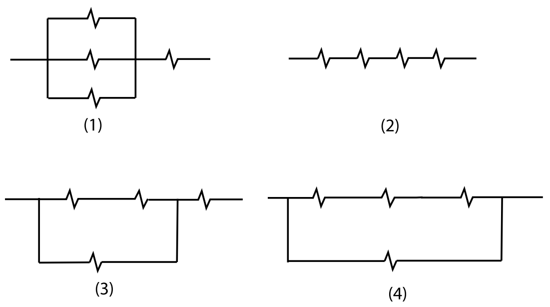
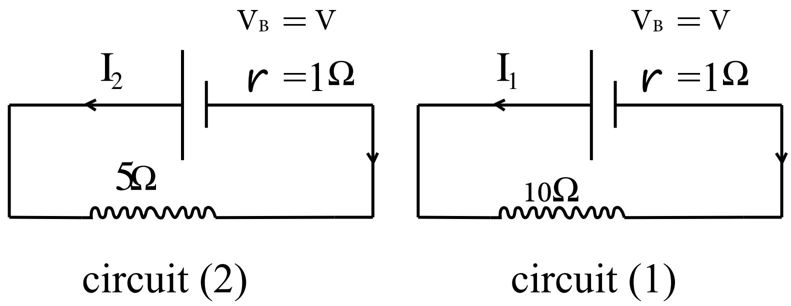
1



Four equal resistors are connected together as in figures, so, the correct arrangement for the figures from the highest equivalent resistance to the least one is….

- **4<1<3<2**
- **1<2<3<4**
- **4<3<2<1**
- **1<4<2<3**

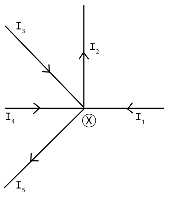
2



In the figure, Then, the ratio : $\frac{I_1}{I_2}$ =............

- $\frac{6}{11}$
- $\frac{1}{2}$
- $\frac{5}{12}$
- $\frac{4}{9}$

3

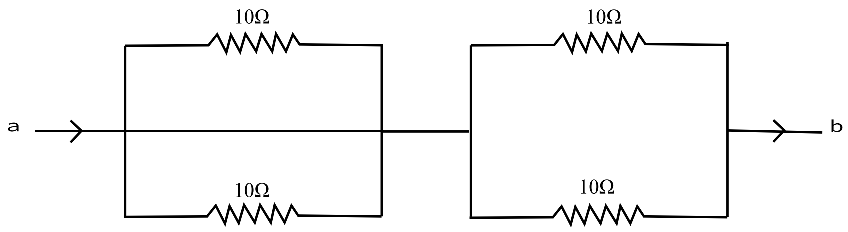


In the opposite figure .If the shown directions represent the motion of the electrons ,so

We can apply Kirchhoff's 1st law at the point (X) as follow ………………

- $-I_1 - I_3 - I_4 + I_2 + I_5 = 0$
- $I_1 + I_3 + I_4 + I_2 + I_5 = 0$
- $-I_1 - I_3 + I_4 + I_2 + I_5 = 0$
- $I_1 + I_3 + I_4 - I_2 + I_5 = 0$

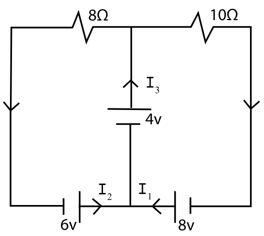
4



In the electric circuit shown, the equivalent resistance between points (a , b) equals ……….

- 5Ω
- 10Ω
- 20Ω
- 40Ω

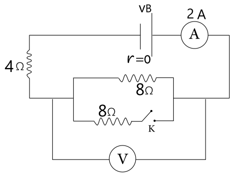
5



In the circuit shown, the value of electric current (I_3) is….

- **2.45A**
- **1.25A**
- **1.2A**
- **2A**

6



In the electric circuit. When the key (K) is closed, the voltmeter reading becomes …………..

- **12V**
- **8V**
- **6V**
- **4V**

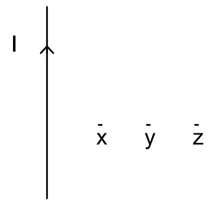
7

A current of (I) intensity passes in a conductor of (L) length and its cross-sectional area = (3A), when the same battery is used with a different conductor of the same material as the first one, it was found that a current of

(3 I) passes in it, this is due to

- **The second conductor is of length (2L) and its cross-section area = (18 A)**
- The second conductor is of length (3L) and its cross-section area = (3 A)
- The second conductor is of length (18L) and its cross-section area = (2 A)
- The second conductor is of length($\frac{1}{2}$ L) and its cross-section area = ($\frac{1}{3}$ A)

8

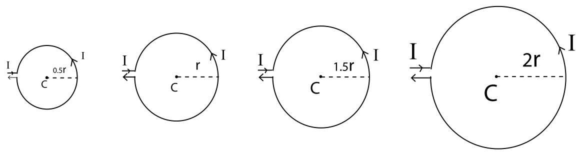


A long straight wire carrying electric current of intensity (I) as in the figure.

Which one from the following expressions represents correctly the magnetic flux density (B) that is produced at points x,y,z due to the passing current through the wire ?

- $B_x > B_y$
- $B_y < B_z$
- $B_z > B_x$
- $B_z > B_y$

9



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

Four metallic circular rings of different radii and same current intensity pass in each of them as in the figure.

So, the smallest magnetic flux density is generated at the center of the ring ……….

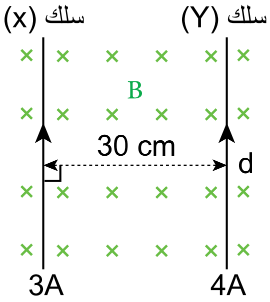
- **A**
- **B**
- **C**
- **D**

10

A straight wire was wounded in the form of a circular coil of (N) number of turns, and a current of (I) intensity passes in it, If it is reformed so that the number of turns is $\frac{N}{4}$ and the same current intensity passes through it, so the magnetic flux density at its center becomes ……… of its value

- $\frac{1}{16}$
- **16 times**
- **4 times**
- $\frac{1}{4}$

11



The figure shows two parallel wires (X) and (Y) , the normal distance between them is 30 cm , carrying electric currents of intensities (3A) and (4A) respectively and are affected by external magnetic field of flux density (B) as shown in the figure. If the resultant magnetic force per unit length of the wire (X) is $2x10^{-5}$ N/m.Then, the value of (B) equals ....

($\mu=4\pi \times 10^{-7}$ T.m/A)

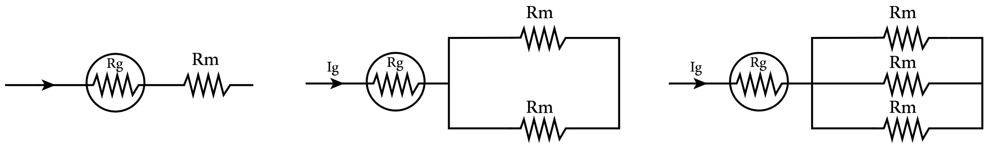
- 9.33×10^{-6} T
- 4×10^{-6} T
- 2.67×10^{-6} T
- 6.67×10^{-6} T

12

An electric current passes through a rectangular coil its plane is parallel to the direction of a magnetic field of   flux density =2 T and magnetic dipole moment of coil =0.3A.m^2 so the magnetic torque acting on the coil ……………………

- **0.6 N.m**
- **0.06 N.m**
- **0.015 N.m**
- **0.15 N.m**

13

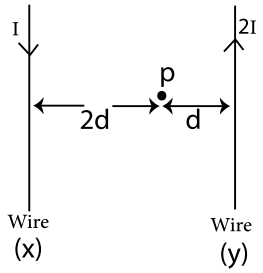


Voltmeter(A) Voltmeter(B) Voltmeter(C)

A galvanometer of coil resistance (R_g) was connected to a multiplier to convert it to a Voltmeter (A, B, or C) so. The correct arrangement for the maximum reading ($V_{A,}$ V_B and V_C)

- $V_A > V_B > V_C$
- $V_B < V_A < V_C$
- $V_B > V_C > V_A$
- $V_A < V_C < V_B$

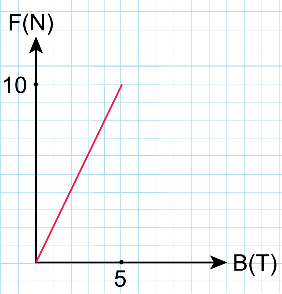
14



In the shown figure, the resultant magnetic flux density at point (P) due to the two electric currents that are passing through the two wires(X) and((Y) is (B_t) . When the direction of the passing current through wire (X) is reversed keeping the current of (Y) as it is so, the resultant magnetic flux density at point (P) becomes …………

- $\frac{3}{5}B_t$
- $\frac{2}{3}B_t$
- $\frac{3}{7}B_t$
- $\frac{3}{8}B_t$

15

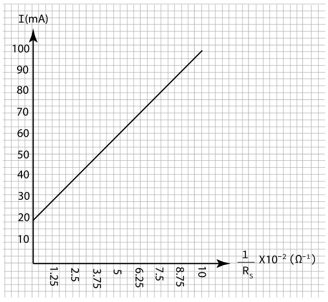


The graph represents the relation between the magnetic force (F) acting on a current carrying wire placed perpendicular to a magnetic field of density (B) and the magnetic flux density for different magnetic fields.

So, the magnetic force acting on the wire when the magnetic flux density equals (3T) is .... Newton.

- **6**
- **4**
- $\frac{1}{2}$
- **2**

16



The graph represents the relation between maximum current intensity measured by an ammeter and the reciprocal of its shunt resistor, so the potential difference between the shunt terminals =..........

- **0.8V**
- **1 V**
- **1.2 V**
- **0.1 V**

17

An Ohmmeter contains a galvanometer of full-scale deflection when a current Ig passes in it, when an external resistor 12 KΩ is connected to its test terminals, the passing current becomes $\frac{1}{5}$ Ig, if a resistor of 1.5 KΩ is connected to the test terminals, so the passing current becomes …………

- $\frac{2}{3} I_g$
- $\frac{1}{8} I_g$
- $\frac{1}{5} I_g$
- $\frac{3}{4} I_g$

18

A magnetic flux, its density is changed by a constant rate is acting normally to a circular coil.

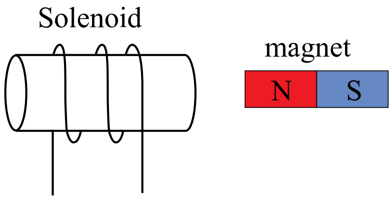
An induced electro motive force (E) is produced in the coil.

If the number of turns of the coil increased to double and its area decreased to half.

So, the induced electro motive force equals …….

- **E**
- 4**E**
- $\frac{1}{2}$**E**
- $\frac{1}{4}$**E**

19



A student conducts the following steps by using the tools shown in the figure.

Step (I): moving the magnet towards the stationary solenoid.

Step (II): moving both the solenoid and the magnet with the same velocity and in the same direction.

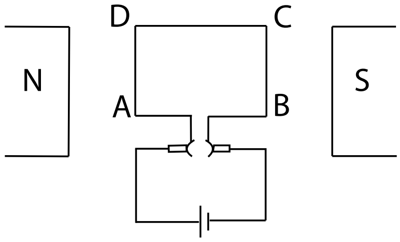
Step (III): moving both the solenoid and the magnet with the same speed but in two opposite directions.

Which of the above steps does not produce an induced electromotive force in the coil?

- **Step (II) only.**
- **Step (I) only.**
- **Step (III) only.**
- **All steps.**

20

The figure illustrates the structure of a simple electric motor. When the coil rotates from the parallel



position. So, the force acting on the wire (AD) ………..

- **Remains maximum**
- **Remains zero.**
- **Increases from zero to maximum value.**
- **Decreases from maximum value to zero.**

21

A straight wire of unit length moves perpendicular to a magnetic field of flux density (0.4 T), so an induced e.m.f. of (0.2 V) generates between its terminals, so the velocity of the wire was …….

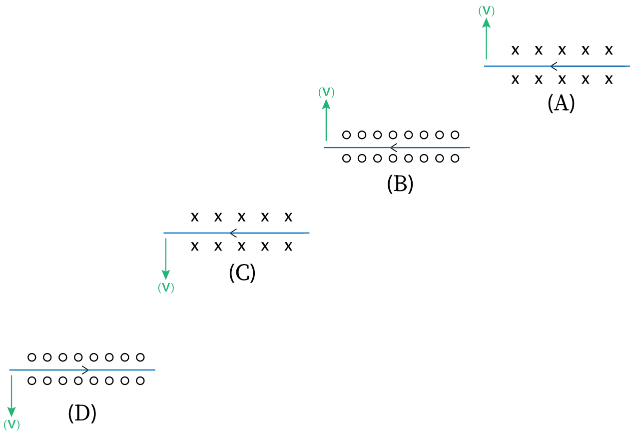
- **0.5m/s**
- **1m/s**
- **2m/s**
- **1.5m/s**

22

The following figures represent straight wires (A),(B),(C),(D)

Each one moves at velocity (V) in uniform magnetic field

Which figure represents the correct direction of the induced current ?



- **A**
- **B**
- **C**
- **D**

23

A simple electric generator, it lights an electric bulb of power 60 W and its resistance 30 Ω. The maximum electric current intensity passing in the bulb equals ....

- **2A**
- $\sqrt{2A}$
- **1A**
- **0.5A**

24

An ideal step up transformer, the ratio between the number of its turns is $\frac{3}{2}$. Its secondary coil is connected to a device which works on a potential difference 300V

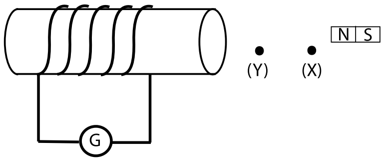
Which choice of the following expresses the value of (V_s) and $\frac{P_{w(s)}}{P_{w(p)}}$ is correct ?……

	V_P	$\frac{P_{w(s)}}{P_{w(p)}}$
A	200	$\frac{2}{3}$
B	450	$\frac{3}{2}$
C	200	$\frac{1}{1}$
D	450	$\frac{1}{1}$

- **A**
- **B**
- **C**
- **D**

25

The figure illustrates an experiment, when the magnet is moved towards the coil with velocity (v) from point (X) to point (Y), the pointer of galvanometer was deflected 2 divisions to the right of its scale.

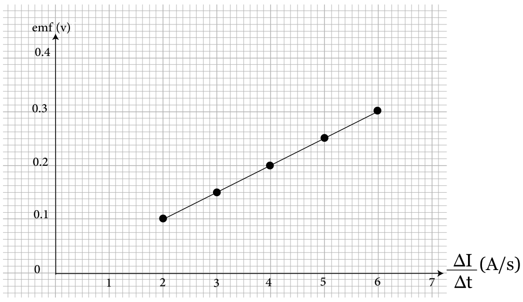


If the experiment repeated such as the south pole of the magnet is faced to the coil, and is moved towards the coil with velocity (2v) from point (X) to point (Y).

So, the pointer of galvanometer deflects with …………

- **4 divisions to the left.**
- **4 divisions to the right.**
- **2 divisions to the left.**
- **2 divisions to the right.**

26

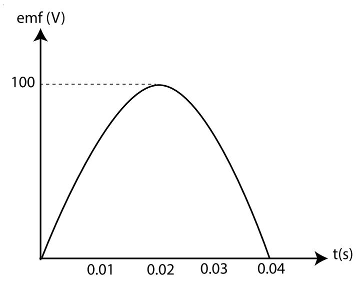


The graph represents the relation between the induced electro motive force (e m f) in the secondary coil and the rate of change of the electric current intensity in the adjacent primary coil $\frac{\Delta I}{\Delta t}$

So, the mutual inductance between the two coils is ……….

- **0.05 mH**
- **50 mH**
- **0.04 mH**
- **40 mH**

27



The graph represents the relation between the induced electromotive force (e.m.f) in the dynamo and time (t) through half cycle,

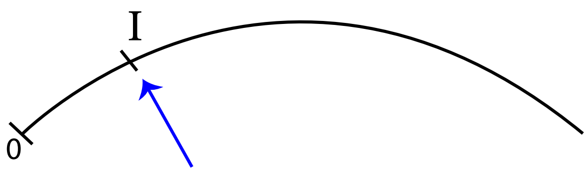
so the average electromotive force generated in the dynamo's coil during interval time from t=0 into t=$\frac{1}{75}$ *sec* **....... volt**

($\pi = 3.14$).

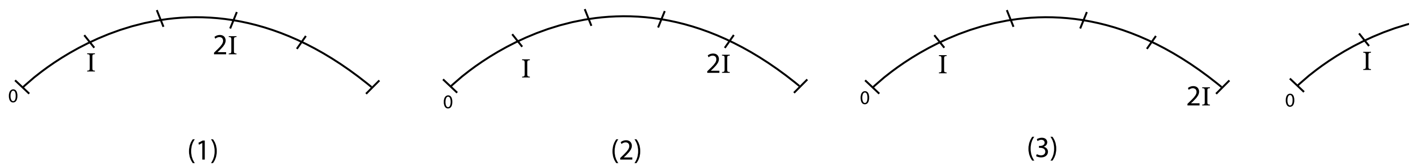
- **47.77**
- **63.69**
- **21.23**
- **86.60**

28

During the calibration of the hot wire ammeter scale, the opposite figure represented the position of the pointer of the hot wire ammeter when the effective value of A.C current equals(I)

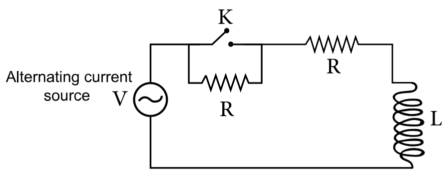


Which one of the following figures represents the correct position of the pointer of the hot wire ammeter when the value of effective current becomes (2I)



- **2**
- **1**
- **3**
- **4**

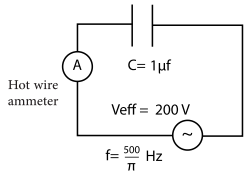
29



The figure illustrates an alternating current circuit:On closing the key (K) the phase angle between the total voltage (V) and the current (I) ……………

- **Increases**
- **Decreases**
- **Doesn’t change**
- **Becomes zero**

30



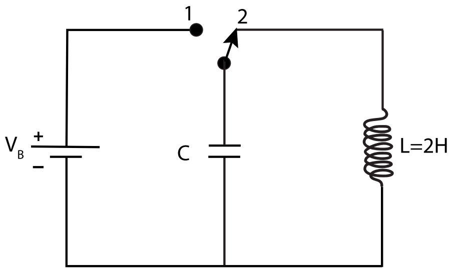
From the opposite figure which represents an electric circuit that contains a hot wire ammeter and an AC source and a capacitor, so the reading of the hot wire ammeter equals ….

(By knowing that the resistance of the Hot wire ammeter is neglected)

- **0.2A**
- **2A**
- **0.02A**
- **20A**

31

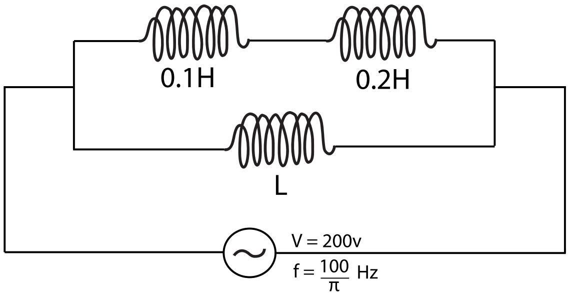
The shown oscillatory circuit contains an inductor of inductance (L=2H),so the capacitance of capacitor (c) that required to obtain a current of frequency 80Hz equals...............



- 1.98 μF
- 1.98×10^{-6} μF
- 1.58×10^{-4} μF
- 1.58 μF

32

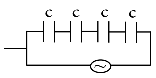
Three inductors of negligible Ohmic resistance were connected together as in figure ,if the effective value of the passing current in the circuit was 5A, neglecting the mutual induction between the coils.



Then, the value of the inductance (L) = …….

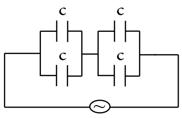
- **0.6 H**
- **0.4 H**
- **0.3 H**
- **1 H**

33



$f_1 = f$

Figure (1)



$f_2 = 2f$

Figure (2)

In the two electric circuits, if the capacitance of each capacitor is (C).

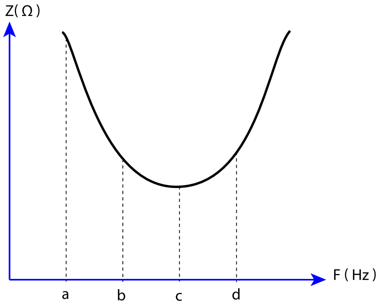
So, the ratio $\frac{(\text{the capacitive reactance in figure } (1)}{(\text{the capacitive reactance in figure } (2)}$ **=..................?**

- $\frac{8}{1}$
- $\frac{2}{1}$
- $\frac{1}{2}$
- $\frac{1}{8}$

34

An Alternating current circuit contains inductive coil of negligible ohmic resistance, capacitor of variable capacitance and ohmic resistance in series.

From the figure, the source voltage becomes equal the potential difference across the ohmic resistance at frequency …………



- **c only**
- **d , b**
- **a only**
- **c , a**

35

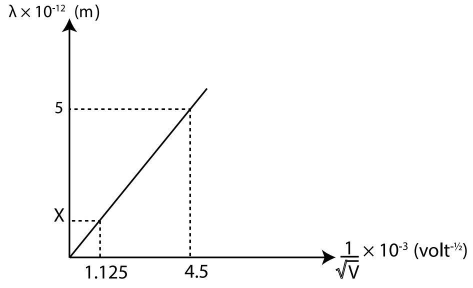
In Compton effect, when a photon of γ-ray collides with a free electron moving with velocity (v), so,

	The momentum of the electron	The momentum of the scattered photon
A	increases	Increases
B	decreases	decreases
C	increases	decreases
D	decreases	increases

- **A**
- **B**
- **C**
- **D**

36

The graph represents the relation between the reciprocal of the square root of the electric potential difference used in the cathode ray tube and the associating wavelength for the electrons emitted from the tube filament, so the value of the point (X) on the graph equals ……..

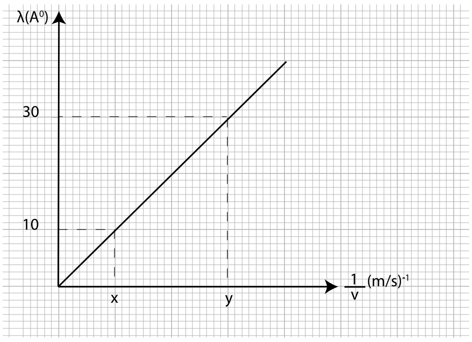


- **1.25×10^{-12}m**
- **2.5×10^{-12}m**
- **2×10^{-11}m**
- **1.5×10^{-11}m**

37

The graph represents the relation between the wavelength for the electrons emitted from the tube filament and the reciprocal of the velocity of the electrons

So , the ratio between:

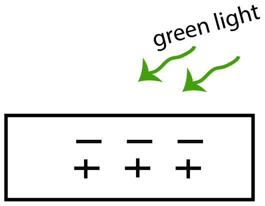


$$\frac{\text{the velocity of the electron at } (x)}{\text{the velocity of the electron at } (y)} = ...$$

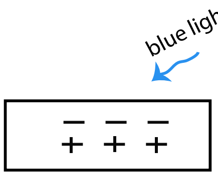
$(m_e = 9.1 \times 10^{-31}$ Kg, $h = 6.625 \times 10^{-34}$ J.s)

- $\frac{9}{1}$
- $\frac{1}{9}$
- $\frac{3}{1}$
- $\frac{1}{3}$

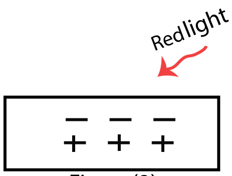
The opposite figure represents a green light falling on the surface of Cesium metal, where electrons barley liberated with zero K.E. in which figure from the following represents electrons will be liberated gained K.E.



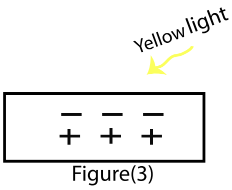
cesium metal



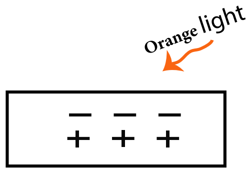
Figure(1)



Figure(2)



Figure(3)



Figure(4)

- **(1)**
- **(2)**
- **(3)**
- **(4)**

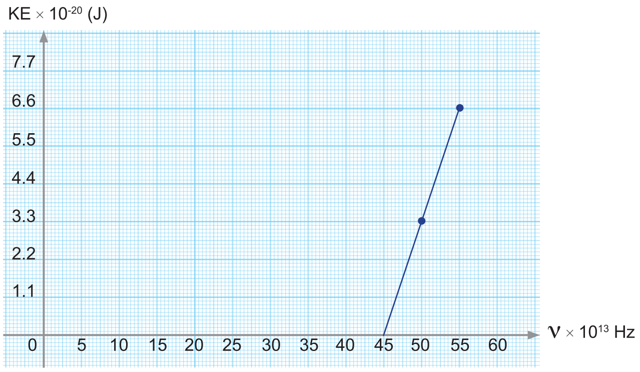
39

An electron microscope is used to examine two different viruses (X) and (Y). If the dimension of virus (X) is 1 nm while that of virus (Y) is 4 nm. Then, the ratio between :

$$\frac{\text{The required potential difference between anode and cathode to observe virus (X)}}{\text{The required potential difference between anode and cathode to observe virus (Y)}} = \text{.........}$$

- **16**
- **4**
- **8**
- **2**

40



The opposite graph represents the relation between the kinetic energy of electrons emit from photo electric cell and the frequency of incident photon on the cathode

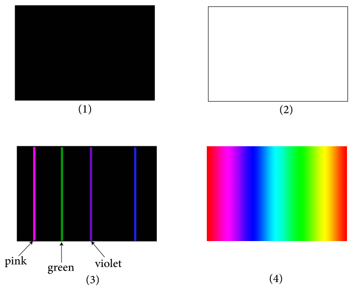
Which one of the following wave lengths emits electrons with kinetic energy = 6.6×10^{-20} J :...............

($C = 3 \times 10^{8}$ m/s).

- 5.45×10^{-7}m
- 5.54×10^{-7}m
- 5.55×10^{-7}m
- 5.65×10^{-7}m

41

Which figure represent the spectrum resulting from the excited Hydrogen gas?



- **3**
- **1**
- **2**
- **4**

42

In Coolidge tube , if the velocity of the electrons colliding with the target is 7.34×10^6 m/s, so the minimum wavelength of the produced x-rays spectrum equals ....

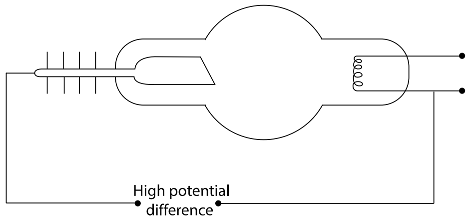
Knowing that:

$h=6.625 \times 10^{-34}$ J.s , $m_e=9.1 \times 10^{-31}$ kg, $C=3 \times 10^8$ m/s

- **8.11 nm**
- **0.811×10^{-9} m**
- **0.059 nm**
- **5.9×10^{-10} m**

43

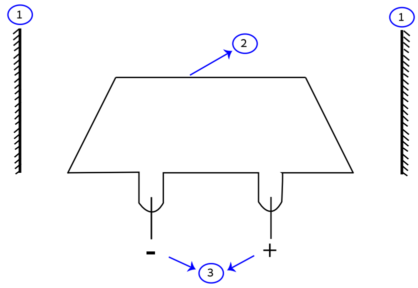
In Coolidge tube in the figure, to produce X-rays. If the atomic number of the target material is (42).



So, To produce the longest wavelength for the characteristic X-rays radiation, we must change the target material to another element of atomic no. ....………..

- **29**
- **74**
- **82**
- **55**

44



The schematic diagram represents the apparatus of (He-Ne) laser production, which choice correctly represents the role of each of the components (1,2 and 3)?

	Number 1	Number 2	Number 3
A	Photons production	High voltage production	Reflecting photons
B	Reflecting photons	Contains the active medium	High voltage production
C	Pumping energy to excite the atoms	exciting the Neon atoms	Amplifying photons
D	LASER photons production	The used energy source	exciting the Neon atoms

- **B**
- **A**
- **C**
- **D**

45

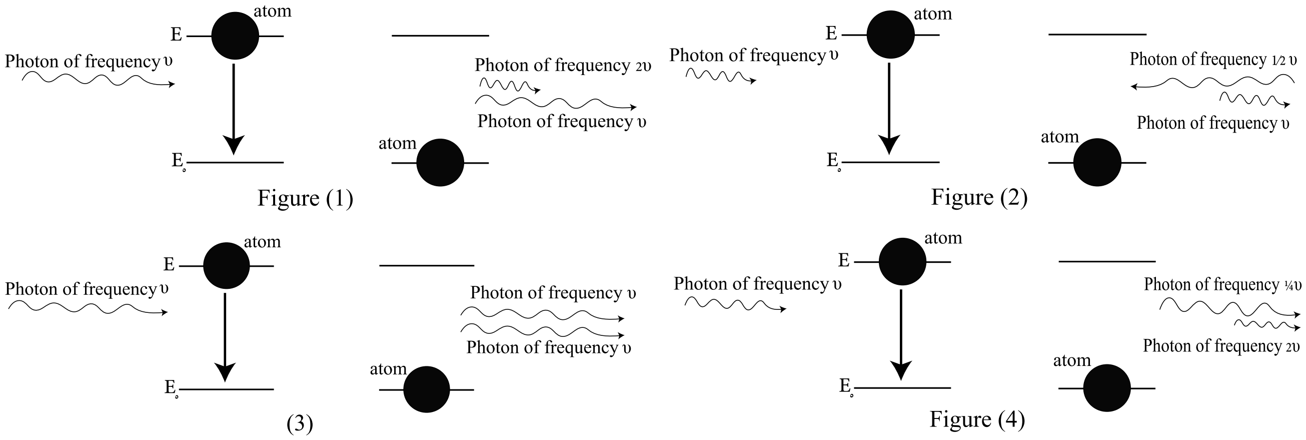
In Rubby-Chromium LASER , string Xenon bulbs are used to excite the atoms of the active medium , so

The ratio between: $\frac{\textit{the speed of produced LASER ray in air}}{\textit{the speed of Xenon lamp light in air}}$ =.........

- **Equals one**
- **is more than one**
- **is less than one**
- **Equals zero**

46

The figure that represents stimulated emission is figure no. ....



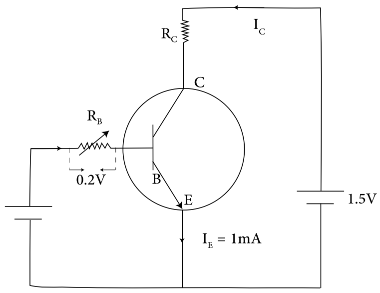
- **3**
- **2**
- **4**
- **1**

47

When the temperature of pure Germanium crystal (Ge) is lowered to zero^{o}C, so its electrical conductivity ………

- **decreases**
- **Vanishes**
- **Does not change**
- **increases**

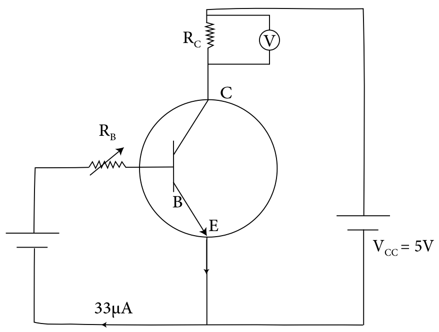
48



The circuit represents a transistor as an invertor gate, if the output potential (V_{CE}) = 0.8 V when the resistance of the base circuit (R_B) = 4000 Ω, so the value of the collector circuit resistance (R_C) = ……….. approximately

- 7.36×10^2 **Ω**
- 73.6×10^2 **Ω**
- 0.736×10^2 **Ω**
- 7360×10^2 **Ω**

49



٣

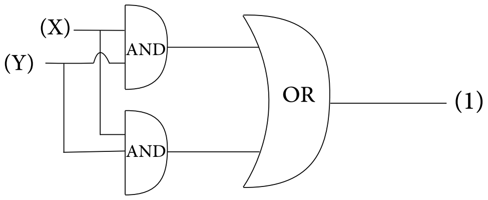
The circuit represents a transistor as an amplifier , if the voltmeter reads 4.8V, and the value of R_C = 4.5KW.

So, the values of β_e *and* α_e respectively are …….

- **0.97 , 32.32**
- **0.95 , 33.67**
- **0.99 , 99**
- **0.75 , 3**

50

The group of logic gates in figure has an output (1), which of the probabilities (A, B, C or D) verifies that?



	X	Y
A	0	0
B	1	0
C	1	1
D	0	1

- **Probability (C)**
- **Probability (B)**
- **Probability (A)**
- **Probability (D)**