

17214

21819

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.

Marks

1. Attempt any TEN of the following :

20

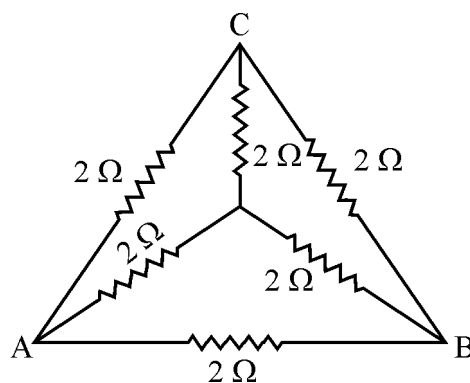
- (a) Define resistance. Also write down its unit.
- (b) State Ohm's law of electric circuit.
- (c) Define Electric current.
- (d) Define Node.
- (e) State different types of capacitor.
- (f) State Ohm's law for Magnetic circuit.
- (g) State two applications of Electromagnet.
- (h) Draw B-H curve.
- (i) State Faraday's first law of Electro-Magnetic Induction.
- (j) State Lenz's law.

- (k) State types of inductors.
- (l) Define cycle, frequency.
- (m) State the properties of good insulating materials.
- (n) State the current carrying conducting materials (any **four**).

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

16

- (a) Derive the expression for equivalent resistance when connected in series.
- (b) State the following effects of electric currents :
 - (i) Heating effect
 - (ii) Magnetic effect
- (c) State the need of source conversion, also explain how voltage source can be converted into an equivalent current source.
- (d) State and explain Kirchoffs current law and Kirchoff's voltage law.
- (e) Calculate the total resistance across terminals BC using star/delta transformation.



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

3. Attempt any FOUR of the following :

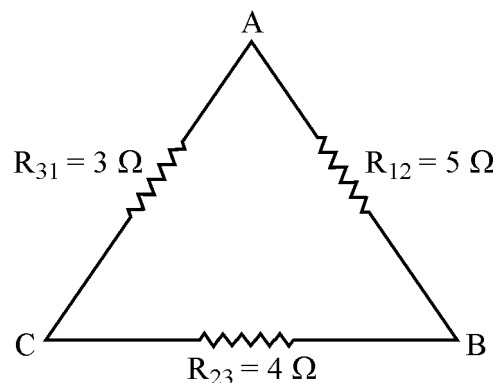
16

- (a) Derive the equation to find capacitance of capacitor having medium partly air.
- (b) Define following terms related to circuit :
- (i) Bilateral network (ii) Node
- (iii) Loop (iv) Branch
- (c) Derive energy stored in capacitor.
- (d) Derive the expression for equivalent capacitance of capacitors connected in parallel (for two capacitors).
- (e) Define the terms :
- (i) MMF (ii) Ampere turns
- (iii) Reluctance (iv) Permeance
- (f) Compare dry cell & liquid cell on basis of (i) principal of operation, (ii) cost, (iii) life & (iv) maintenance.

4. Attempt any FOUR of the following :

16

- (a) Convert delta connected network shown in figure into equivalent star with terminals A, B and C.



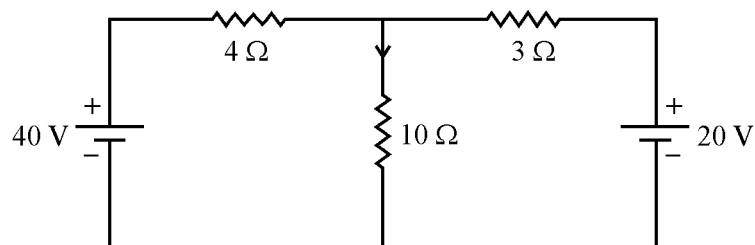
- (b) State types of capacitors and their applications.
- (c) Classify magnetic material.
- (d) With the help of diagram, explain leakage flux, useful flux & fringing.
- (e) State the concept of Magnets & Magnetic lines of force.
- (f) A mild steel ring having a cross-sectional area of 5 cm^2 and a mean circumference of 30 cm has a coil of 200 turns wound uniformly around it. Calculate : (i) Reluctance of the ring, (ii) Current required to produce a flux of 800 micro henry in the ring. (Relative permeability of Mild Steel as 380).

P.T.O.

5. Attempt any FOUR of the following :

16

- (a) Define self inductance & mutual inductance. Also write equation for each.
- (b) Derive an expression for energy stored in a magnetic field.
- (c) Calculate the inductance and energy stored in magnetic field of air cored coil of 250 cm long, 50 cm diameter and wounded with 4000 turns carrying current of 5A.
- (d) State any four advantages of AC over DC.
- (e) Compare statically induced emf with dynamically induced emf (4 points).
- (f) Find current flowing through 10Ω resistance shown in figure using Kirchoff's law.



6. Attempt any FOUR of the following :

16

- (a) Describe the current charging method used to charge batteries.
 - (b) Compare dry cell with liquid cell.
 - (c) Define following terms :
 - (i) Cycle
 - (ii) Frequency
 - (iii) Time
 - (iv) Amplitude
 - (d) Classify insulating materials on the basis of their withstand temperature.
 - (e) Distinguish between HRGO & CRGO on any four points.
 - (f) Define AH efficiency and watt-hour efficiency of a battery.
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