Total No. of Questions : 10] [Total No. of Printed Pages : 4

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BE–104(GS)

B. E. (First/Second Semester) EXAMINATION, Dec., 2011

(Grading System)

(Common for all Branches)

BASIC ELECTRICALS AND ELECTRONICS ENGINEERING

[BE–104(GS)]

Time : Three Hours

Maximum Marks : 70

Minimum Pass Marks : 22 (D Grade)

Note : Attempt *one* question from each Unit. All questions carry equal marks. Assume suitable data if necessary.

Unit–I

1. (a) What do you understand by dependent and independent sources ? Explain with neat sketches.

   (b) State superposition theorem. In the given network, making use of superposition theorem, determine the currents in resistors R_1, R_2 and R_3 and also the currents in voltage source E.

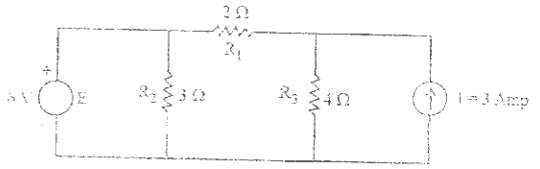

Fig. 1

P. T. O.

Or

2. (a) Voltage $v(t) = v_0 \cos(\omega t + \phi)$ is applied to a series circuit containing resistor R, inductor L and capacitor C. Obtain expression for the steady state current.

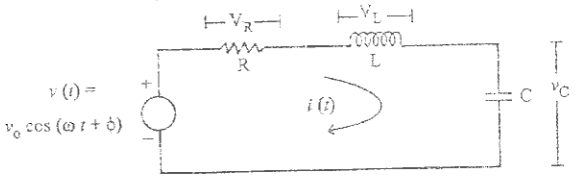

Fig. 2

(b) Describe star connection method for interconnection of 3-phase supply.

Unit – II

3. (a) (i) State Faraday's law of electromagnetism.

(ii) What is meant by turn ratio in transformer ?

(iii) What is megneto-motive force ?

(iv) Mention the *two* important electrical performances of transformer.

(b) Explain the principle of operation of transformer with suitable sketches.

Or

4. (a) The O. C. and S. C. tests on a 5 kVA, 230/110 V, 50 Hz transformer gave the following data :

O. C. test (H. V. side) – 230 V, 0·6 A, 80 W

S. C. test (L. V. side) – 9 V, 15 A, 20 W

Calculate percentage efficiency and regulation of transformer on full load at 0·8 p. f. lagging.

(b) Derive the condition for maximum efficiency of a transformer.

Unit – III

5. (a) Derive the expression for generated voltage in D. C. machine.

(b) Draw and explain the construction of a single-phase induction motor with neat sketches.

Or

6. (a) Obtain an expression for e. m. f. equation of 3-phase induction motor.

(b) What are the different methods of speed control in D. C. motor ? Discuss in details.

Unit – IV

7. (a) Convert the following numbers into decimal :

(i) $(11111111)_2$

(ii) $(100)_8$

(iii) $(FFFF)_{16}$

(iv) $(01010101)_2$

(v) $(100 \cdot 100)_2$

(b) Give the logic symbol and truth table for the following logic gates (any *two*) :

(i) NAND

(ii) NOR

(iii) NOT

(iv) EX-OR

Or

8. (a) Distinguish between combinational and sequential logic circuits giving example of each.

(b) Draw the circuit diagram of a half adder and derive its truth table.

P. T. O.

Unit – V

9. (a) (i) Name any *three* materials which are most widely used as semiconductors.

(ii) What type of semiconductor results when silicon is doped with (a) donor impurities (b) acceptor impurities ?

(iii) What is doping ?

(iv) What is intrinsic semiconductor ?

(v) What is operating points ?

(b) Explain the forward and reverse bias operation and voltage-current characteristics of a PN junction diode.

Or

10. (a) Explain the working of Bipolar junction transistor in common emitter configuration.

(b) Explain how a BJT can be used as (i) An amplifier (ii) 2 switch.