

22212

11819

3 Hours / 70 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) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.
 - (7) Preferably, write the answers in sequential order.

Marks

- 1. Attempt any FIVE of the following: **10****
- a) State any two types of resistors. Give one application of each.
 - b) Define unilateral and bilateral circuit.
 - c) Define breakdown voltage and dielectric strength of a capacitor.
 - d) What is magnetic hysteresis?
 - e) Define reluctance and permeance with respect to magnetic circuit.
 - f) State Faraday's laws of electromagnetic induction.
 - g) State Fleming's right hand rule.

P.T.O.

2. Attempt any THREE of the following: 12

- a) Name the effect of electric current observed in electroplating. Explain the same.
- b) Why the emf of a cell is always greater than its terminal voltage? Explain.
- c) Describe the construction of any one type of capacitor.
- d) Distinguish between statically induced emf and dynamically induced emf.

3. Attempt any THREE of the following: 12

- a) Distinguish between Direct current and Alternating current. (Any four points)
- b) An electric heater is rated as 220V, 800 watts. Calculate resistance and current through it. Determine the bill for using it for 4 hours at a rate of Rs. 4.5 per unit.
- c) Define the following terms related to electric circuits -
 - (i) Node
 - (ii) Branch
 - (iii) Loop
 - (iv) Mesh
- d) Derive the expression for energy stored in capacitor with the help of a neat diagram.

4. Attempt any THREE of the following: 12

- a) Define ideal voltage source and practical voltage source. Draw the symbol for each.
- b) Calculate the equivalent resistance between points A and D in the Fig. No. 1.

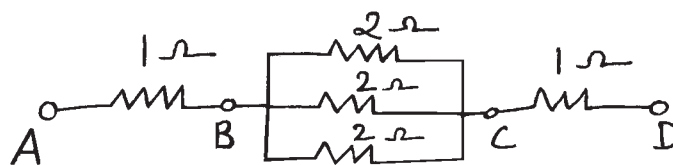


Fig. No. 1

- c) Three capacitors $1 \mu\text{F}$, $2 \mu\text{F}$ and $3 \mu\text{F}$ respectively are connected in a circuit. Determine the equivalent capacitance when they are connected in -
- Series
 - Parallel
- d) Describe the working of capacitor with a neat sketch.

5. Attempt any TWO of the following: 12

- Draw B-H curve for magnetic material and state its nature. State the significance of hysteresis loop. Also draw the hysteresis loop for hard steel and soft steel.
- An iron ring of mean circumference 100 cm is uniformly wound with 500 turns of wire. Calculate the value of flux density to produce a current of 1.1 Amp in the ring. Assume $\mu_r = 1200$.
- A coil consisting of 100 turns is placed in the magnetic field of 0.3 mwb. Calculate the average emf induced in the coil when it is moved in 0.06 seconds from the given field of 0.1 mwb. If the resistance of coil is 200Ω , find the induced current in the coil.

6. Attempt any TWO of the following: 12

- Find the current through 5Ω resistor using Kirchhoff's laws (Fig. No. 2) Also state Kirchhoff's current law.

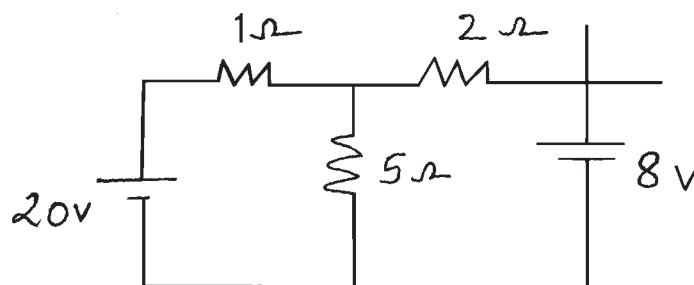


Fig. No. 2

- b) (i) State types of inductor.
- (ii) A magnetic flux of 0.6 mwb is passed through a coil of 1000 turns, is reversed in 0.05 second. Determine the average value of self induced emf.
- c) The field winding of a d.c. electromagnet is wound with 960 turns and has resistance of 50Ω when the exciting voltage is 230V, the magnetic flux linking the coil is 0.005 wb. Calculate the self inductance of the coil and the energy stored in magnetic field.
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