Total No. of Questions : 8]

SEAT No. :

PE-2536

[Total No. of Pages : 2

[6583]-62
T.E. (Electrical)
COMPUTER AIDED DESIGN OF ELECTRICAL MACHINES
(2019 Pattern) (Semester - VI) (303149)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Solve Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Assume suitable data if necessary.***
5) ***Use of Calculator is allowed.***

Q1) a) Explain mechanical axial force developed under short circuit condition in a transformer and the measures to overcome them. **[8]**

b) Explain the procedure to estimate the no load current of three phase transformer. **[4]**

c) Draw and Explain generalized flow chart of design of transformer. **[5]**

OR

Q2) a) A 500 kVA, 11000/440 V, delta/star transformer has the following details: HV turns = 1600, Length of mean turn = 93 cm, Length of coil = 52 cm, short circuit current = 20× rated current . Find radial force in tonnes on the HV winding under short circuit conditions. **[8]**

b) Derive the equation for magnetizing current in terms of magnetizing Volt-Amps. **[5]**

c) Explain the factors on which the radial force developed in the transformer depends. **[4]**

Q3) a) Discuss the various factors to be considered for selection specific electric loading (ac) for the design of three phase induction motors. **[9]**

b) Derive the output equation of three phase AC machines, from the same equation, derive kVA input equation in terms of mechanical power output of three phase induction motor. **[9]**

OR

P.T.O.

Q4) a) Explain the main dimensions of three phase induction motors. Also explain the factors on which the main dimensions or size of the ac machines depends. **[9]**

b) List the advantages of squirrel cage motor as compared to slip ring induction motor. **[9]**

Q5) a) Estimate the main dimensions for 3 phase, 50 Hz, 10 kW, 400 V, 4 pole, squirrel cage induction motor. Assume full load efficiency of 0.85, full load power factor of 0.86 and winding factor 0.955. The specific magnetic loading is 0.4 wb/m^2 and the specific electric loading = 22000 A/m, stacking factor = 0.9. Take rotor peripheral speed as 20 m/s at synchronous speed. **[9]**

b) Explain the points to be considered while selecting the stator slots of three phase induction motor. **[9]**

OR

Q6) a) A 11 kW, 3-phase, 6 pole, 50 Hz, 220 V, star connected induction motor has 54 stator slots, each containing 9 conductors. Calculate the values of bar and end ring currents. The numbers of rotor bars is 64. The machine has an efficiency of 0.86 and power factor of 0.85. The stator mmf may be assumed 80 % of stator mmf. Also find bar and end-ring sections if the current density is 5 A/mm^2. **[9]**

b) Explain the effect of length of air-gap on the overload capacity of three phase induction motor. **[9]**

Q7) a) Explain the procedure to find out mmf required for air gap , stator teeth, stator core , rotor teeth , rotor core of three phase induction motor. **[8]**

b) Draw and explain the effect of saturation in Induction Motor. **[9]**

OR

Q8) a) State and explain with neat sketches different types of leakage fluxes in an induction motor and estimate slot leakage reactance in an induction motor. **[8]**

b) Draw and Explain generalized flow chart of design of Induction Motor. **[9]**

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