

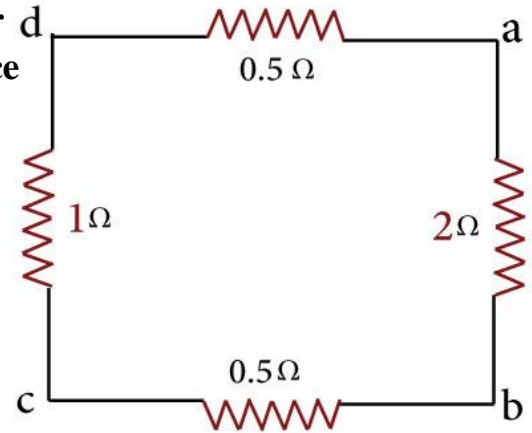


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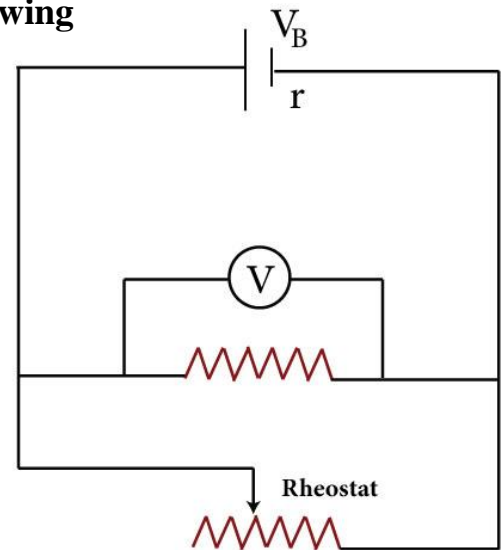
1- Four electric resistances as in the figure, the pointer of ohmmeter reads the same reading when the device is connected between the two points:

- A. "c" and "b" or "b" and "d"
- B. "a" and "c" or "a" and "d"
- C. "a" and "c" or "b" and "d"
- D. "a" and "d" or "c" and "d"



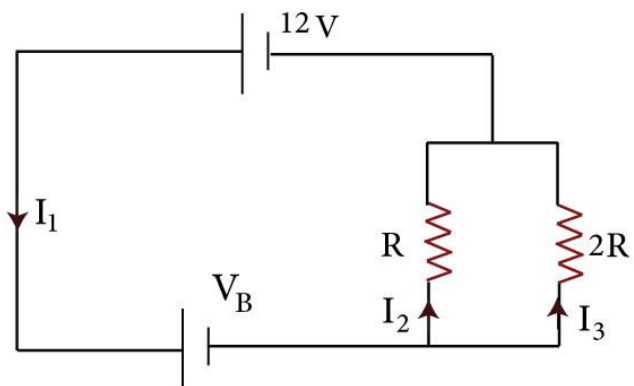
2- According to the opposite circuit, which of the following represents what will happen to the reading of the voltmeter by changing the value of resistance which is taken from rheostat?

	The value of the resistance taken from the rheostat	The reading of the voltmeter
A	decreases	decreases
B	decreases	increases
C	increases	decreases
D	increases	doesn't change



3- As in the shown circuit, which of the following is correct with respect to the value of V_B , I_1 and I_2 ?

	V_B	I_1	I_2
A	6 V	2 A	1 A
B	18 V	3 A	1 A
C	18 V	1 A	2 A
D	6 V	3 A	2 A

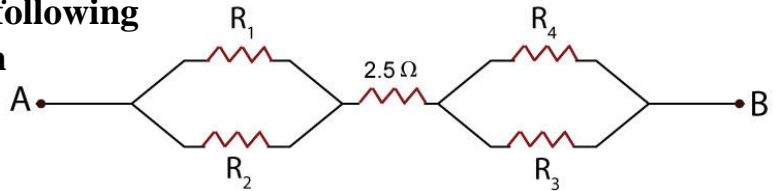




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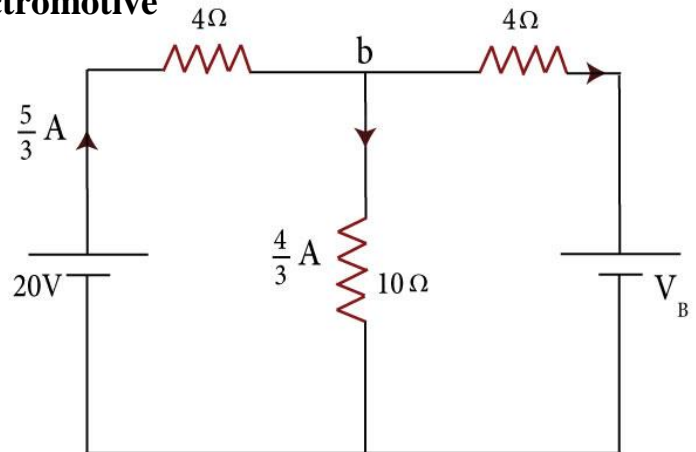
4- In the opposite figure ,which of the following choices makes the resistance between “A” and “B” equals 5Ω ?



The choice	R_1	R_2	R_3	R_4
A	2	9	8	2.5
B	1	9	2	8
C	1	2	8	9
D	8	1	9	2

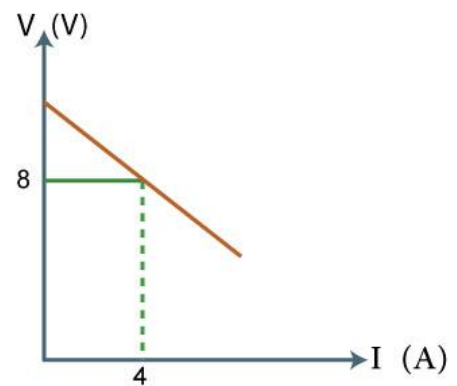
5- In the illustrated electric circuit, the electromotive force of the battery V_B is

- A- $\frac{36}{3}$ v
- B- $\frac{4}{3}$ v
- C- $\frac{40}{3}$ v
- D- $\frac{44}{3}$ v



6- The opposite graph shows the relation between the terminal voltage of a battery (V) that has an internal resistance 0.5Ω connected with a closed electric circuit and the current intensity (I) that passes through it then, the value of the electromotive force of the battery is

- A- 8 v
- B- 10 v
- C- 9 v
- D- 12 v



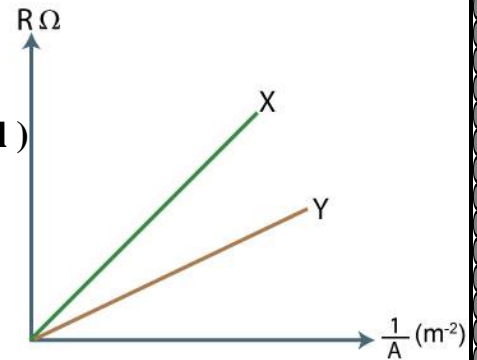


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7- The opposite graph represents the relation between the resistance (R) of two groups of wires “X” and “Y” (each group is made of a different material) and the reciprocal of cross-sectional area ($\frac{1}{A}$) at the same temperature. Given that the length of each wire is 1m. Which of the following choices is correct?



	According to the resistivity	According to the cross-sectional area
A.	$\rho_X > \rho_Y$	$A_X > A_Y$
B.	$\rho_X < \rho_Y$	$A_X > A_Y$
C.	$\rho_X > \rho_Y$	$A_X < A_Y$
D.	$\rho_X < \rho_Y$	$A_X = A_Y$

8- Two parallel long wires (X) and (Y) the normal distance between them is 0.5 m , the two wires carrying currents pass in the same direction , the value of the current in wire X is (I) and that of wire Y is (3I), so that the position of the neutral point is at a distance

- A. 0.125 m from wire Y
- B. 0.25 m from wire Y
- C. 0.125 m from wire X
- D. 0.625 m from wire X

9- A solenoid of length 20cm consists of 100 turns and its radius is 0.1 m carries a current of 4.9 A. Knowing that the permeability of the medium inside the coil is ($\frac{88}{7} \times 10^{-7}$) wb/A.m, the magnetic flux lines that penetrate the face of the coil equals

..... Given that : $\pi = \frac{22}{7}$

- A- 6.66×10^{-6} Wb
- B- 30.8×10^{-4} Wb
- C- 6.66×10^{-3} Wb
- D- 9.68×10^{-5} Wb



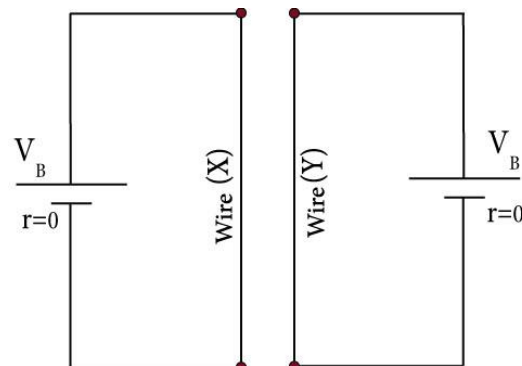
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10- A solenoid made of insulated copper wire carrying an electric current (I), and the magnetic flux density along its axis is (B), If the turns are displaced uniformly away from each other, So the magnetic flux density along its axis is decreased to ($\frac{B}{4}$). If we have to increase the current intensity by $3A$ to return the value of magnetic flux density to its initial value (B), then the current intensity (I) is

- A. $1A$
- B. $2A$
- C. $3A$
- D. $4A$

11- Two long parallel wires X and Y , each of them is connected to a battery of negligible internal resistance, the mutual force between them is (F). When wire X is replaced by another one of same length and radius but the resistivity of its material is $\frac{1}{4}$ of that of wire X so, the mutual force between the two wires becomes



- A. $2F$
- B. F
- C. $4F$
- D. $\frac{F}{4}$

12- A rectangular coil made of insulated wire, its dimensions are $0.1m$ and $0.05m$, consists of 50 turns, can rotate in a magnetic flux of 10^{-3} wb perpendicularly to the coil plane, around an axis in the same plane of its surface that is parallel to its length. If a current of $2A$ passes through the coil so, the value of the magnetic torque acting on the coil equal to

- A- 0.1 N.m
- B- zero
- C- $5 \times 10^{-4} \text{ N.m}$
- D- $2 \times 10^{-3} \text{ N.m}$



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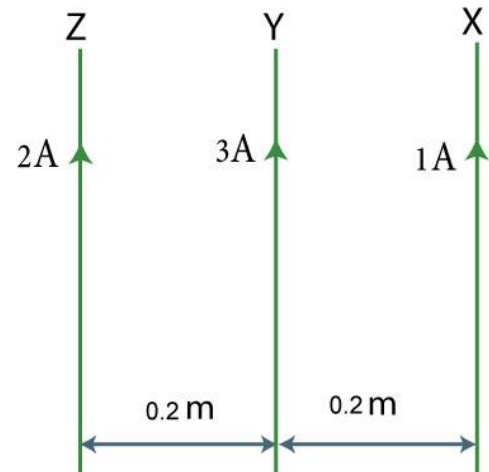


13- A voltmeter the resistance of its coil is 40Ω , reaches its full-scale deflection when a current of intensity $0.1A$ passing through it. Then the value of the multiplier resistance of the device that makes the maximum potential difference reaches $100V$ between its two ends is

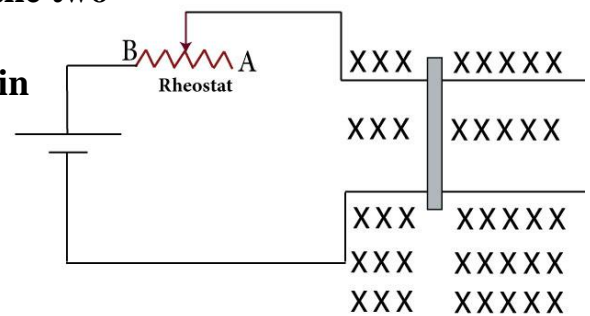
- A- 25Ω
- B- 2.5Ω
- C- 960Ω
- D- 1040Ω

14- From the data in the figure, which of the following choices represents the correct arrangement of magnetic forces per unit length acting on each wire ?

- A- $F_y < F_x < F_z$
- B- $F_z < F_y < F_x$
- C- $F_x < F_y < F_z$
- D- $F_y < F_z < F_x$



15- A cylindrical metallic rod (L) ,slides on two copper sheets fixed in same plane of the page , the two sheets are connected to a battery and a rheostat where the rod and sheets are placed in a uniform magnetic field of flux lines perpendicular to the plane of the page as in figure, Which of the following represents what happens to the rod L on moving the slider of the rheostat towards point B:



- A. Force (F) decreases and rod moved away from the battery.
- B. Force (F) increases and rod moved away from the battery.
- C. Force (F) increases and rod moved towards the battery.
- D. Force (F) decreases and rod moved towards the battery.

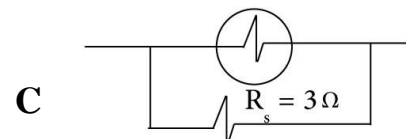
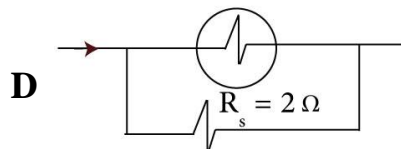
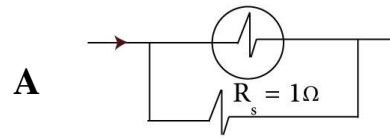
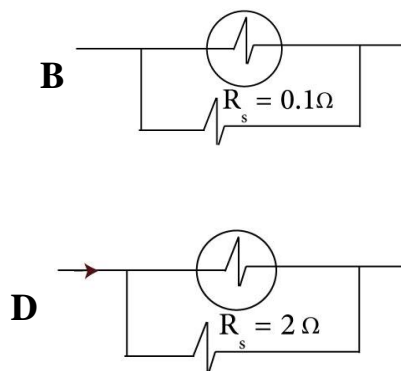
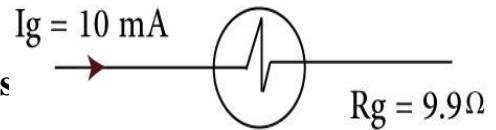


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16- The figure represents a sensitive galvanometer.

Which of the following figures correctly represents the modification to the galvanometer to become capable of measuring a maximum current of 1A?



17- Ohmmeter of internal resistance 3000Ω its pointer deflects by an angle (θ) when its terminals are connected together and when it is connected with resistance R_1 the pointer deflects by an angle ($\frac{\theta}{3}$) and by replacing R_1 by another resistance R_2 the pointer deflects by an angle ($\frac{\theta}{4}$) so the value of R_1 and R_2 equal.....

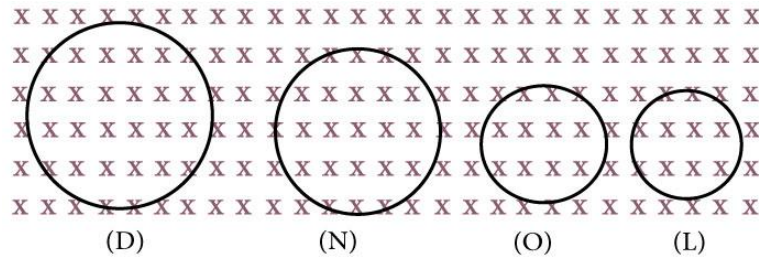
The choice	R ₁	R ₂
a	9000 Ω	3000 Ω
b	6000Ω	12000 Ω
c	3000 Ω	12000 Ω
d	6000 Ω	9000 Ω



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18- Four Copper rings of different radii all lie in the plane of the page and are exposed to a uniform magnetic field as in the figure. If the magnetic field vanishes at the same moment, which of the rings will have the greatest induced e.m.f ?



- A- D
- B- L
- C- O
- D- N

19- A Copper wire of length (L) connected to a galvanometer. If the wire is moved with velocity (V) perpendicular to an electric field of magnetic flux density (B), the pointer of the galvanometer deflects momentarily with an angle θ . and when the velocity of the wire is increased to (2V) and the flux density is increased to (2B), then the pointer of the galvanometer will deflect momentarily with an angle equals.....

- A. 2θ
- B. 4θ
- C. 6θ
- D. θ

20- A wire of length 0.2m is moved with velocity 2m/s in a direction makes an angle 30° with magnetic flux lines of density 0.4 T so, the instantaneous induced electromotive is

- A- 0.16 v
- B- 0.32 v
- C- 0.08 v
- D- 0.24 v

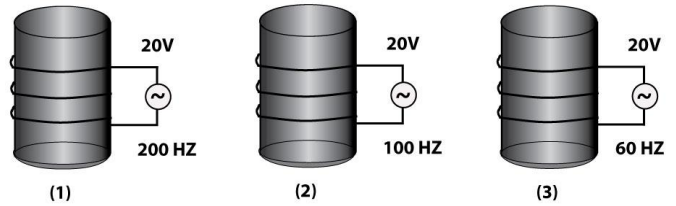


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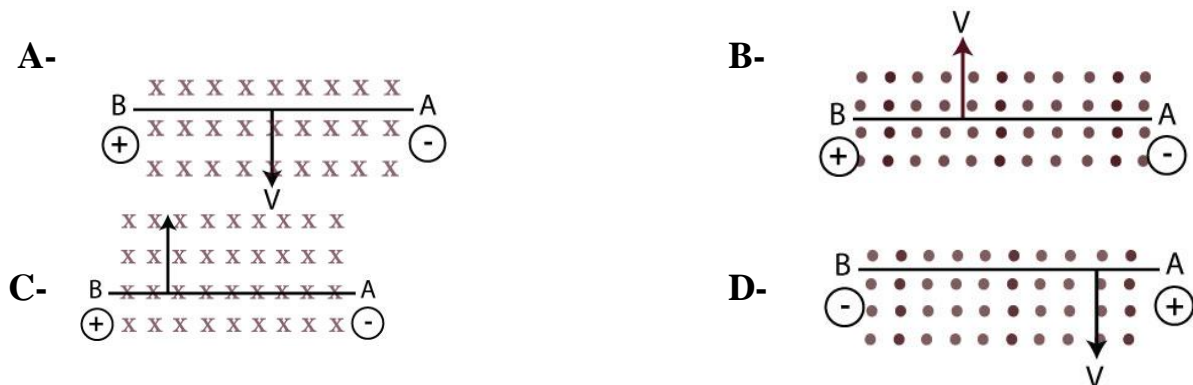


21- The figure shows three identical metallic blocks inside three identical coils, if an alternating current with the same voltage (but with different frequencies) passes through the three coils for the same time, then the temperature of the three blocks increased, which of the following choices is correct concerning the temperature (T) of the three blocks



- A. $T_1 > T_2 > T_3$
- B. $T_2 > T_1 > T_3$
- C. $T_2 > T_3 > T_1$
- D. $T_3 > T_1 > T_2$

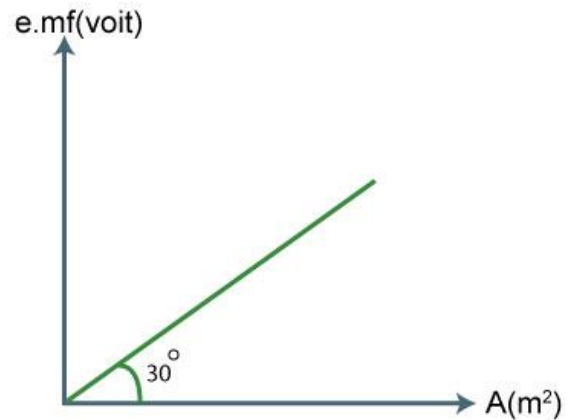
22- A copper wire AB of length (L) is placed in the same plane of the page, and then it is moved perpendicular to a uniform magnetic field, which of the following figures correctly represents the polarity of the wire terminals?



23- An alternating current dynamo ($N = 300$), the area of the face of its coil is 0.02 m^2 rotates with a rate of 1400 cycle /minute in a field of magnetic flux density 0.01 T so the instantaneous induced electromotive force in the coil when the coil plane makes angle 60° with the direction of magnetic field is

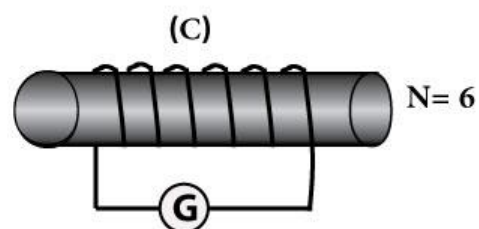
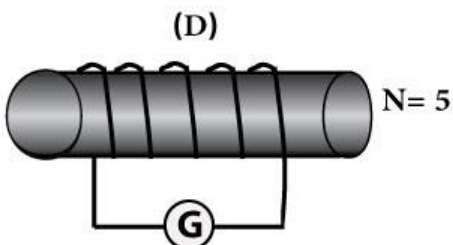
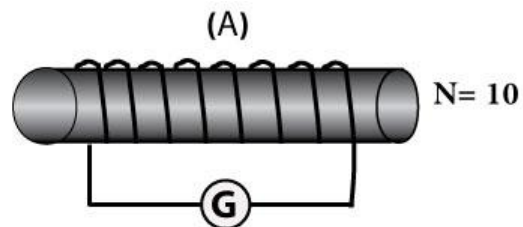
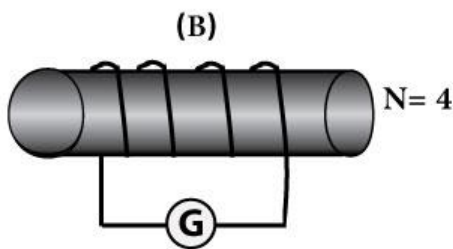
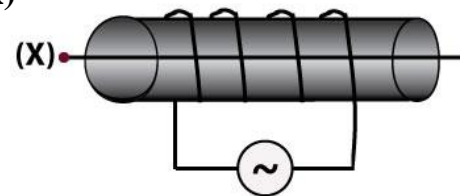
- A- 8.8 v
- B- 4.4 v
- C- 7.62 v
- D- 2.2 v

24- A group of coils of different areas , the number of turns of each coil is 100 turns, are exposed to a variable magnetic flux at the same time. The following graph represents the relation between the average induced electromotive force in each coil and the area so the rate of change in magnetic flux density is



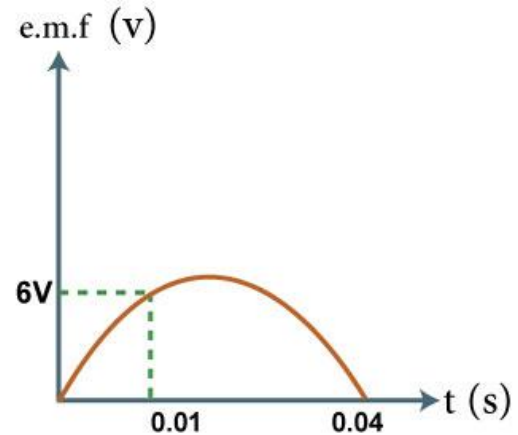
- A- $0.577 \times 10^{-3} T/S$
- B- $57.7 \times 10^{-3} T/S$
- C- $577 \times 10^{-3} T/S$
- D- $5.77 \times 10^{-3} T/S$

25- The figure represents a coil connected with an alternating current source . Which of the following coils when it is placed at point (X) (So that the axes of the two coils are at the same Line) the pointer of the galvanometer deflects With a higher angle? (Knowing that the permeability of all coils is the same.)



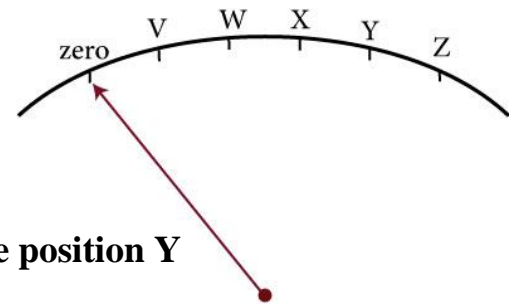
26- The graph illustrates the relation between the induced electromotive force of dynamo coil and the time , the effective value of induced electromotive force is

- A. 6 v
- B. $6\sqrt{2}$ v
- C. 12 v
- D. $12\sqrt{2}$ v



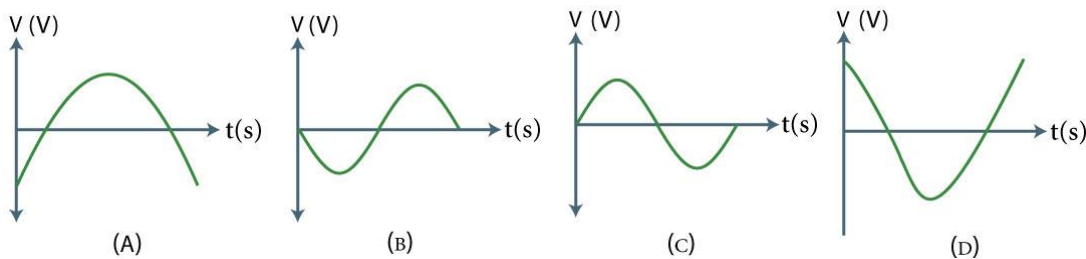
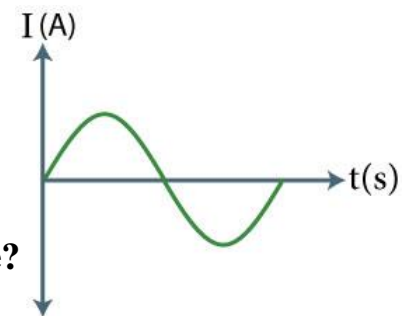
27- The figure illustrates the scale of a hot wire ammeter where the spaces between the positions marked on the scale are equal.

When a current of intensity (I) passes through the wire of the device, the pointer deflects to the position V. Which of the following choices represent the current intensity passing through the wire of the device when the pointer deflects to the position Y



- A. 2I
- B. 3I
- C. 4I
- D. 5I

28- The graph illustrates the relation between the change in the current intensity (I) and the time (t) in an alternating current circuit contains a capacitor . Which of the following graphs represent the change of voltage across the two plates of the capacitor at same time?

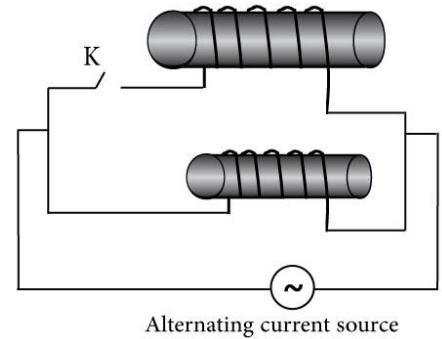




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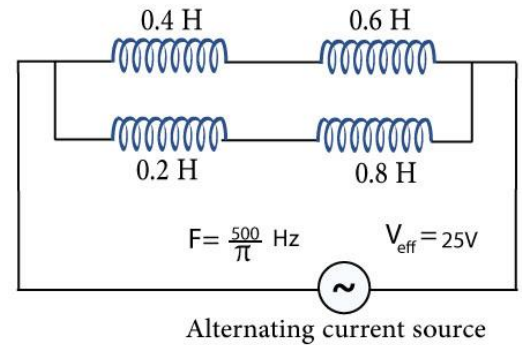


29- The circuit shows two induction coils of negligible ohmic resistance connected to an alternating current source. When the key (K) is closed the phase angle between the voltage and the current is



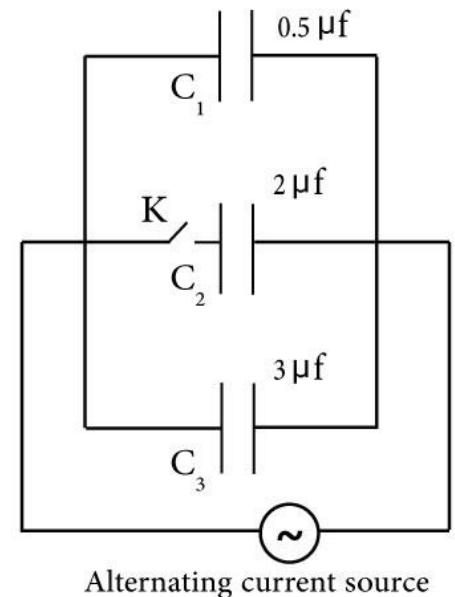
- A. 180°
- B. 90°
- C. 45°
- D. Zero

30- According to the shown electric circuit , the effective value of the alternating current in the circuit is



- A- 0.05 mA
- B- 0.5 mA
- C- 5 mA
- D- 50 mA

31- From the opposite electric circuit, the ratio between the total capacitance of capacitors before closing the key (K) and after closing it equals



- A- $\frac{7}{11}$
- B- $\frac{11}{7}$
- C- $\frac{6}{1}$
- D- $\frac{1}{6}$



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32- Resonant circuit of frequency 2×10^{14} Hz has a capacitor of capacitance (C) farad and a coil of self-induction (L) Henry, if the capacitance is increased to (9C) farad and self-induction of the coil decreases to $(\frac{L}{9})$ Henry, then the resonate frequency will

- A-increases three times
- B-remains constant
- C-increases 9 times
- D-decreases to third

33- When a photon of Gamma ray collides with a free electron. Which of the following is the correct?

The choice	Linear momentum of the scattered photon	Wavelength of the scattered photon
a	Decreases	Constant
b	Increases	Decreases
c	Decreases	Increases
d	Increases	Increases

34- Two photons (X) and (Y) propagate in air, the frequency of (X) is more than that of (Y). Which of the following choices is correct?

- A- The velocity of photon X is less than that of Y
- B- The energy of photon X is less than that of Y
- C- The wavelength of photon X is more than that of Y
- D- The momentum of photon X is more than that of Y



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35- If the wavelength of red light is the greatest wavelength in the visible light, which of the following choices is correct?

- A. The frequency of the photons in red light is the greatest in visible light.
- B. The energy of the photons in red light is the greatest in visible light.
- C. The momentum of the photons in red light is the smallest in visible light.
- D. The speed of photons in red light in air is greater than that of visible light.

36- If the work function $E_{W(C)} > E_{W(B)} > E_{W(A)}$ where A,B and C are three different metals, the same light falls on the surface of these metals so that the photo electrons are released, Which of the following choices represent the arrangement of the kinetic energy for the photo electrons?

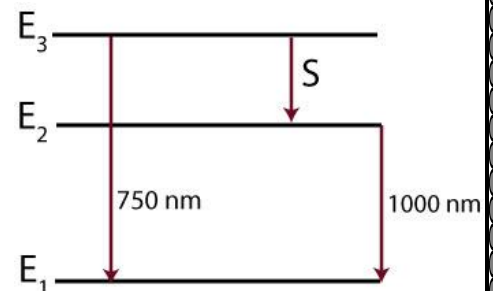
- A. $K.E._B < K.E._A < K.E._C$
- B. $K.E._C < K.E._B < K.E._A$
- C. $K.E._A < K.E._C < K.E._B$
- D. $K.E._C < K.E._A < K.E._B$

37- The resolving power of the electron microscope is high because

- A. The electrons have high kinetic energy and a short wavelength associated to its motion.
- B. The electrons have high kinetic energy and long wavelength associated to its motion.
- C. The electrons have low kinetic energy and short wavelength associated to its motion.
- D. The electrons have low kinetic energy and long wavelength associated to its motion.

38- The figure illustrates an excited atom that produces wavelengths due to the transition of an electron from a higher energy level to a lower energy level then the wavelength (S) equals

- A. 2250 nm
- B. 1500 nm
- C. 3000 nm
- D. 450 nm



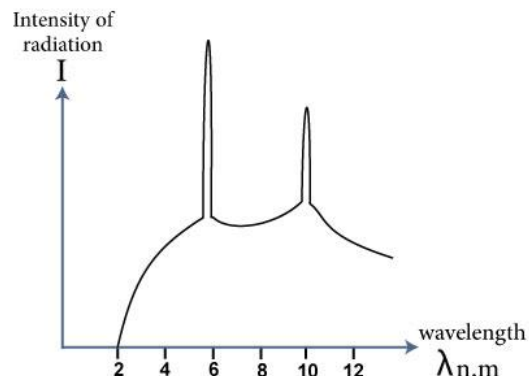


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39- The smallest characteristic wavelength of X-Rays from the figure equals.....

- A- 8 n.m
- B- 12 n.m
- C- 4 n.m
- D- 6 n.m



40- The number of coherent photons that emitted from Neon atoms in He – Ne laser increases due to.....

- A. The electric discharge inside the quartz tube.
- B. The ratio between Helium atoms to Neon atoms in the active medium.
- C. The multiple reflections inside the resonate cavity.
- D. The presence of the semi-transparent mirror in the resonate cavity.

41- On replacing one of the two mirrors in a laser device by a transparent glass piece and switching on the device so that.....

- A. The laser beam comes out from the side of transparent glass piece.
- B. The laser beam comes out from the side of the mirror.
- C. No laser beam will produce from the device.
- D. The laser beam comes out from the two sides of the device.

42- Two sources, one of them is a normal light source emits monochromatic blue light and the second emits laser beam in red spectrum region. Which of the following sentences is the correct?

- A. The photon energy of laser beam is greater and the intensity is higher.
- B. The photon energy of normal light is greater and the intensity is lower.
- C. The photon energy of normal light is lower and the intensity is higher.
- D. The photon energy of laser beam is greater and the intensity is lower.

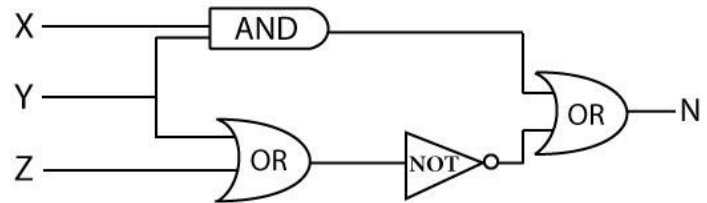


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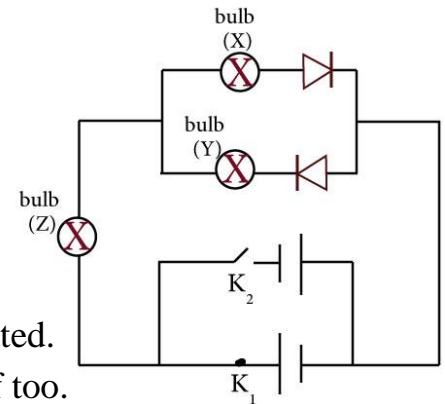
43- In the illustrated circuit of logic gates.

Which of the following choices gives an output for $N = 0$?



The choice	X	Y	Z
A	0	1	0
B	1	1	0
C	0	0	0
D	0	1	1

44- The figure illustrates an electric circuit that contains three bulbs X, Y and Z are connected as in the figure , when k_1 is opened and K_2 is closed. Which of the following choices represent the correct change in the lightning of bulbs?



- A. The bulb (y) illuminates and the bulb(X) remains illuminated.
- B. The bulb (X) switched off and the bulb (Z) is switched off too.
- C. The bulb (Y) not illuminates and the bulb (Z) is switched off.
- D. The bulb (X) is switched off and the bulb (Z) remains illuminated.

45- If the base current in (n p n) transistor is $6\mu\text{A}$ and ($\alpha_c = 0.95$) then the current of the emitter and the collector respectively are.....

The choice	I_E	I_C
A	$120\mu\text{A}$	$114\mu\text{A}$
B	$114\mu\text{A}$	$120\mu\text{A}$
C	$11.4\mu\text{A}$	$12\mu\text{A}$
D	$240\mu\text{A}$	$242\mu\text{A}$



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46- The figure represents four identical silicon sheets have the same dimensions (the temperature of each one and the type of the impurity and its concentration if it exists is recorded).

Arrange them according to the electric conductivity from higher to lower

- a) $A > B > C > D$
- b) $C > D > B > A$
- c) $D = C = B > A$
- d) $C = D > B > A$

A	B
pure 290 K	pure 300 K
C	D
B 10^{14} Cm^{-3} 300 K	As 10^{12} Cm^{-3} 300 K

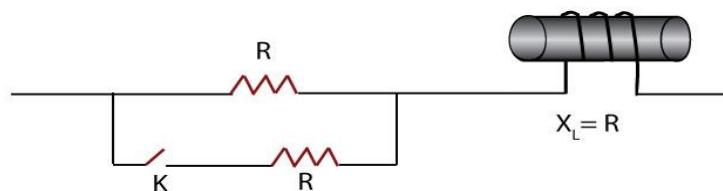
47- Ideal electric transformer its primary coil is connected with A.C supply of 120V and its secondary coil is connected with an electric lamp which works on 12V and power 60 watt . Calculate the current intensity in both of the primary and secondary coil of the transformer.

48- The figure represents a part of electric circuit which connected with an alternating current source

What will happen for the phase angle

between the total voltage and the total current at closing key (K) ?

Explain your answer.



49- When a light falls on metallic surface electrons will be emitted. What will happen for the work function and the kinetic energy of the emitted electrons by using a light has a higher frequency on falling on the same metal surface?

50- The following graph represents the relation between the intensity of radiation (I) and the wavelength (λ) of X- rays emitted from Coolidge tube.

Calculate :

- 1) Maximum energy of emitted photons.**
- 2) Energy of one of emitted photon for line**

X- ray spectrum ($h= 6.625 \times 10^{-34}$ J.S. , $C = 3 \times 10^8$ m/s)

