Exam.Code:0933
Sub. Code: 6971

1129

B.E. (Electrical and Electronics Engineering)
Third Semester
EE-301: Electric Machinery – I

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 Unit. Missing data (if any) can be appropriately assumed.

x-x-x

I. Explain briefly:-

a) Write three four applications of the autotransformer -

b) Can generators that are being driven in opposite directions be success fully paralleled?

c) What is meant by the compound motor?

d) Cite possible reasons why a three-phase induction motor fails to start.

e) Why cannot an asynchronous motor run at synchronous speed? (5x2)

UNIT – I

II. a) Discuss the different types of losses in transformer and derive efficiency of transformer.

b) The maximum efficiency of a 3-phase 11000/400V, 500 KVA transformer is 98.8% and occurs at 80% full load, unity power factor. Its percentage impedance is 4.5% Load power factor is now varied while the load current and the supply voltage are held constant at their rated values. Determine the load power factor at which the secondary terminal voltage is minimum and find the value of the latter. (2x5)

III. a) A 45 KW, 250V, 4 pole, lap connected D.C. Shunt motor has 32 slots with 10 conductors/ slot. The armature and shunt field resistances are 0.05 ohm and 125 ohms respectively. The flux/pole is 0.03 Wb. If the full load efficiency is 85% find at full load: (i) Useful torque at shaft; (ii) The speed.

b) What is commutation? Explain commutation process with suitable diagrams in reference to the DC machine. (2x5)

IV. a) Draw and explain the phasor diagram of transformer when it is operated under load.

b) Explain in detail about the commutation and list out the various methods of improving commutation in detail with a neat sketch. (2x5)

P.T.O.

UNIT – II

V. a) Why the starter is necessary to start an induction motor? Mention the variou methods of starting and discuss the limitations of these methods.

b) A 185 KW, 110V, 50 Hz, 4 pole single phase induction motor has a rotational los of 15 W at normal speeds. The equivalent circuit parameters are: r_1 = 1.3 ohm r_2' = 3.2 ohm, x_1 = 2.5 ohm, x_2' = 2.2 ohm, x_m = 48 ohm. Determine the lin current, line power factor, power output, and efficiency of this motor, when i operates at a slip of 4%. (2x5)

VI. a) Explain how the speed of slip ring induction motor can be varied by varying it rotor circuit resistance. What are the limitations of this method?

b) Explain the no load and block rotor test on a three phase induction motor. How ar the parameters of equivalent circuit determined from these results? (2x5)

VII. a) Explain in detail with suitable diagrams the capacitor start - capacitor run single phase induction motor.

b) Write a short note on Induction generator. (2x5)

x-x-x