



# 17214

21718

**3 Hours / 100 Marks**

Seat No.

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- Instructions :**
- (1) *All questions are **compulsory**.*
  - (2) *Answer **each** next main question on a **new** page.*
  - (3) *Illustrate your answers with neat sketches **wherever** necessary.*
  - (4) *Figures to the **right** indicate **full** marks.*
  - (5) *Assume suitable data, if **necessary**.*
  - (6) *Use of Non-programmable Electronic Pocket Calculator is **permissible**.*
  - (7) *Mobile Phone, Pager and any other Electronic Communication devices are **not permissible** in Examination Hall.*

	<b>Marks</b>
<b>1. Attempt any ten of the following :</b>	<b>20</b>
a) Define potential difference and give its unit.	<b>2</b>
b) Define i) Power ii) Energy.	<b>2</b>
c) Draw the waveform of direct current and alternating current.	<b>2</b>
d) Define unilateral and bilateral circuit.	<b>2</b>
e) Compare series and parallel circuit in terms of voltage and current.	<b>2</b>
f) State KVL as applied to DC circuit.	<b>2</b>
g) What is capacitance ? State its unit.	<b>2</b>
h) State the values for permeability of free space and relative permeability of air.	<b>2</b>
i) Write one application of each	<b>2</b>
i) Permanent Magnet	
ii) Electromagnet	
j) State Fleming's Right Hand Rule.	<b>2</b>
k) State the meaning of 'A' and 'B' type insulating materials.	<b>2</b>
l) Write the equation of ac voltage.	<b>2</b>
m) List any four application of lead acid battery.	<b>2</b>
n) State Ohm's law for electric circuit.	<b>2</b>

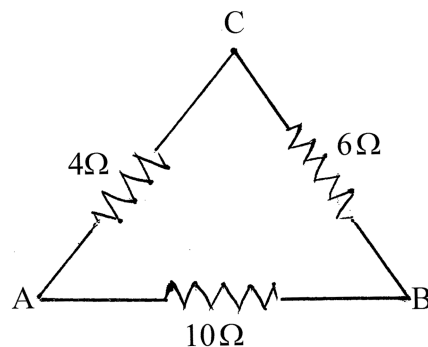
**P.T.O.**



2. Attempt **any four** of the following :

16

- a) A copper coil has a resistance of 12.7 ohms at 18°C and 14.3 ohms at 50°C. Find : 4  
 i) Temperature co-efficient of resistance at 0°C  
 ii) Resistance of coil at 0°C
- b) List any four types of resistance. Give one application of each. 4
- c) Define 'Ideal voltage source' and 'Practical voltage source'. Draw the symbol for each. 4
- d) Define the terms : 4  
 i) Node ii) Branch  
 iii) Loop iv) Mesh
- e) Convert the network of fig. 1 into equivalent star network. 4



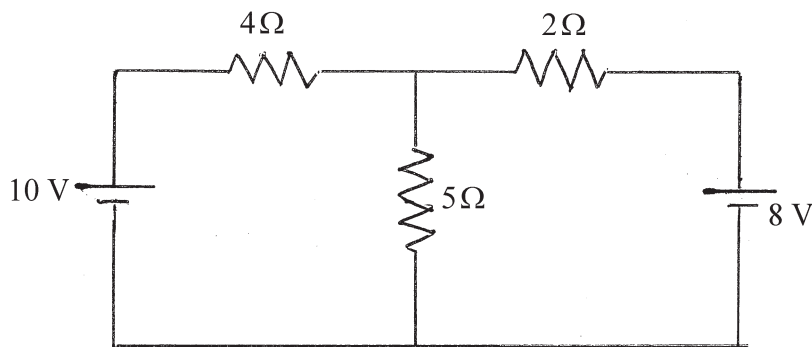
**Fig. 1**

- f) Draw Hysteresis loop for Hard steel and soft steel. Also write one application of each material. 4

3. Attempt **any four** of the following :

16

- a) Find the current flowing through 5Ω resistor using Kirchoff's laws in Fig.2. 4

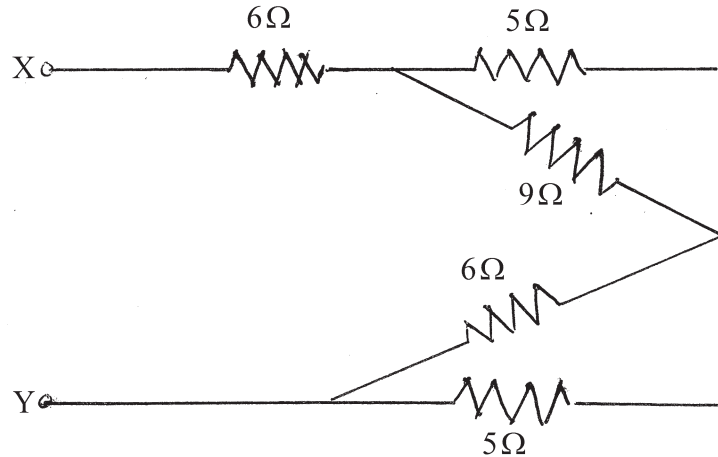


**Fig. 2**

- b) Draw the voltage and current curves during charging and discharging of a capacitor. 4

**Marks**

- c) Two capacitor of 4 microfarad and 8 microfarad are connected in parallel and this combination is connected in series with a capacitor of 24 microfarad. Find 4
- i) Total capacitance
  - ii) Total charge
  - iii) Charge on each capacitor if applied voltage is 34 volts.
- d) Calculate equivalent resistance  $R_{xy}$  in following in fig. 3. 4

**Fig. 3**

- e) Four capacitors have capacitance of  $3\mu\text{F}$ ,  $5\mu\text{F}$ ,  $8\mu\text{F}$  and  $10\mu\text{F}$ . Find the total capacitance when they are connected in i) series ii) parallel. 4
- f) Explain the electrolytic capacitor with neat diagram. 4
4. Attempt **any four** of the following : 16
- a) Explain B-H curve of magnetic material. 4
  - b) Compare between electric and magnetic circuit. 4
  - c) An iron ring with mean length of 60 cm is uniformly wound with 250 turns of wire. Calculate the value of flux density if a current of 2A flows through a wire. Assume  $\mu_r = 500$  for iron. 4
  - d) Derive the expression for equivalent resistance when there resistances are connected in series. 4
  - e) State and explain Lenz's law. 4
  - f) Give classification of insulating materials on the basis of state of material and give one application of each. 4
5. Attempt **any four** of the following : 16
- a) Prove that  $L = N^2/S$ . Where N = Number of turns S = Reluctance. 4
  - b) Compare Dry cell and liquid cell. 4



	<b>Marks</b>
c) What are the different methods of charging batteries. Explain any one of them.	4
d) Define :	4
i) Amplitude	ii) Frequency
iii) Time period	iv) Angular velocity related to a.c.
e) State the application of following materials :	4
i) CRGO Silicon Steel	ii) HRGO Silicon Steel
iii) Amorphous metal	iv) Bronze
f) What is coefficient of coupling ? Explain in brief .	4
<b>6. Attempt any four of the following :</b>	<b>16</b>
a) Define :	4
i) MMF	ii) Reluctance
iii) Fringing	iv) Leakage flux
b) A coil of 100 turns is linked by a flux 20 mWb. If the flux is reversed in time of 2 m sec. Calculate average emf induced in the coil.	4
c) Define :	4
i) Self inductance	ii) Coefficient of self induction
d) i) Define AH efficiency of Watt-Hr efficiency of a battery.	4
ii) State applications of storage batteries.	
e) Give the properties and application of following materials	4
i) mica	ii) rubber
f) State the temperature with standing capacity of following class-insulating material class Y, class A, class B, class E. Also state two examples for each.	4

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