Time 1.5 hr

Physics – Evaluation – X

Mark 40

Section -A

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Answer any 4 from questions 1 to 5. (1 Score for each answer.)

1) When thickness of a conductor increases amperage..... (increases / decreases)

Ans: increases

2) Ten 10Ω resistors are connected in parallel. What will be its net resistance?

Ans:

$R = r/n = 10/10 = 1\ \Omega$

3) The frequency of AC generated for distribution in our country is .....?

Ans:50 Hz

4) The end of the solenoid at which current flows in the clockwise direction will be the ..... (south Pole / north pole)

Ans: south Pole

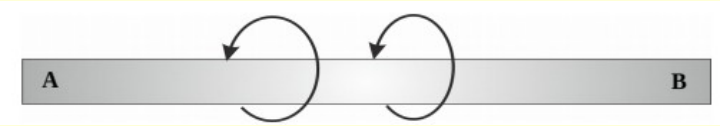
5) Which type of transformer is a distribution transformer?

Ans: step down transformer

Section -B

Answer any 4 from questions 6 to 10. (2 Score for each answer)

6)The magnetic field around the current carrying conductor AB is depicted.



a) Find out the direction of current through the conductor?

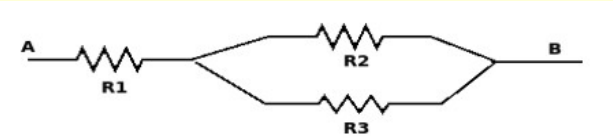
b) Name the Rule by which we can find out the direction of current through the conductor?

Ans:

a) From B- A

b) Right Hand Thumb Rule

7) Observe the connection. All the resistors used is of 10 ohms



(a) Which are the resistors connected in parallel ?
(b) Calculate the total resistance across A and B ?

Ans:

a) R_3 and R_2

b) $R_1 + (R_2\ R_3 / R_2\ + R_3) = 10 + 100/20 = 10 + 5 = 15\Omega$

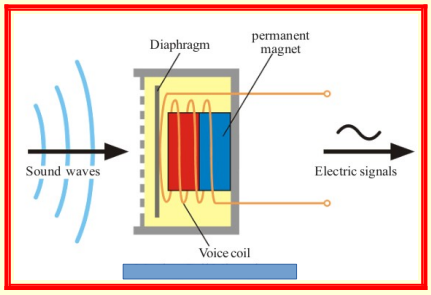
8) How much will be the heat developed if 0.2 A current flows through a conductor of resistance 100 Ω for 5 minute?

Ans:

$H = I^2Rt = (0.2)^2 \times 100 \times 5 \times 60$ | I= 0.2A, R= 100 Ω , t = 5 x60 s

$= 0.04 \times 100 \times 300 =$ **1200J**

9) observe the following figure



a) What is the energy transformation takes place in the above device?
b) It works based on the principle of .....

Ans:

a) Sound (mechanical) energy to electrical energy
b) Electro magnetic induction

10) What are the similarities between the DC motor and a DC generator?

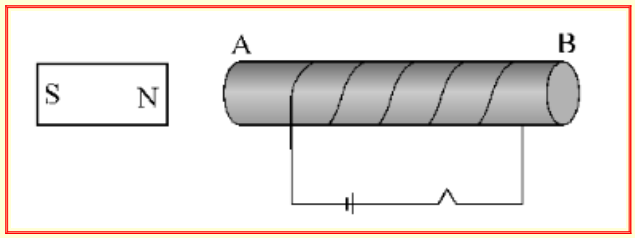
Ans:

1) Both have a strong horse shoe permanent magnet or an electromagnet.
2)Both have an armature coil having a soft iron core.

Section -C

Answer any 4 from questions 11 to 15. (3 Scores for each answer.)

11) Figure shows a bar magnet arranged near a solenoid.



When the switch is put on

a)Will the solenoid attract or repel the bar magnet ?.

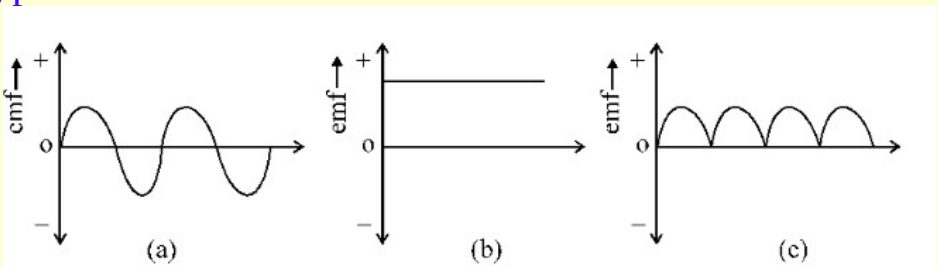
b)What is the reason?

Ans:

a) Attract

b) Since the current is in clockwise direction, the end A is South pole (S & N attracts)

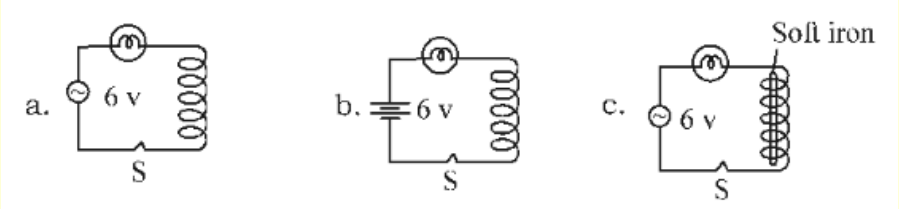
12) Observe the following graphs and identify the devices from which those type of emfs are obtained.



Ans:

a) ac generator b) dc battery or cell c) dc generator

13) Given are the pictures of experiments, done by a student using insulated copper wires of equal length and bulbs of equal power



When the switches are turned on:

(i) Write the descending order of the intensity of bulbs in the circuits.

(ii) Why do the bulbs have different intensity even though they have same power? Explain.

(iii) Which is the phenomenon that causes the decrease in intensity of bulbs 2

Ans:

(i) b , a, c

(ii) Difference in voltage due to back emf . No back emf in 'b' so maximum intensity . Highest back emf in 'c' so least intensity.

(iii) Self induction

14) Match the following

LED bulb	Arc lamp
Filament lamps	Diffuser cup
Discharge lamps	Tungsten

Ans:

LED bulb	Arc lamp
Filament lamps	Diffuser cup
Discharge lamps	Tungsten

15) When the electricity generated in power stations is transmitted to distant place energy is lost as heat

a) What are the methods to minimize the energy loss due to heat?

b) By what factor will the heat reduce if the current is reduced to half ?

Ans:

a) The energy loss can be minimised by reducing the strength of the current($H = I^2Rt$) without power loss ,by increasing voltage proportionally ($P = VI$)

b) $H = I^2Rt$; here $I = I/2$,

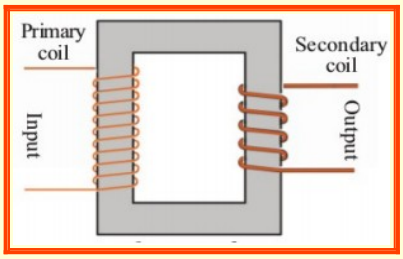
so $H' = (I/2)^2Rt = \frac{I^2Rt}{4}$

so $H' = \frac{H}{4}$

Section -D

Answer any 4 from questions 16 to 20. (4 Scores for each answer.)

16) Observe the following schematic diagram of a transformer



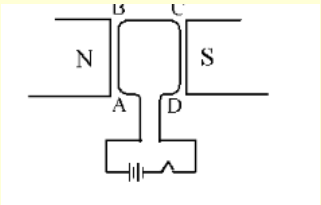
a) Identify the type of transformer
b) What is the principle behind the working of a transformer ?

c) The transformer is working on a 240 V AC ,and supplies a voltage of 12 V to an electric bell in the output circuit. Calculate the number of turns in the secondary coil if the number of turns in the primary coil is 5000.

Ans:
a) Step down
b) Mutual induction

c) $\frac{V_s}{V_p}=\frac{N_s}{N_p}; \frac{12}{240}=\frac{N_s}{5000}; N_s=\frac{12\times5000}{240}=250$

17) A rectangular coil ABCD is arranged so as to move freely in a magnetic field.



a) What are the directions of the forces acting on the arms AB and CD of the coil?
b) What is the effect of these forces on the coil
c) If the direction of current is reversed, what happens to the direction of motion of the coil in the magnetic field?
d) Give examples of two devices making use of this principle.
Ans:

a) AB downwards and CD upwards
b) Coil starts rotating in the anticlockwise wise direction.
c) It starts rotating in the opposite direction.
d) Electric motor & moving coil loud speaker

18) Three resistors of 2 Ω , 3 Ω and 6 Ω are given in the class.

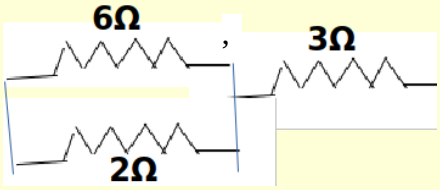
(a) What is the highest resistance that you can get using all of them?
(b) What is the least resistance that you can get using all of them ?
(c) Can you make a resistance 4.5 Ω using these three? Draw the circuit.

Ans:

a) Connect these three resistors in series, then total resistance is equal to ($R1 + R_2 + R_3 = 2+ 3+ 6 = 11\ \Omega$) 11 Ω. It is the highest resistance

b) Connect these three resistors in parallel , then total resistance is equal to ($1/R = 1/ R_1 + 1/R_2 + 1/ R_3 = 1/ 2+ 1/3+1/ 6 = 1$; $R = 1\Omega$) 1 Ω. It is the least resistance

c) Yes ,



R = $\frac{6\times2}{6+2}+3=\frac{12}{8}+3=1.5+3=4.5$

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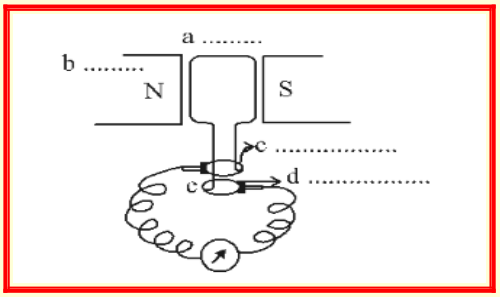
19) observe the figure



(i) Identify the device shown in the figure.

(ii) What is the working principle of this device?

(iii) Name the parts a, b, c,d.

(iv) When the part 'a' is perpendicular to the flux lines from N to S, then flux is maximum. But induced current is zero. Why ?

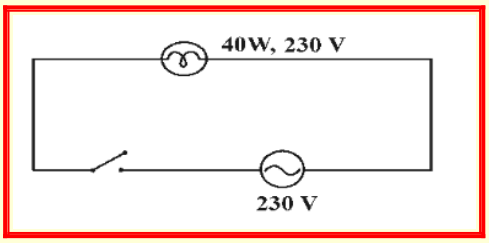
Ans:
(i) ac generator

(ii) Electromagnetic induction

(iii) 'a' - armature coil 'b' - field magnet 'c' -slip ring , 'd' - brush

(iv) Even though the flux is maximum change in flux is zero so induced current is zero .

20) Observe the circuit



a). What is the power of bulb in the circuit? What is the resistance of the bulb ?

b) . When a 60W bulb is connected in series to the 40W bulb, which bulb glows more brightly ? Justify your answer.

Ans:

a) power (P) = 40w ; **R=** $\frac{v^2}{p}=\frac{230^2}{40}=1322.5\Omega$

b) In series connection current flowing through both bulb is same , 40w bulb has more resistance than 60w .So more heat produce in 40w bulb and glows more brightly