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Name.....

Reg. No.....

**COMBINED FIRST AND SECOND SEMESTER B.TECH. (ENGINEERING)
DEGREE EXAMINATION, DECEMBER 2006**

ME 04 108—BASIC ELECTRICAL ENGINEERING

(2004 admissions)

Time : Three Hours

Maximum : 100 Marks

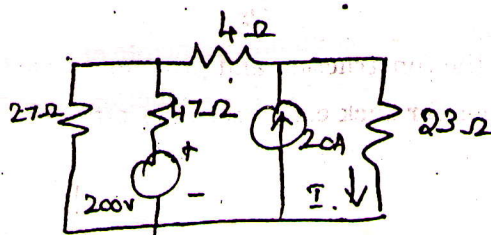
Part A

- I. (a) A toroidal air cored coil with 2000 turns has a mean radius of 25 cm., the diameter of each turn being 6 cm. If the current in the coil is 10 A, find (a) mmf, (b) flux and (c) flux density.
- (b) What is the principle of electrodynamic Wattmeter ? Explain.
- (c) Explain what is meant by impedance of a circuit and determine its value for a circuit having resistance R, inductance 'L' and capacitance 'C'. Also derive an expression for power factor.
- (d) What is a balanced three phase system ? Explain.
- (e) Draw neat sketches of step-up and step-down transformer. Explain their principles.
- (f) Enumerate the merits and applications of autotransformers.
- (g) What are the methods of exciting D.C. generators ? Explain any *one* method.
- (h) Give an account on potential applications of D.C. series and shunt motors.

(8 × 5 = 40 marks)

Part B

- II. (a) (i) State superposition theorem. (8 marks)
- (ii) Compute the current in 23 ohm resistor of the Figure shown below using superposition theorem.



(7 marks)

Or

- (b) (i) Explain the principles of Induction type energy meter with a neat sketch. (8 marks)
- (ii) Differentiate moving coil from moving iron instruments. (7 marks)

Turn over

- III. (a) (i) Compare the parameters of series resonance circuit with parallel resonance circuit. (8 marks)
- (ii) A capacitor and resistor are connected in series to an a.c. supply of 50 V and 50 Hz. The current is 2 A and the power dissipated in the circuit is 80 W. Calculate the resistance and capacitance value. (7 marks)

Or

- (b) (i) Show that a 3 ϕ power can be measured with the help of 2 wattmeters. (8 marks)
- (ii) An inductive coil takes 10 A and dissipates 1000 W when connected to a supply at 250 V, 25 Hz. Calculate the impedance, the effective resistance, the reactance, the inductance and the power factor. (7 marks)

- IV. (a) (i) Define and explain the following for transformers : (7 marks)

1 Transformation Ratio.

2 Regulation.

3 Transformer efficiency.

- (ii) Differentiate ideal transformer from real transformer. (8 marks)

Or

- (b) (i) Explain in detail the significance of having transformer o.c. and s.c. tests. (8 marks)
- (ii) Write a technical note on 'principles of autotransformers'. (7 marks)

- V. (a) (i) Derive the e.m.f. equation of D.C. generators. (8 marks)
- (ii) Explain the load characteristics of D.C. generator with neat curves. (7 marks)

Or

- (b) (i) Describe in detail the construction and principle of Operation of D.C. motors. (8 marks)
- (ii) Derive an expression for back e.m.f. of D.C. motors. (7 marks)

[4 $\times$ 15 = 60 marks]