C 31679

(Pages : 2)

Name................................

Reg. No............................

COMBINED FIRST AND SECOND SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION, JUNE 2007

IT/CS 2K 109—BASIC ELECTRICAL ENGINEERING

Time : Three Hours

Maximum : 100 Marks

Answer **all** *questions.*

I. (a) Give international system of units for energy, voltage, current, flux density and force.

   (b) State and explain Thevenin's Theorem.

   (c) Give restrictions on pole-zero locations for driving point functions.

   (d) Show that power consumed in a pure resistive circuit is not constant but it is fluctuating.

   (e) In a 25 kVA, 2000/200 V transformer the iron and full-load copper losses are 350 W and 400 W respectively. Calculate the efficiency at unity power factor at (i) full-load and (ii) half-load.

   (f) Write short notes on : Wattmeters.

   (g) Derive the e.m.f. equation of a d.c. generator.

   (h) Explain the working principle of three-phase induction motors.

(8 × 5 = 40 marks)

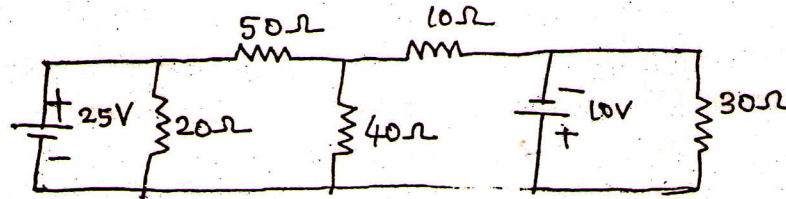II. (a) Use Norton's theorem to find current and voltage across 50 Ω resistor in the network of Fig. 1.

Fig. 1

Or

   (b) Use superposition theorem to find current through 3 Ω resistor in the network of Fig. 2.
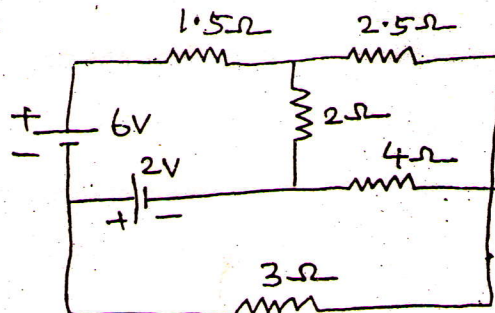

Fig. 2

Turn over

III. (a) (i) A resistor R in series with a capacitor C is connected to a 240 V, 50 Hz supply. Find the value of C so that R absorbs 300 W at 100 V. Find also the maximum charge and maximum energy stored in C.

(8 marks)

(ii) A coil resistance 10 Ω and inductance 0.1 H is connected in series with a capacitor of capacitance 150 μF across a 230 V 50 Hz supply. Determine power factor, voltage across the coil and voltage across the capacitor.

(7 marks)

Or

(b) In the network of Fig. 3, the switch is closed at $t = 0$. Find an expression for currents $i_1(t)$ and $i_2(t)$. Assume initial conditions are zero.
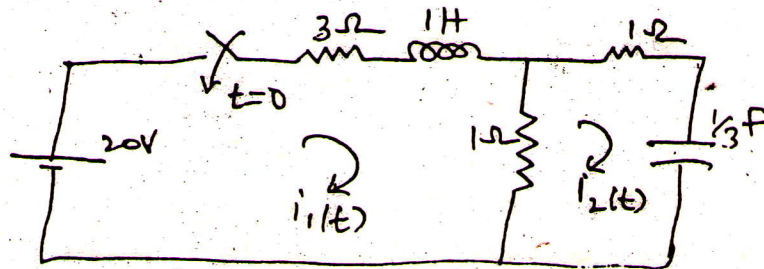

fig. 3

(15 marks)

IV. (a) A 5 kVA, 200/400 V, 50 Hz single-phase transformer gaine the following data :—

OC test (on LV side) : 200 V, 0.7A, 60 W.

SC test (on HV side) : 22 V, 16 A, 120 W

Obtain the equivalent circuit parameters of the transformer referred to LV and HV side. If the transformer operates on full-load, determine the percentage regulation at 0.8 p.f. leading.

Or

(b) Draw a neat diagram and explain the working of a moving coil voltmeter. Show the scheme of connection if the meter range is to be extended.

(15 marks)

V. (a) Name the various types of d.c. generators. Draw the circuit diagram and voltage equation for each case.

Or

(b) Explain in detail the construction and working of three-phase alternators.

(15 marks)

[4 × 15 = 60 marks]