source, it gives the same reading I, so with neglecting the internal resistances of both sources, the value of the DC voltage equals……

(A) V_o

(B) $V_o/2$

(C) $0.707\ V_o$

(D) $1.22\ V_o$

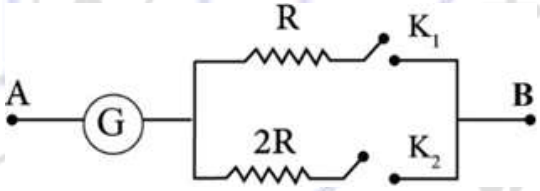
305. The figure shows a galvanometer that can be converted into a voltmeter when closing any of the switches (K_1) or (K_2). If the maximum potential difference measured by the voltmeter when closing switch K_1 only is V_1 and when closing switch K_2 only is V_2 so which of the following relations is correct?

(A) $V_2 < 2V_1$

(B) $V_1 = 2V_2$

(C) $V_2 = 2V_1$

(D) $V_2 > 2V_1$



306. For the electric circuit shown in figure (1), the graph of each of the two voltmeters readings (V_1 and V_2) versus the ammeter reading (A) is represented as in figure (2):

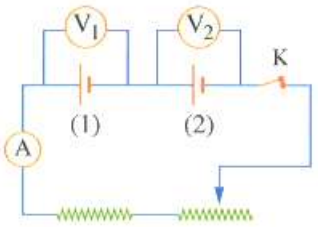


Figure (1)

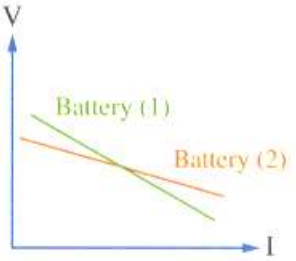
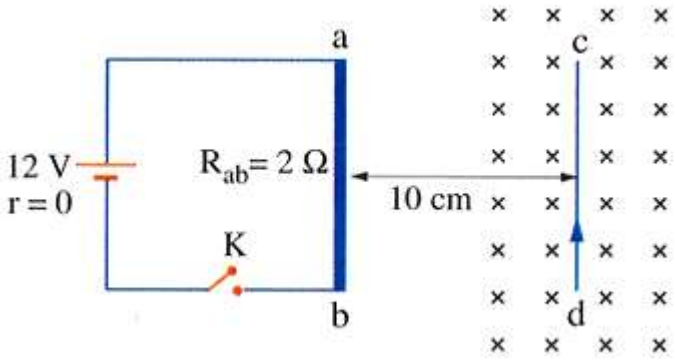


Figure (2)

So from the graph, we conclude that battery (2) compared to battery (1) has

	emf that is	internal resistance that is
(a)	higher	lower
(b)	lower	higher
(c)	higher	higher
(d)	lower	lower

307. A uniform magnetic flux of density 10^{-5} T is perpendicular to the plane of the page affecting a current-carrying wire (cd) that is positioned in the plane of the page parallel to and at a distance 10 cm from another wire (ab) that has the same length and connected in a circuit as shown in the opposite figure, so if switch K is closed, the magnetic force that affects the unit lengths of wire (cd) (Take: $\mu = 4\pi \times 10^{-7}$ Wb/A.m)



(A) increases and its direction doesn't change

(B) increases and its direction gets reversed

(C) decreases and its direction doesn't change

(D) decreases and its direction gets reversed

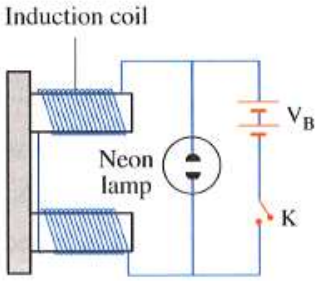
308. In the electric circuit illustrated in the opposite figure, the neon lamp glows because the induced emf in the induction coils will be…….

(A) forward at the moment of closing switch K

(B) forward at the moment of opening switch K

(C) backward at the moment of closing switch K

(D) backward at the moment of opening switch K



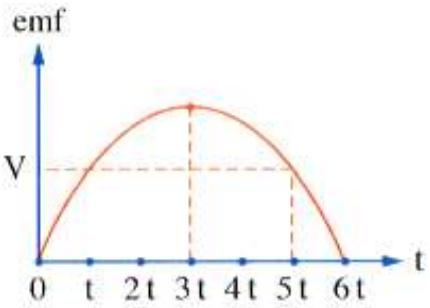
309. The opposite graph represents the change of the induced electromotive force in an AC dynamo coil during half a cycle, so the effective value of the electromotive force generated in the coil is equal to……

(A) V

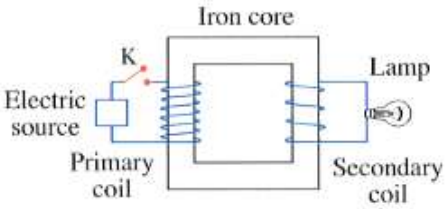
(B) 2V

(C) $\frac{V}{\sqrt{2}}$

(D) $\sqrt{2V}$



310. In the opposite figure, after closing switch K, it has been noticed that the electric lamp glows with a constant brightness, so the cause for the existence of the current that makes the electric lamp glows is……..



(A) the passage of the primary coil current to the secondary coil through the iron core

(B) connecting the primary coil to a direct current source

(C) the presence of a variable magnetic field in the iron core

(D) the conversion of the mechanical energy of the iron core atoms into an electric energy

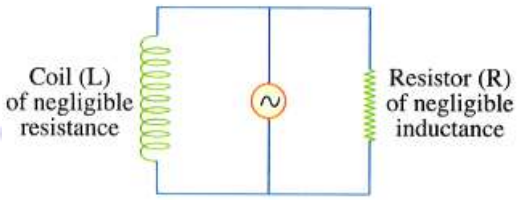
311. In the opposite AC circuit, at a given instant, the current intensities in each of the coil (L) and the resistor (R) are maximum values, then at the same instant, the voltages across each of them respectively are…..

(A) a maximum value and zero

(B) zero and a maximum value

(C) maximum values in both

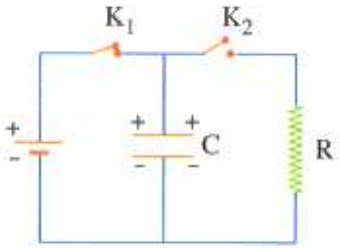
(D) zero in both

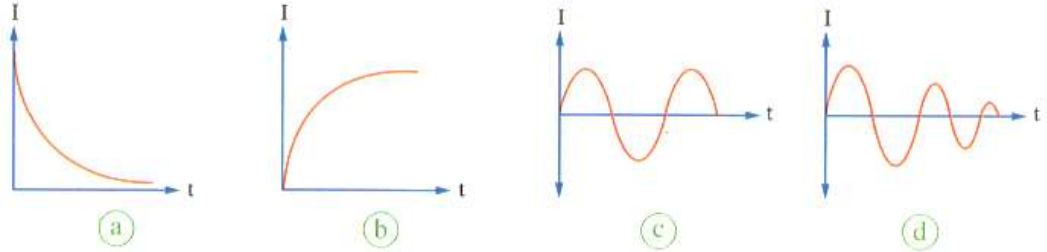


312. Three identical capacitors, the capacitance of each is C, are connected together then to an electric source so that the potential difference between the plates of each of them becomes V, so the total capacitance of the group of capacitors and the potential difference across them respectively are

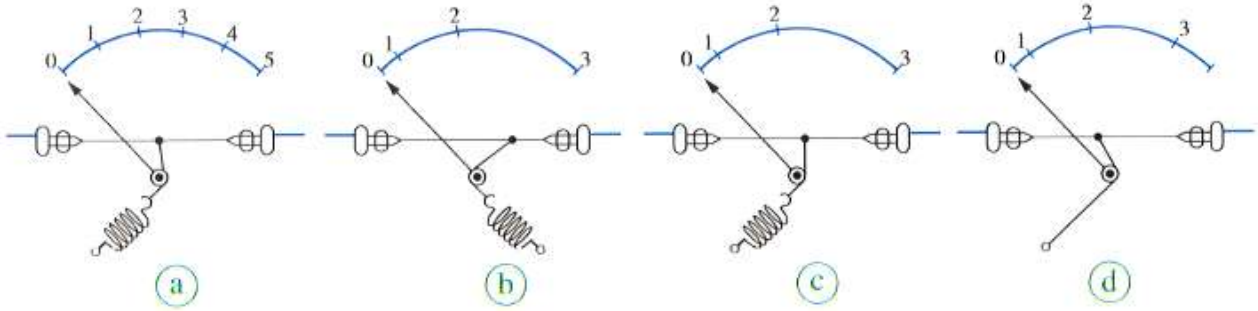
	Type of connections	The potential difference across them	The total capacitance of the group
A	Series	3V	3C
B	Parallel	V	3C
C	Parallel	V	C/3
D	Series	3V	C/3

313. In the opposite electric circuit, which of the following graphs represents the relation between the value of the electric current (I) through the non-inductive ohmic resistance (R) and the time (t) when switch (K_1) is opened, then switch (K_2) is closed?

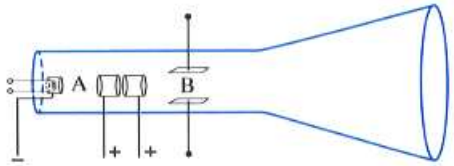




314. Which of the following diagrams illustrates the structure of a hot-wire ammeter whose pointer can give a correct reading for a direct current of 3 A when it passes through its hot-wire?



315. The opposite figure illustrates some parts of a cathode ray tube, where A and B represent two electric field regions, so what is the effect of each of them on the motion of the electrons emitted from the cathode?



	Field region A	Field region B
a	Accelerating electrons	Accelerating electrons
b	Changing the electrons direction	Changing the electrons direction
c	Changing the electrons direction	Accelerating electrons
d	Accelerating electrons	Changing the electrons direction

316. Which of the following statements correctly represents the order of the stages of digital transmission and reception?

(a) Physical message ⟶ Analog signal ⟶ Digital signal ⟶ Analog signal ⟶ Physical message.

(b) Physical message ⟶ Digital signal ⟶ Analog signal ⟶ Digital signal ⟶ Physical message.

(c) Analog signal ⟶ Physical message ⟶ Digital signal ⟶ Physical message ⟶ Analog signal.

(d) Digital signal ⟶ Analog signal ⟶ Physical message ⟶ Analog signal ⟶ Digital signal.

317. Each of the following figures represents two straight parallel wiresat a distance d apart carrying electric currents of equal intensities and in the same direction.

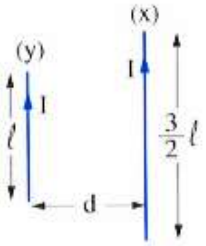


Figure (1)

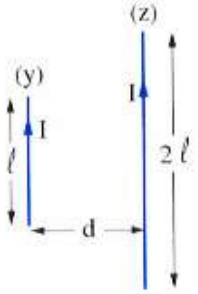


Figure (2)

Then, the ratio between the magnetic force that acts on wire (y) in both figures ($\frac{F_1}{F_2}$) equals…….

(A) $(\frac{3}{4})$

(B) $(\frac{4}{3})$

(C) $(\frac{3}{1})$

(D) $(\frac{1}{1})$

318. Suppose a collision between X-rays photon of wavelength λ_1 and a free static electron of mass m, if the wavelength of the photon after scattering becomes λ_2 so the speed (v) acquired by the electron is given by the relation……..

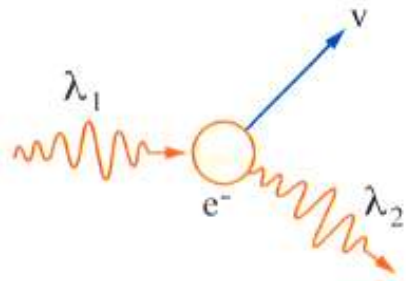
(Where: h is Planck's constant, c = speed of light in space)

(A) $V = \frac{2hc}{m_e}\sqrt{\frac{1}{\lambda_1} - \frac{1}{\lambda_2}}$

(B) $V = \frac{2hc}{m_e}\sqrt{\lambda_1 - \lambda_2}$

(C) $V = \sqrt{\frac{2hc}{m_e}(\frac{1}{\lambda_1} - \frac{1}{\lambda_2})}$

(D) $V = \sqrt{\frac{2hc}{m_e}(\lambda_1 - \lambda_2)}$



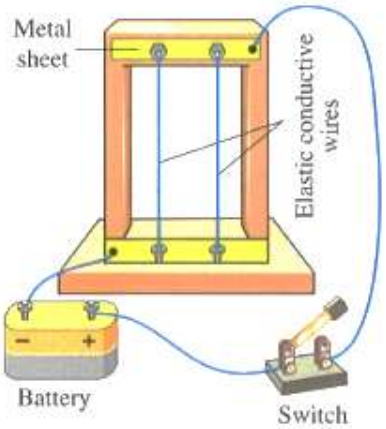
319. In the opposite experiment, when the switch is closed, the two wires

(A) repel each other

(B) attract each other

(C) move to the right

(D) move to the left



320. A straight wire that is perpendicular to the plane of the page carries an electric current of intensity I whose direction is into the page, the wire is placed in an external magnetic field, so if the magnetic force affecting the wire is parallel to the plane of the page upwards, the direction of the acting external magnetic field on the wire is

(A) parallel to the plane of the page to the right

(B) parallel to the plane of the page to the left

(C) perpendicular into the plane of the page

(D) perpendicular out of the plane of the page

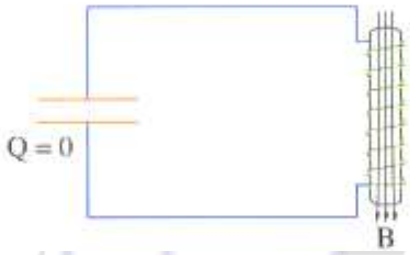
321. The opposite figure represents a resonant circuit at a certain moment. What happens to the intensity of the current passing in the circuit in the following moments and within quarter the periodic time of the current?

(A) Increases to the maximum value.

(B) Increases then decreases.

(C) Decreases till vanishes.

(D) Decreases then increases.



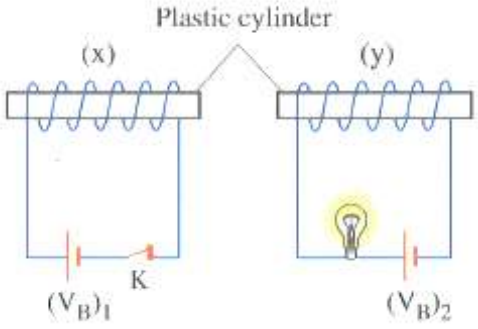
322. In the opposite figure, the brightness of the electric bulb increases when

(A) changing the plastic cylinder with another made of soft iron

(B) moving the two coils closer to each other

(C) displacing the turns of the coil (x) closer to each other

(D) opening switch K



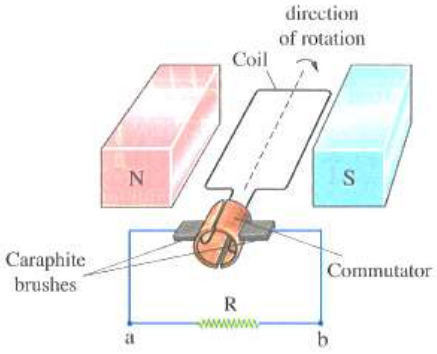
323. The opposite figure shows a dynamo during the rotation of its coil at a certain moment where a current of value I passes in resistor R, so the value and the direction of the current through resistor R after half a cycle from that moment are

(A) I, from a to b

(B) I, from b to a

(C) 0.707 I, from b to a

(D) zero



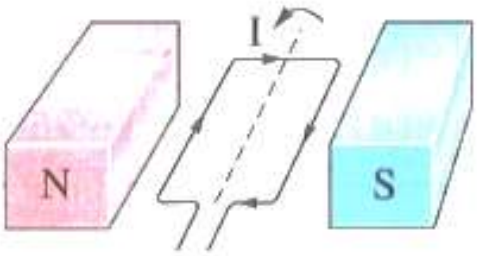
324. A rectangular coil is carrying a constant current during its rotation from the position shown in the opposite figure by an angle of 90°, so the magnitudes of the magnetic dipole moment and the magnetic torque acting on it respectively

(A) doesn't change, decreases

(B) doesn't change, increases

(C) increases, decreases

(D) decreases, increases



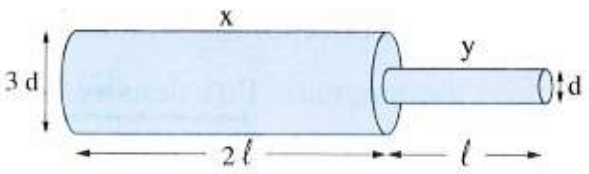
325. A metal wire consists of two parts x and y, each has a uniform cross-section and dimensions as shown in the opposite figure. If the total resistance of the wire is 44 Ω, then the resistance of part y equals……

(A) 8 Ω

(B) 17.6 Ω

(C) 36 Ω

(D) 26.4 Ω



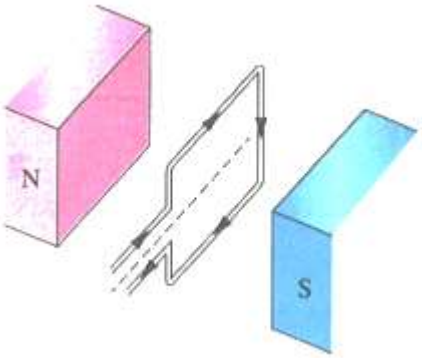
326. In the opposite figure, a rectangular coil carries an electric current, so the magnitudes of the magnetic flux through the coil and the magnetic torque affecting it respectively, when its plan is perpendicular to the magnetic field, are…….

(A) maximum value, zero

(B) zero, maximum value

(C) maximum value, maximum value

(D) zero, zero



327. A step-down electric transformer is ideal. The ratio between the number of turns of its coil is 10:1. Its primary coil is connected to an AC electric generator that gives an effective electromotive force of 220 V with a frequency of 50 Hz. If the rotation rate of the generator coil increases to 60 Hz, the output voltage from the secondary coil of the transformer will

(A) increase by a value of 4.4 V

(B) decrease by a value of 4.4 V

(C) increase by a value of 44 V

(D) remains unchanged

328. An electron beam passes through a certain section in a cathode ray tube at a rate of 7.2 x 10^{20} electrons per minute. Given that the charge of the electron equals 1.6 x 10^{-19} C, so the current intensity and its conventional direction for the beam are

(A) 1.92 A, towards the screen

(B) 1.92 A, towards the cathode

(C) 7.5 A, towards the screen

(D) 7.5 A, towards the cathode

329. The wavelength in angstroms associated with an electron that has been accelerated by a potential difference of magnitude V equals

(Note: m_e = 9.1 x 10^{-31} kg, e = 1.6 x 10^{-19} C, h = 6.625 x 10^{-34}J.s)

(A) $\frac{12.28}{\sqrt{V}}$

(B) $\frac{1.6}{\sqrt{V}}$

(C) 12.28 $\sqrt{V}$

(D) 1.6 $\sqrt{V}$