D 26595 (Pages : 2) Name.....

Reg. No.....

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

EE 04-109—BASIC ELECTRICAL ENGINEERING

(2004 admissions)

[AI/EE/EC/IC/BM/BT]

Time : Three Hours Maximum : 100 Marks

Answer **all** *questions.*

Part A

1. (a) What are dependent and independent sources ? Explain with examples.
   (b) State and explain superposition theorem.
   (c) Explain the concept of electromagnetic force with the help of relevant rules.
   (d) What is leakage coefficient ? How does it affect magnetic circuits ? What are its disadvantages ?
   (e) Explain the generation of sinusoidal e.m.f. with a neat sketch. Obtain the mathematical representation of it.
   (f) Define (i) Bandwidth ; (ii) Q factor ; (iii) Resonant frequency. Obtain the relation among them.
   (g) What are 3 wire and 4 wire systems ? Explain with examples.
   (h) Explain the principle of measurement of 3ϕ power using 2 wattmeter method.

(8 × 5 = 40 marks)

2. (a) (i) 3 resistors 4Ω, 12Ω and 6Ω are connected in parallel. If the total current taken is 12 A, find the current through each resistor.

(8 marks)

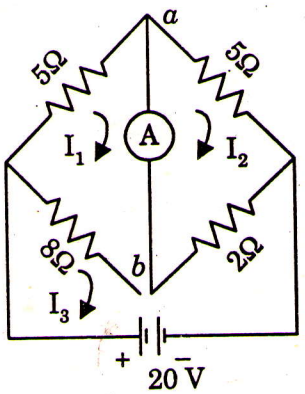
(ii) What are the advantages of series, parallel and series parallel circuit ? Explain the characteristics of a series and parallel circuit.

(7 marks)

Or

(b) (i) State and explain Norton's theorem. (8 marks)

(ii) In the circuit shown in figure, compute the current through the "O" resistance ammeter. Use Norton's theorem.



(7 marks)

Turn over

3. (a) (i) Explain the concept of electromagnetic force with the help of relevant rules. (8 marks)

(ii) Two coupled coils have a coefficient of coupling 0·85 ; N_1 = 100 turns and N_2 = 800 turns. With coil 1 open and a current of 5 A in coil 2, the flux is ϕ_2 0·35 MWb. Find L_1, L_2 and M. (7 marks)

Or

(b) (i) Derive an expression for energy stored in electrostatic field. (8 marks)

(ii) Define and explain the following :—

1 Natural response. 2 Rise time.

3 Fall time. 4 Clamping ratio.

4. (a) (i) Derive an expression for the alternating sinusoidal e.m.f. (7 marks)

(ii) Define R.M.S. value and obtain the same for a sinusoidal voltage wave. (8 marks)

Or

(b) (i) Explain the concept of impedance and admittance. (7 marks)

(ii) Broadly compare the parameters of series resonance and parallel resonance circuits. (8 marks)

5. (a) (i) What are 3 wire and 4 wire systems ? Explain. Give examples. (7 marks)

(ii) Three identical coils each having a resistance of 20 Ω and a reactance of 20 Ω are connected in (1) star ; (2) delta across 440 V, 3ϕ supply. Calculate for each case line current and reading in each of the wattmeters connected to measure power. (8 marks)

Or

(b) (i) Define and explain :

1 Active power. 2 Reactive power.

3 Apparent power. 4 Power factor. (8 marks)

(ii) Explain the principle of measurement of 3ϕ power using 2 wattmeter method. (7 marks)

(4 × 15 = 60 marks)