Exam (1)

Part (1) Objective questions (multiple choice) "Each question has one mark":-

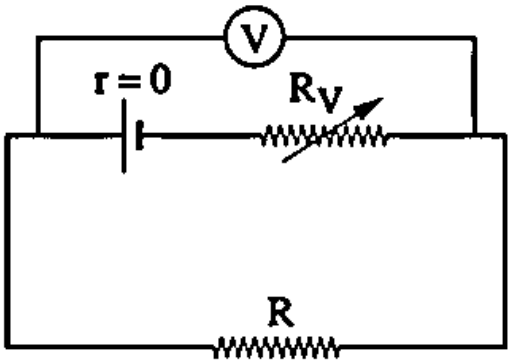
(1) **In the opposite electric circuit, when the value of the resistance taken from R_V decreases, the reading of the voltmeter (V)……**

A **Increases**

B **Decreases**

C **Remains unchanged**

D **Becomes zero**



(2) **Two wires of same material, if the diameter of the first is three times the diameter of the second, and the resistance of the second is four times the resistance of the first, so the length of the second wire is…… the length of the first one.**

A $\frac{4}{3}$

B $\frac{4}{9}$

C $\frac{72}{2}$

D $\frac{36}{3}$

(3) Three identical resistors, each of value 24 Ω, are connected in different ways, hence the following choices represent the possible values of their equivalent resistance except……

A 36 Ω

B 20 Ω

C 16 Ω

D 8 Ω

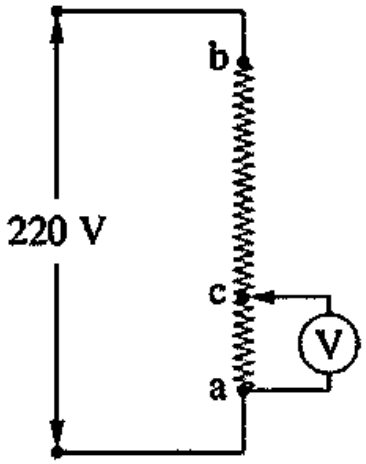
(4) In the opposite circuit, there is a resistance ab of 12 kΩ where its terminals are connected to a potential difference of 220 V. If the part ac that represents the quarter of the resistance ab is connected to a voltmeter of resistance 6 kΩ, So the voltmeter reading equals .....

A 36 V

B 32 V

C 42 V

D 40 V



Exam (1)

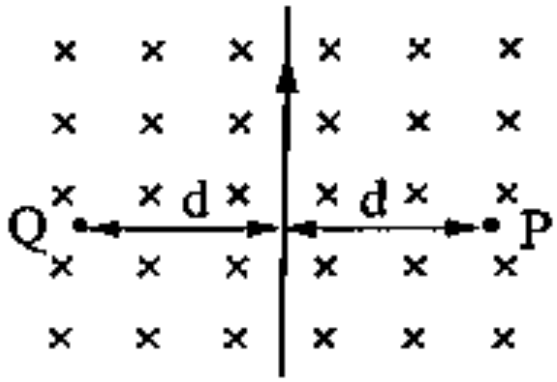
(5) In the opposite figure, a straight wire is placed perpendicular to a uniform magnetic field of flux density B that is directed into the page. When an electric current of intensity I passes in the wire, the total magnetic flux density at point P becomes $3B$, so the net magnetic flux density at point Q is ……

A zero

B B

C 2B

D 3B



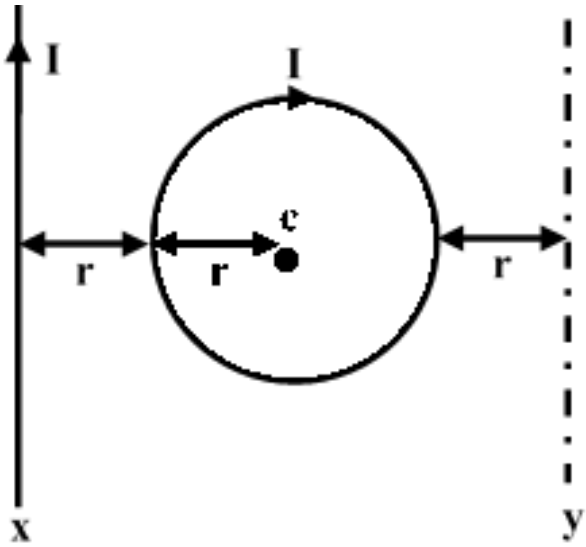
(6) In the opposite figure a circular wire ring and a straight wire placed at the position x in the same plane of the ring and both carries electric current its intensity I so that the resultant magnetic flux density at the center of the ring c is B and when the wire is moved to position y the magnetic flux density at point c becomes ……

A 2B

B B

C 0.73B

D 1.38B



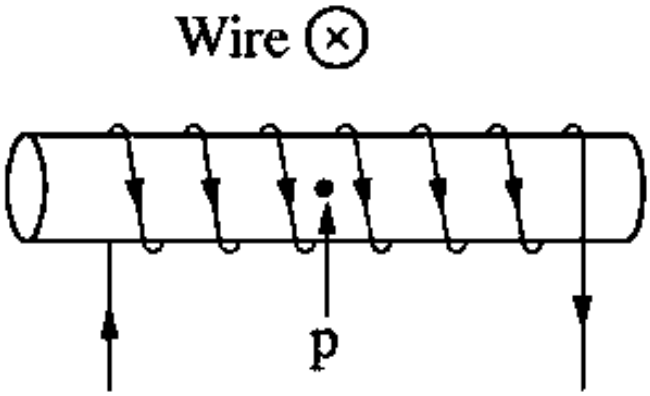
(7) **In the opposite figure, a solenoid carries an electric current that produce a magnetic flux of density 2 x 10^{-6} T at the center of its axis at point p and a straight wire is placed perpendicular to the plane of the page above the solenoid. The wire carries an electric current that generates a magnetic flux of density 4 x 10^{-6} T at point p, then the total magnetic flux density at point p is……**

A $2\sqrt{5}$ x 10^{-6} T

B 6 x 10^{-6} T

C 2 x 10^{-6} T

D 4 x 10^{-6} T



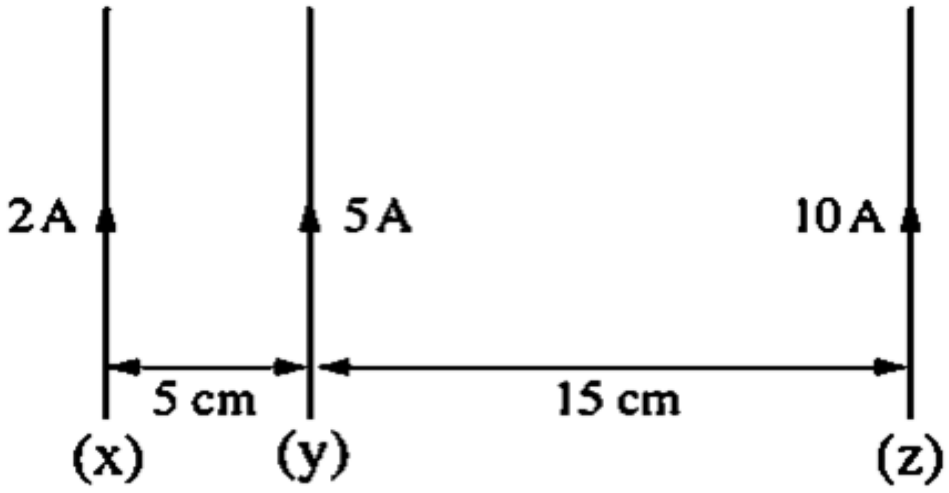
(8) **In the opposite figure, three parallel wires carry electric current as shown in the figure, then the net magnetic force which acts on one meter of the wire y is……** **(Where: μ = 4 π x 10^{-7} Wb/A.m)**

A 3.42 x 10^{-4} N/m

B 2.65 x 10^{-5} N/m

C 4.67 x 10^{-4} N/m

D 3.78 x 10^{-5} N/m



(9) **Which of the following adjustments can be done on a galvanometer device to increase its range for measuring electric current intensity than the other adjustments……**

A **Connecting a shunt resistance of value one fifth that of the galvanometer's resistance**

B **Connecting a shunt resistance of value one third that of the galvanometer's resistance**

C **Connecting a multiplier resistance of value double that of the galvanometer's resistance**

D **Connecting a shunt resistance of value half that of the galvanometer's resistance**

(10) **A circular coil formed of one turn carries electric current intensity I, if the magnetic flux density at its center is B_1 and then it is reshaped to another circular coil of N turns and carried the same current intensity, then the magnetic flux density at its center will be ……**

A NB_1

B N^2B_1

C $2NB_1$

D $2N^2B_1$

Exam (1)

(11) **The scale of a sensitive galvanometer consists of 20 divisions. If its pointer deflects to half its scale when a current of intensity 0.2mA passes in its coil, then each division of the scale indicates……**

A **20μA**

B **10μA**

C **5μA**

D **2μA**

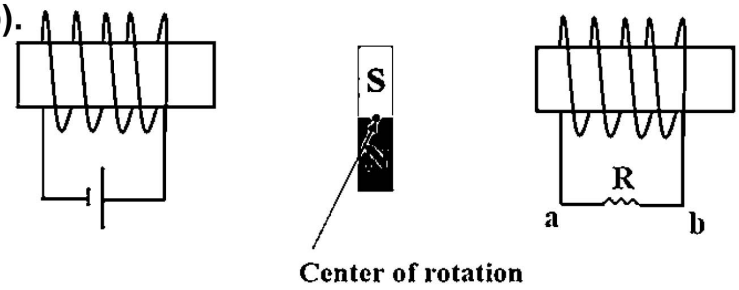
(12) **In the** shown **figure, avoiding the mutual induction between the two coils the magnet can move freely around its center of rotation between the two coils so** at the moment of clothings the switch (K) the election **potential of point (a)** becomes ……

A **greater than** that of **(b).**

B **less than** that of **(b).**

C **equal to** that of **(b).**

D **equal to zero.**



Exam (1)

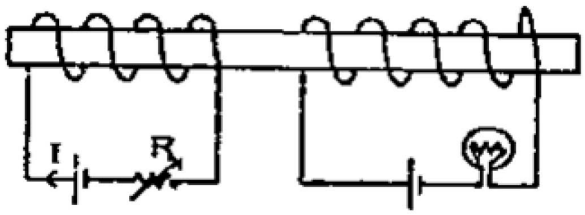
(13) **In the shown figure when R decreases, the light of lamp……**

A **decreases momentarily**

B **increases momentarily**

C **remain as it is**

D **switches off.**



(14) **In the standard resistors, it´s coil are made of double wound wires……..**

A **to reduce the resistance of the wire**

B **to increase the resistance of the wire**

C **to avoid self-induction**

D **to vanishes the resistance in the wire**

(15) **A straight wire of length 20 cm moves at velocity 0.5 m/s in a direction that makes angle (θ) with the direction of a magnetic field of flux density 0.4 T, so an induced emf of 20 mV is generated between its terminals, hence the angle (θ) equals……**

A **60°**

B **30°**

C **45°**

D **90°**

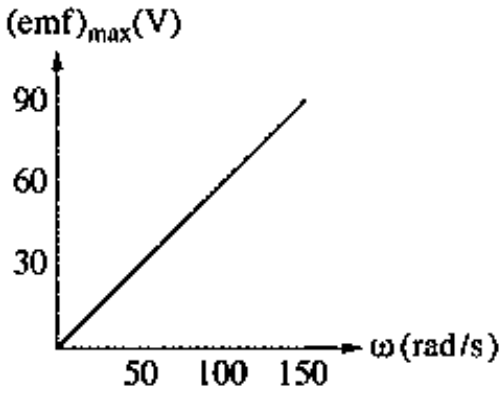
(16) **The opposite graph represents the relation between the maximum induced emf for an AC dynamo and the angular velocity for the rotation of its coil. If the number of turns of the coil is 100 turns and the magnetic flux density that acts on the coil is 0.1 T, then the area of the coil equals....**

A **0.12 m^2**

B **0.001 m^2**

C **0.0012 m^2**

D **0.06 m^2**



(17) **During the rotation of the coil of the electric motor, the back induced electromotive force acts to ……**

A **increase the electric current intensity.**

B **change the electric current direction in the coil.**

C **increase the speed of rotation of the coil.**

D **stabilize the speed of rotation of the coil.**

(18) **The opposite figure represents a non-ideal transformer having two secondary coil that are working together at the same time.**

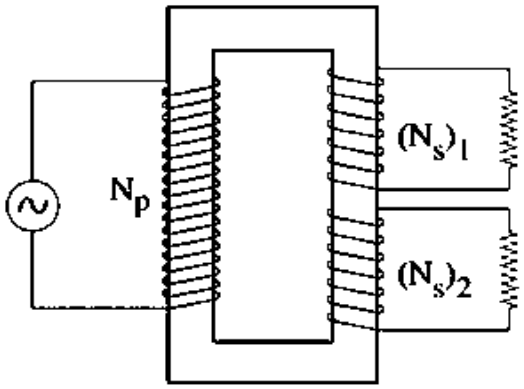
If $(P_W)_{S1}$ = 50 W, $(P_W)_P$ = 100 W, then .....

A **$(P_W)_{S2}$ > 100 W**

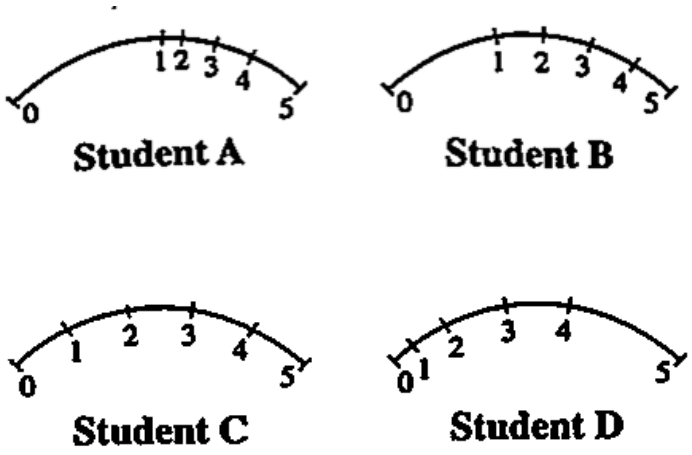
B **100 W > $(P_W)_{S2}$ > 50 W**

C **$(P_W)_{S2}$ = 50 W**

D **$(P_W)_{S2}$ < 50 W**



(19) **Four students drew schematic diagrams for the hot wire ammeter scale, which student drawing is the correct scale for the hot wire ammeter?**



A **Student A**

B **Student B**

C **Student C**

D **Student D**

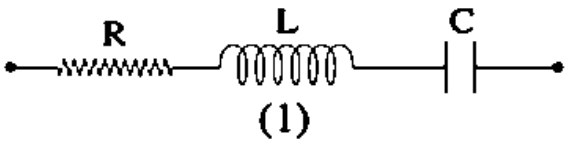
(20) **The two figures (1) and (2) show parts of AC circuits. If the resonance frequency in figure (1) is 5 kHz, then the resonance frequency in figure (2) equals……**

A **10 KHz**

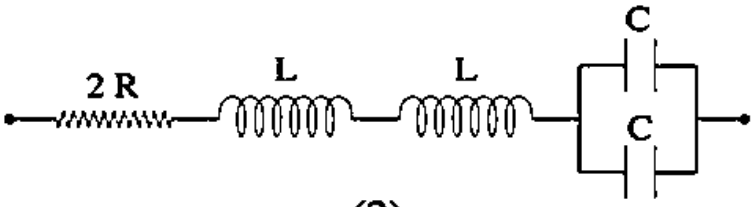
B **5 KHz**

C **2.5 KHz**

D **40 KHz**



(1)



(2)

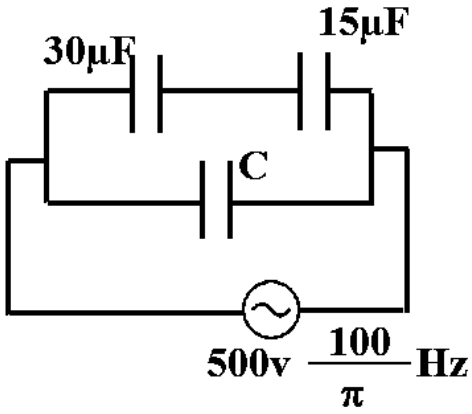
(21) **In the opposite figure: If the effective value of the current passing in the circuit is 2A, then the capacitor capacitance (C) is equal to …**

A **15 µf**

B **10 µf**

C **20 µf**

D **50 µf**



(22) **Which of these figures represents resonance in R.L.C circuit?**

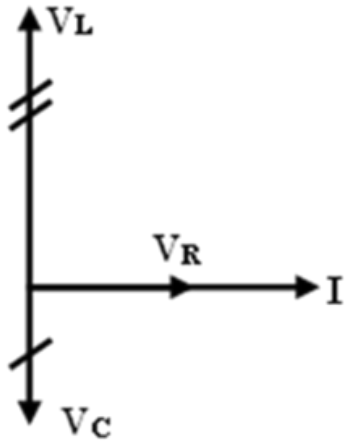


Figure (1)

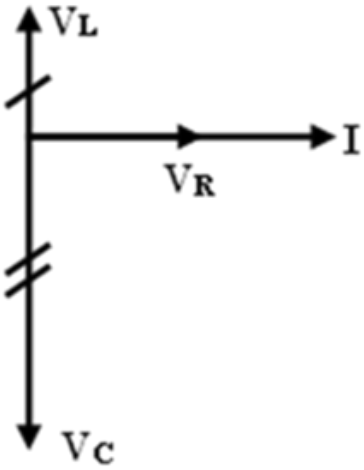


Figure (2)

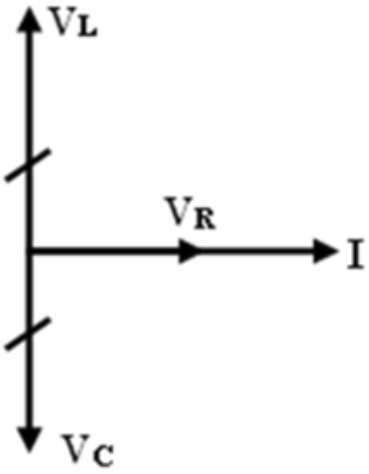


Figure (3)

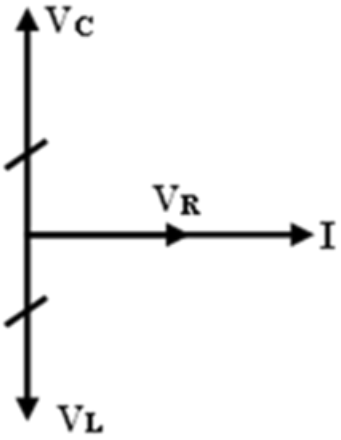


Figure (4)

A **Figure (1)**

B **Figure (2)**

C **Figure (3)**

D **Figure (4)**

(23) **The opposite figure shows an incandescent electric bulb, so the ratio between the produced infra-red total energy to the produced visible light total energy through the same time is ……..**

A **greater than one**

B **less than one**

C **equal to one**

D **not changed by the change of temperature**

(24) **In the electron microscope, when the potential difference between the cathode and the anode is increased from 25 kV to 100 kV, the wavelength associated with the motion of the electron beam ……**

A **decreases to its quarter**

B **decreases to its half**

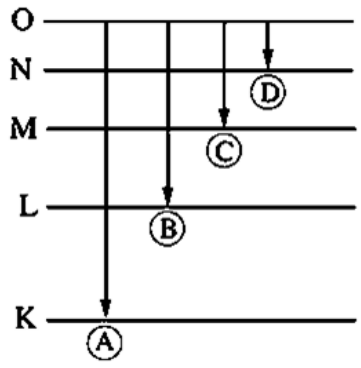
C **increases to its double**

D **increases to its quadruple**

(25) **In Compton effect, when a photon X-ray collides with an electron at rest, then, ……..**

	The speed of the electron after collision	The equivalent mass of the photon after collision
A	increases	increases
B	increases	decreases
C	decreases	increases
D	decreases	decreases

(26) **The opposite figure represents multiple probable transitions for the emission of a linear spectrum from the hydrogen atom, then……**



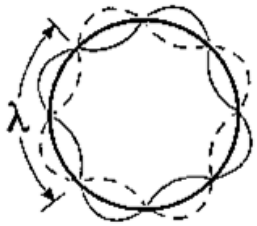
A $\lambda_A < \lambda_B$

B $\lambda_C > \lambda_D$

C $\lambda_B > \lambda_D$

D $\lambda_A > \lambda_C$

(27) **An electron moves in energy level around the nucleus of hydrogen atom associated with a standing wave of wavelength λ as in the opposite figure, so the radius of the energy level (r) is …**



A $\frac{4\lambda}{\pi}$

B $\frac{2\lambda}{\pi}$

C $\frac{\lambda}{\pi}$

D $\frac{\lambda}{2\pi}$

(28) **A flash lamp is used as an energy source to excite the atom of active medium in ……. laser.**

A Gas

B solid crystal

C liquid-dye

D semiconductor

(29) **A laser ray of wavelength λ is used in holography where the phase difference between two rays of the reflected rays from the body was $\frac{\pi}{2}$, then the path difference between them is …….**

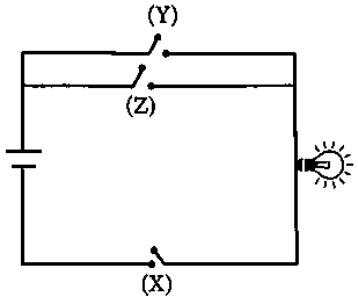
A $\frac{\lambda}{4}$

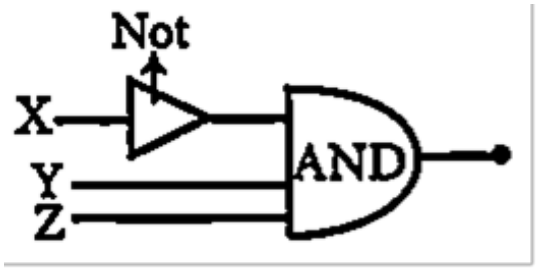
B $\frac{\lambda}{2}$

C 2λ

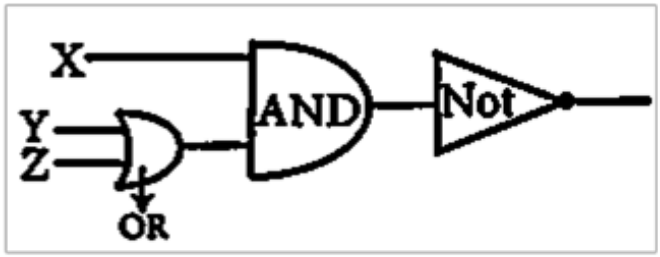
D 4λ

(30) **The figure shows a simple electric circuit that contains three switches (X, Y and Z) working as inputs of a logic circuit, while the lamp gives the output. The group of logic gates that is represented by this simple electric circuit is……**

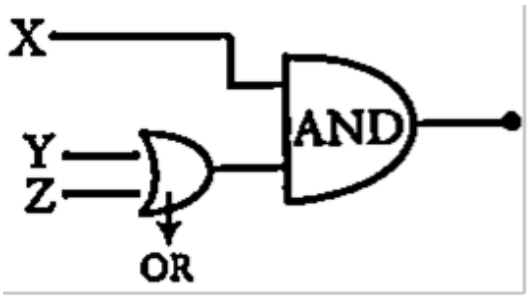




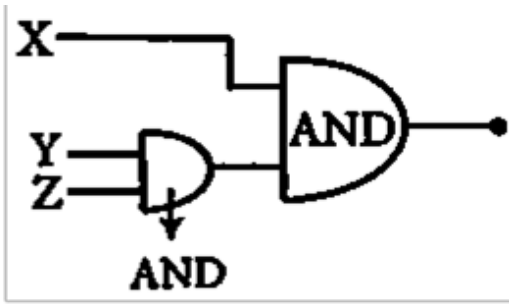
(a)



(b)



(c)



(d)

A **Group (a)**

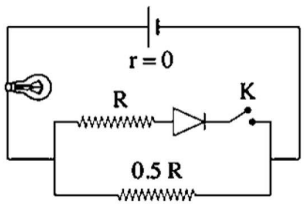
B **Group (b)**

C **Group (c)**

D **Group (d)**

Exam (1)

(31) **If the resistance of the diode is negligible in the case of forward biasing and infinite in the case of reverse biasing, then in the opposite circuit when the switch K is closed, the luminosity of the electric bulb……**



A **Remains unchanged**

B Vanishes

C **Increases**

D **Decreases**

(32) **If the concentrations of each of the free electrons and the holes in a doped semiconductor crystal are $10^{14}cm^{-3}$ and $10^{8}cm^{-3}$ respectively, so the concentration of the free electrons and the holes in the pure crystal before doping were …… and …… respectively.**

A **$10^{14}cm^{-3}$, 10^{8} cm^{-3}**

B **10^{8} cm^{-3}, $10^{12}cm^{-3}$**

C **10^{8} cm^{-3}, $10^{12}cm^{-3}$**

D **$10^{11}cm^{-3}$, $10^{11}cm^{-3}$**

Exam (1)

Part (2) Objective questions (multiple choice) "Each question has two mark":-

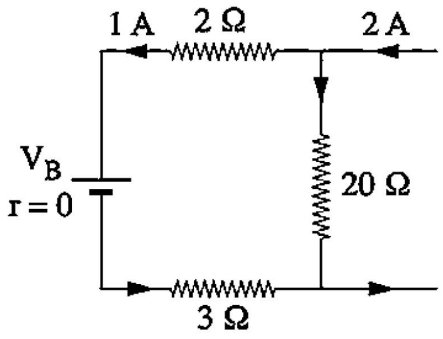
(33) **The opposite figure represents a part of an electric circuit that carries an electric current, then the value of V_B is.....**

A **25 V**

B **20 V**

C **30 V**

D **15 V**



(34) **The torque acting on a coil carrying current in a uniform magnetic field becomes maximum value when the direction of the magnetic dipole moment of the coil is ..... to the magnetic flux lines**

A **Perpendicular to the magnetic flux lines.**

B **Parallel to the magnetic flux lines.**

C **Inclined by an angle 30° to the direction of magnetic field.**

D **Inclined by an angle 60° to the direction of magnetic field.**

(35) **A voltmeter, its resistance is 100 Ω and the maximum voltage that can be measured by it is 1 V. The value of multiplier resistance that should be connected to increase the measured voltage by 10 times equals……..**

A $0.9\ \text{k}\Omega$

B $10\ \text{k}\Omega$

C $1.1\ \text{k}\Omega$

D $1\ \text{k}\Omega$

(36) **If a circular ring of radius 5cm that carries an electric current of 10A is bent such that each half ring becomes perpendicular to the other half, the resultant magnetic field intensity at the center will be …… (Knowing that: $\mu_{air} = 4\pi \times 10^{-7}$Wb/A.m)**

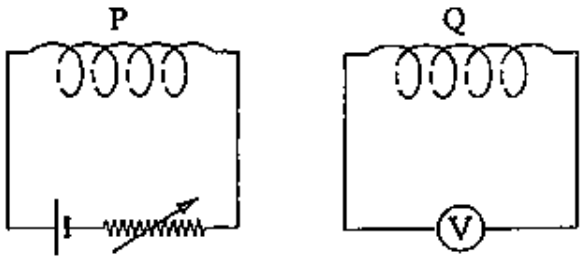
A 2.2×10^{-5}T

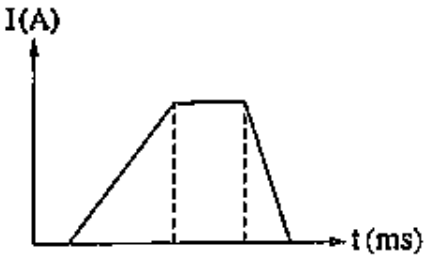
B 4.5×10^{-5}T

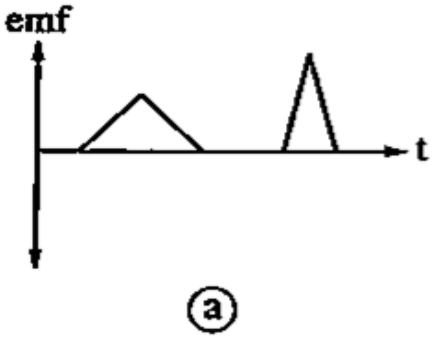
C 13.4×10^{-5}T

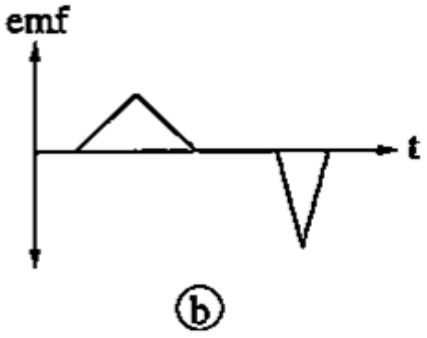
D 8.9×10^{-5}T

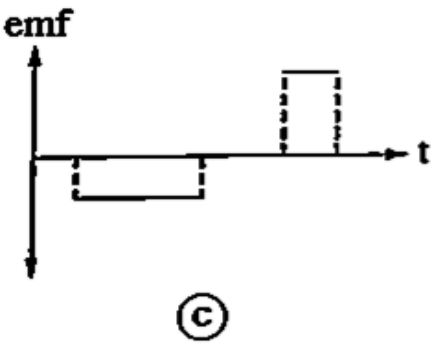
(37) **The opposite figure represents two adjacent solenoids P, Q and the opposite graph represents the relation between the current intensity (I) in coil P and the time (t), then the graph that represents the induced emf in coil Q versus time is……**

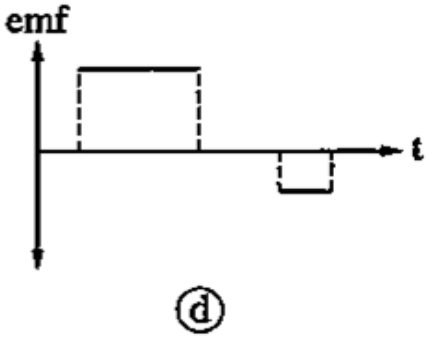












A **Graph (a)**

B **Graph (b)**

C **Graph (c)**

D **Graph (d)**

(38) two coils (x) and (y), the cross-section area of coil (x) twice the cross-section area of (y) put in the magnetic field. Which the magnetic flux density (B). two coils placed perpendicular on the direction of magnetic flux lines. When reverse the direction of the magnetic field through time (2ms). The ratio = $\frac{\text{emf}_{\text{avrag}}(x)}{\text{emf}_{\text{avrag}}(y)} = \frac{3}{1}$, so the ratio $\frac{\text{no.of turns (x)}}{\text{no.of turns (y)}} =$.....

A $\frac{3}{1}$

B $\frac{3}{2}$

C $\frac{1}{3}$

D $\frac{2}{3}$

(39) The graph represents the relationship between the induced electromotive force (emf) in a dynamo coil and time during a half-cycle. The average electromotive force generated in the dynamo coil during the time period from zero to t = $\frac{1}{75}$ sec .....volts

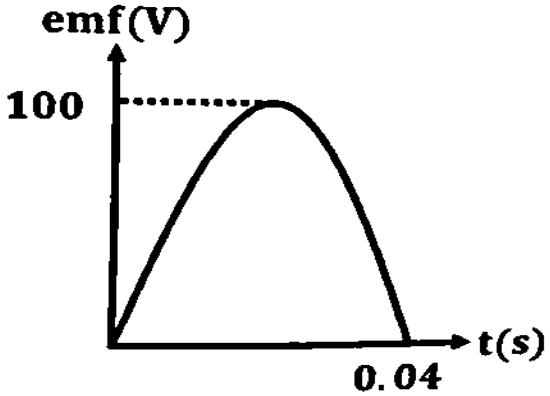
(π = 3.14)

A 47.77

B 63.69

C 21.23

D 86.603



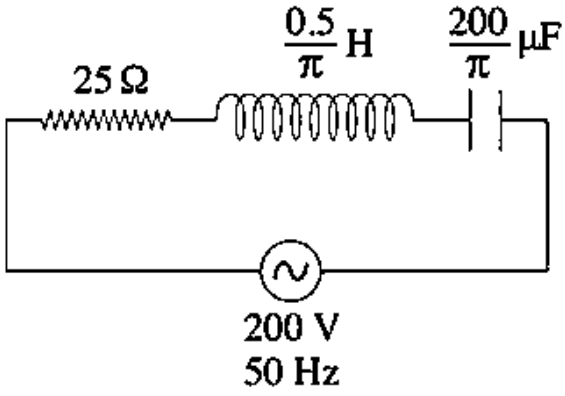
(40) **The opposite figure represents a series RLC circuit, so the current intensity that passes through the circuit equals……**

A **4 A**

B **8 A**

C **2 A**

D **6A**



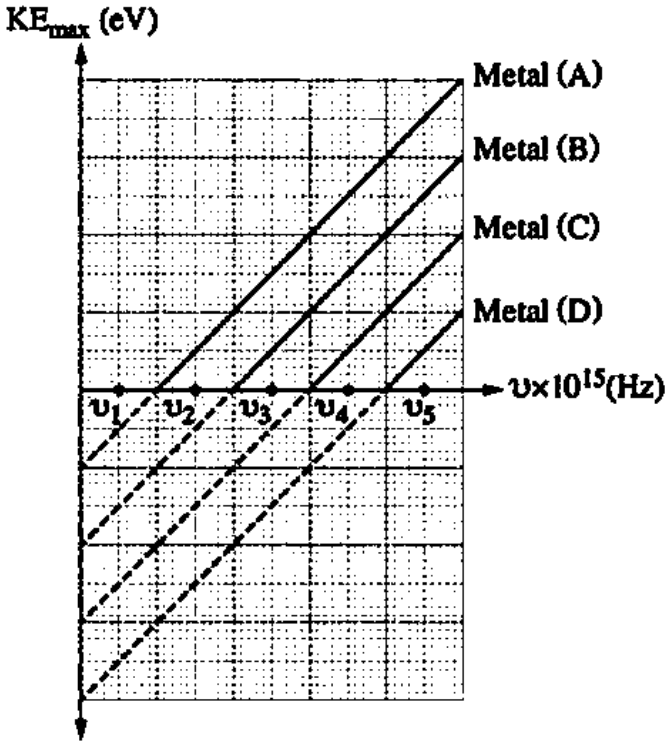
(41) **The graph represents the relation between maximum kinetic energy for the emitted electrons from the surfaces of 4 different metals (A, B, C and D) and the frequency of the light falling on them. Which frequency causes electrons to get emitted from metal (A and B) but does not cause electrons emission from metals (C, D)?**

A υ_3

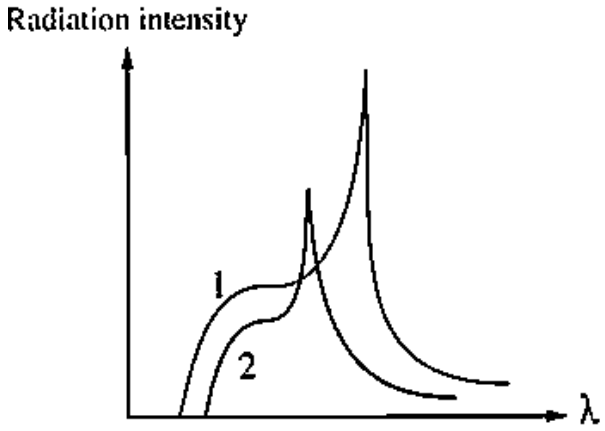
B υ_5

C υ_2

D υ_4

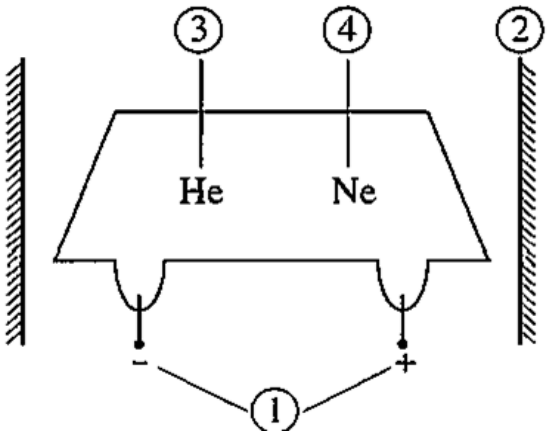


(42) **The opposite figure shows the relation between the X-rays intensity and its wavelength (λ) for two Coolidge tubes which have targets of two different materials their atomic numbers Z_1 and Z_2 and operate on two different voltages V_1 and V_2 respectively.**
Thus .....



	Relation between V_1, V_2	Relation between Z_1, Z_2
A	$V_1 > V_2$	$Z_1 > Z_2$
B	$V_1 > V_2$	$Z_1 < Z_2$
C	$V_1 < V_2$	$Z_1 = Z_2$
D	$V_1 < V_2$	$Z_1 < Z_2$

(43) **The schematic diagram represents the (He-Ne) laser, so most of neon (Ne) atoms can be excited by ……..**



A **colliding with component (2)**

B **colliding with excited atoms of component (3)**

C **colliding with unexcited atoms of component (3)**

D **gaining energy from component (1)**

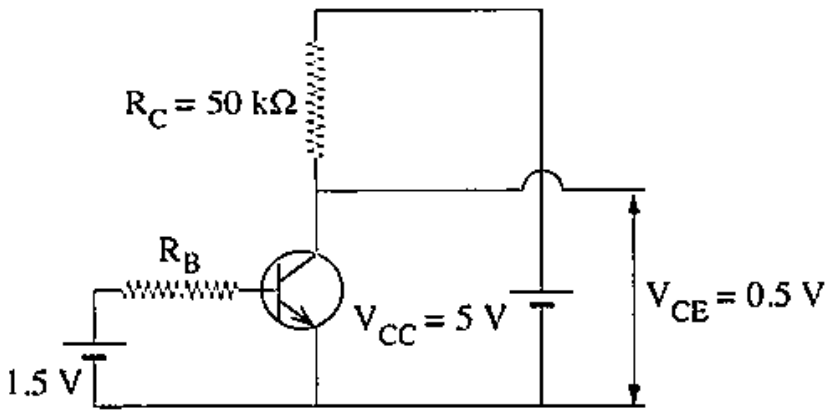
(44) **In the npn transistor circuit, the resistance connected to its collector R_C =50 kΩ, if its current gain β_e = 30, from the data on the figure the intensity of the base current (I_B) =……**

A **3 x 10^{-6} A**

B **9.3 x 10^{-5} A**

C **9 x 10^{-5} A**

D **8.7 x 10^{-6} A**



Part (3) Essay questions "Each question has two mark":-

(45) **An ohmmeter consists of an ammeter, a standard resistance and a 6V battery. It shows a full-scale deflection when a current of 1 mA flows through it**

(i) Calculate the total resistance of the ohmmeter.

(ii) Calculate the external resistance that makes the pointer deflect to half its current scale.

(46) **The opposite figure shows an ideal electric transformer that is connected between an AC source and a bulb then:**

(i) What is the type of this transformer?

(ii) Calculate the ratio between $\left(\frac{V_s}{V_p}\right)$.