Exam.Code:0906
Sub. Code: 6250

2014

B.E. (Mechanical Engineering)

Second Semester

ESC-X 05: Basics of Electrical and Electronics Engineering

Time allowed: 3 Hours **Max. Marks: 50**

NOTE: Attempt five questions in all, including Question No. I which is compulsory and selecting two questions from each Part.

x-x-x

Que.1

(a) Explain the tests performed on a single phase transformer

(b) Explain how voltage source with a source resistance can be converted into equivalent current source

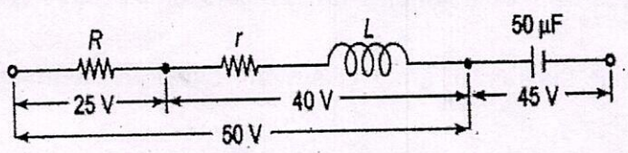
(c) Write the relation between power factor and wattmeter readings in two wattmeter method of power measurement.

(d) What is the function of capacitor in a single phase induction motor?

(e) Explain the depletion region in a PN junction. (5*2=10)

PART –A

Que. 2 (a) The series circuit of figure has shown below carries a current of 35 A. Find the values of R, r and L and the frequency of the applied voltage and its magnitude.



(5)

(b) Input power to a three-phase motor is measured by the two-wattmeter method. The two wattmeter readings are 4.8 kW and –1.6 kW with a line voltage of 400 V. Calculate (a) the total power (active), (b) the power factor, and (c) the line current. (5)

Que.3 (a) A balanced three-phase star-connected voltage source supplies power to a balanced three-phase star-connected load. Show with the help of a phasor diagram that if the load neutral is connected to the source neutral, no current will flow in the connecting wire.

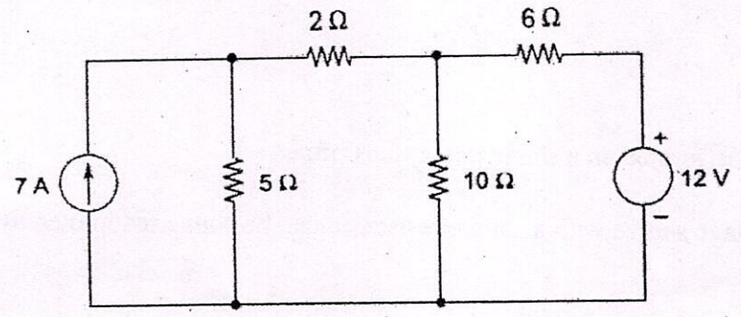
(5)

(b) Explain the input & output characteristics of CE configuration of a transistor?

(5)

P.T.O.

Que.4. Show that the Thevenin and Norton equivalents of a network have the same value of the resistance. For the circuit given below, find the nodal voltages and the current through the 2 ohm resistance.



(10)

PART –B

Que. 5 (a) Draw and explain the no load phasor diagram for a single-phase transformer. (5)

(b) Sketch and explain the speed-current, speed-torque and torque-current characteristics of a shunt motor, series motor and compound motor. (5)

Que.6 (a) The required no-load ratio in a 1-phase 50 Hz core type transformer is 6000/250 V. Find the no. of turns in each winding if the flux is to be about 0.06 wbs. (5)

(b) Draw single line diagram of a power system. Label all the major components of the system. (5)

Que.7 (a) What is the magnetic force which creates magnetic flux density? What name is used for it? Write the expression for B at distance r from a long conductor carrying current i. What are the path along which B is constant and its direction? (5)

(b) Draw the logic circuit given by the Boolean equation

$$Y = \bar{A}BC + A\bar{B}C + \bar{A}B\bar{C}$$

(5)

x-x-x