



17214

21314

3 Hours/100 Marks

Seat No.

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- Instructions:** (1) **All** questions are **compulsory**.
(2) Illustrate your answers with **neat** sketches **wherever** necessary.
(3) Figures to the **right** indicate **full** marks.
(4) Assume suitable data, if **necessary**.
(5) Use of Non-programmable Electronic Pocket Calculator is **permissible**.
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MARKS

1. Attempt **any ten** of the following :

20

- a) Define potential difference and give its unit.
- b) State Ohm's law.
- c) Define temperature coefficient of resistance. State its unit.
- d) Define :
 - i) Linear Network
 - ii) Non-linear Network.
- e) State any four types of capacitors.
- f) Compare series and parallel circuit in terms of voltage and current.
- g) Define the term magnetic hysteresis.
- h) State two Faraday's laws of electromagnetic induction.
 - i) Enlist two electrical properties of insulating material.
 - j) Define self inductance and give its unit.
- k) Give the classification of magnetic material.
- l) List any four applications of lead acid battery.
- m) State Fleming's right hand rule.

P.T.O.



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

16

- a) How to convert practical voltage source into practical current source? Draw equivalent current source for given circuit shown in Fig. 1

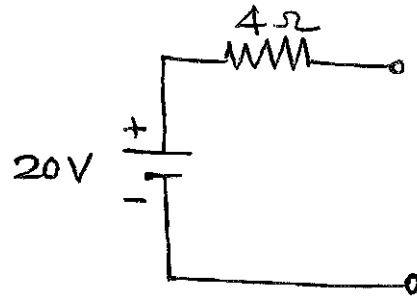


Fig. 1

- b) The resistance of copper coil changes from 80 ohm at 10°C to 98.8 ohm at 62°C . Find temperature coefficient of material at 0°C .
- c) Show the duality between series and parallel D. C. circuit (any four points).
- d) i) How to convert delta into star connection?
ii) Convert the circuit shown in Fig. 2 to equivalent star.

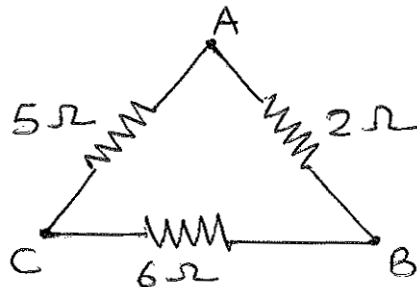


Fig. 2

- e) Determine current through 10 ohm resistance as shown in Fig. 3 using mesh analysis.

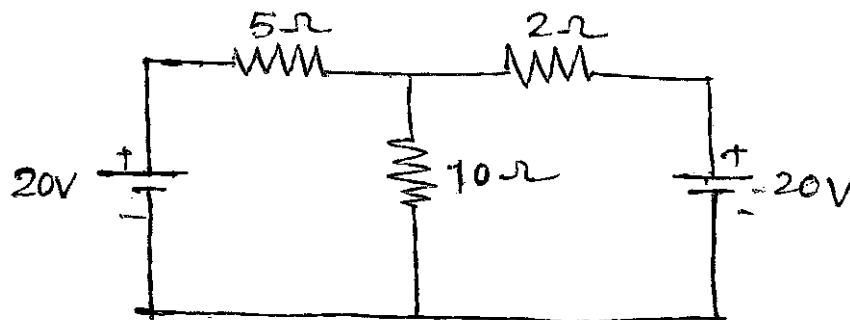


Fig. 3

- f) Compare magnetic circuit with electric circuit on any four points.



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

- a) State Kirchoff's laws for electric circuit.
- b) Define :
 - i) MMF
 - ii) Reluctance
 - iii) Fringing
 - iv) Leakage flux.
- c) A magnetic circuit has effective iron length of 100 cm and air gap of 0.2 cm. It is wound with 800 turns. If relative permeability of iron is 1200. Find flux density when winding carry a current of 1 Amp. Neglect leakage and fringing.
- d) Four 40 W, 230 V, lamps remain ON for 5 hours a day. Calculate monthly electricity bill. If rate is Rs. 5 per unit.
- e) Calculate current through branch AB using current division formula in the circuit shown in Fig. 4.

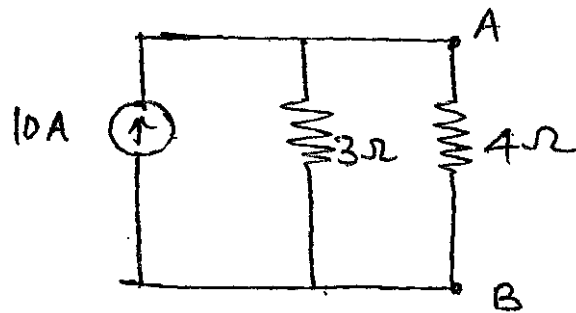


Fig. 4

f) What are the thermal properties of good insulating materials ?

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

- a) What is the equation of energy stored in a capacitor ? State the meaning of each terms used.
- b) Three capacitors having capacitances $3\mu F$, $5\mu F$ and $7\mu F$. Find total capacitance when they are connected in
 - i) In series
 - ii) In parallel
- c) Explain the phenomenon of discharging of capacitor.
- d) Explain the electrolytic capacitor with neat diagram.
- e) Explain B-H curve of magnetic material.
- f) What are the different methods of charging batteries ? Explain any one of them.



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

16

- a) Prove that $L = \frac{N^2}{S}$. Where N = Number of turns S = Reluctance.
- b) State and explain Lenz's law.
- c) What is coefficient of coupling ? Explain in brief.
- d) A coil of 100 turns is linked by a flux of 20 mWb. If the flux is reversed in time of 2 msec. Calculate average emf induced in the coil.
- e) State the laws of resistance and derive unit of resistivity.
- f) List out types of resistor used in electric circuit and also state one application of each.

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

16

- a) State atleast four indications of fully charged lead acid battery.
 - b) Explain ampere-hour efficiency of battery.
 - c) Define :
 - i) amplitude
 - ii) frequency
 - iii) time period
 - iv) angular velocity related to a.c.
 - d) Give the general properties of insulating materials.
 - e) Give the properties and application of following materials
 - i) mica
 - ii) rubber.
 - f) Derive the relation for equivalent resistance in parallel connection.
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