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18ELE13/23

First/Second Semester B.E. Degree Examination, June/July 2019
Basic Electrical Engineering

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-I

1 a. State and explain Kirchofis laws. **(08 Marks)**

b. Define form factor and peak factor. Obtain their values for a sinusoid voltage. **(06 Marks)**

c. A circuit consists of two parallel resistors having resistances of 200 and 300 respectively connected in series with a 150 resistor. If current through 150 resistor is 3A, find,
  i) Current through the branches.
  ii) Voltage across whole circuit
  iii) Power consumed by 200 and 150 resistors. (06 Marks)

OR

2 a. Define average and rms value of a sinusoid. Also derive the respective expressions. **(08 Marks)**

b. Find the potential difference between XY for the network shown below Fig.Q2(b). **(06 Marks)**

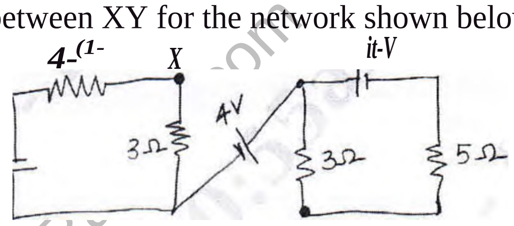

Fig.Q.2(b)

c. State Ohm's Law. Mention its limitations. **(06 Marks)**

Module-2

3 a. Obtain the behaviour of voltage, current and power in a pure inductor. Connected to single phase ac supply. **(08 Marks)**

b. Show that, 34) power can be measured using only two wattmeters for a balanced star connected load. **(06 Marks)**

c. A 34) load of 3 equal impedances are connected in delta across a balanced 400V, 50Hz, 3 4) supply which takes a line current of 10A at a power factor of 0.7 lagging. Calculate: i) Phase current ii) Total power in W iii) Power in VA iv) Power in VAR. **(06 Marks)**

OR

4 a. Obtain expressions for line and phase relationship of voltage, current and power in a 34) star connected system. **(08 Marks)**

b. An alternating voltage of (160 + j120)V is applied to a circuit and the current is given by (6 + j8)A. Find the values of circuit elements by assuming f = 50Hz. Calculate the power factor of the circuit and power consumed by the circuit. **(06 Marks)**

c. A balanced 34) star connected system draws power from 440V supply. The two Wattmeters connected indicate W1= 5kW and W2 = 1.2kW. Calculate power, power factor and current in the circuit. **(06 Marks)**

Module-3

5 a. Explain electrical shock, its causes and precautions to be taken to prevent them. **(08 Marks)**
b. Discuss about various types of losses in a transformer. **(06 Marks)**
c. A 250KVA; 11,000/415 Volts, 50Hz, 1+ transformer has 80 turns on the secondary. Calculate:
i) Rated primary and secondary currents
ii) Number of primary turns
iii) Maximum value of flux in the core
iv) Voltage induced/turn on secondary. **(06 Marks)**

OR

6 a. A 500kVA, 14) transformer has an efficiency of 92% at full load, upf and at half the full load, 0.9pf. Determine its efficiency at 80% of the full load and 0.95pf. **(08 Marks)**
b. Discuss about necessity of earthing, with a neat diagram explain pipe earthing. (06 Marks)
c. Write short notes on: i) Fuse ii) MCB. **(06** Marks)

Module-4

7 a. With a neat sketch, explain construction of a DC machine. **(08 Marks!**
b. A 4 pole, 230V, DC series, wave connected armature with 1254 conductors, with flux per pole of 22mWb, takes 50A for motoring. The armature and series field coil resistances are 0.30 and 0.2) respectively. Calculate the speed and torque developed in Watts. **(06 Marks)**
c. Brief on characteristics of a DC shunt motor with neat diagrams. **(06 Marks)**

OR

8 a. Define back emf and derive torque equations for a DC motor. **(08 Marks)**
b. A shunt generator has 4 poles, lap wound armature having 24 slots with 10 conductors/slot. If the flux/pole is 0.04Wb. and the speed is 1500rpm, calculate the emf generated in the armature. What would be the generated emf if the winding is wave connected? **(06 Marks)**
c. Give the classification of DC generators with their equivalent circuit diagrams. **(06 Marks)**

Module-5

9 a. Explain the principle of working of an induction motor. **(08 Marks)**
b. List the advantages of rotating field over rotating armature. **(06 Marks)**
c. A 34), 6-pole, star connected alternator, revolves at 1000rpm. The stator has 90 slots and 8 conductors/slot. The flux per pole is 0.05 Wb. Calculate the voltage generated by tht, machine if winding factor is 0.96. **(06 Marks)**

OR

10 a. Explain the working principle of an alternator. Also derive its emf equation. **(08 Marks)**
b. Compare squirrel cage and slip ring types of rotors of an Induction motor. **(06 Marks)**
c. An 8 pole alternator runs at 750 rpm, supplies power to a 4 pole induction motor. The frequency of the rotor is 1.5Hz. What is the speed of the motor? **(06 Marks)**