BT-3/D11: 7613-RE

ELE 201 E : Electromechanical Engg. Conversion

Time : 3 Hours
Maximum Marks : 100

Note: Attempt Any Five question. Selecting at least one question from each unit. Each Question carries equal marks.

UNIT - 1

Q.1 a) Discuss how will you describe magnetism around a solinoid. 10

b) Discuss what are frictional and copper losses. 10

Q.2 a) A transformer is operated at rated frequency but at a voltage higher than its rated value. Explain how the following quantities would change:

a) No load current.

b) Hysteresis loss.

c) Eddy current loss. 4x3 = 12

b) What are the condition for parallel operation of the transformer? 8

Q.3 a) Show that the torque developed in a doubly excited magnetic system is equal to the rate of increase of field energy with respect to displacement at constant currents. 10

b) For a singly excited magnetic system derive the relation for magnetic stored energy in terms of reluctance. 10

Q.4 a) Show that the effect of armature mmf on the main field is entirely cross magnetizing. 10

b) Explain three types of characteristics of a DC generator. Why do the external characteristics of a shunt generator turn back as the generator is overloaded? http://www.kuonline.in 10

Q.5 a) Why is it not advisable to start wound rotor induction motors by the methods employed for starting cage induction motor. 7

b) What is the objection to the reduced voltage starting of polyphase induction motor? 6

c) What are the causes of an induction motor operating always at lagging power factors. 7

Q.6 A 14 K.W, 3 phase, 50 Hz, 4 pole induction motor has a full load slip of 0.03. mechanical and stray load losses at full load are 3.5% of output power. Compute

a) Power delivered by stator to rotor

b) Electromagnetic (internal) torque at full load

c) Rotor ohmic losses at full load 20

Q.7 a) Explain the difference between cylindrical rotor theory and two reaction theory. 8

b) A salient pole synchronous is connected to infinite bus. If its field current is reduced to zero, will it stop or continue running? If the latter, what will be its speed at what load angle will it fall out of step with zero field current. 12

Q.8 a) Explain how the graph between the p.f and field current can be obtained from the V curves of a synchronous motor. 10

b) A 5 MVA, 11 KV,50Hz, 4 pole, star connected synchronous generator with synchronous reactance of 0.7 per unit is connected to an infinite bus. Find synchronizing power and the corresponding torque per unit of mechanical angle displacement.

a) at no load

b) at full load of 0.8 p.f. lag 10