PA-1463

[5926]-80

T.E. (Electrical Engineering)
COMPUTER AIDED DESIGN OF ELECTRICAL MACHINES
(2019 Pattern) (Semester - II) (303149)

Time : 2½ Hours]

[Max. Marks : 70

Instructions to the candidates:

1) *Solve Q1 or Q2, Q3 or Q4, Q5 or Q6 and Q7 Q8.*

2) *Figures to the right indicate full marks.*

3) *Neat diagrams must be drawn wherever necessary.*

4) *Assume suitable data, if necessary.*

5) *Use of non-programmable calculator is allowed.*

Q1) a) Explain the various heat dissipating modes by which heat developed in electrical machines dissipates. **[6]**

b) Derive the Output equation for single transformers with usual notations. **[7]**

c) Derive the equation for radial mechanical forces developed in transformers under short circuit conditions and measures to overcome the mechanical forces develop. **[7]**

OR

Q2) a) Explain the significance of mitred joint in transformer core design. **[6]**

b) Explain the role of Buchholz Relay in power transformers. Where it is lcoated. **[7]**

c) Explain step by step the procedure to design the core of transformers. **[7]**

Q3) a) Derive the output equation of three phase ac machines and from the same derive the equation input kVA for three phase induction motor in terms of h.p. or kW. **[8]**

b) Explain the points to be considered while selecting the value of specific magnetic loading for the design of three phase induction motor. **[8]**

OR

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Q4) a) Explain in detail the factors affecting the size of ac machines. **[8]**

b) Explain the points to be considered while selecting the stator slots of three phase induction motor. **[8]**

Q5) a) Derive the equation for end ring current in squirrel cage rotor with usual notations. **[8]**

b) What are different types of rotor slots? Explain any one. What are the advantages of tapered slots? **[8]**

OR

Q6) a) Why the length of air gap in an induction motor is kept minimum possible range. What factors govern the choice of air gap in induction motor. **[8]**

b) A 11 kW, 3-phase, 6 pole, 50 Hz star connected induction motor has 54 stator slots, each containing 9 conductors. Calculatm 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 85% of stator mmf. Also find bar and end-ring sections if the current density is 5 A/mm^2. **[8]**

Q7) a) Explain the effect of duct on the calculation of magnetizing current of three phase induction motor. **[8]**

b) What are various methods to improve the starting torque of three phase squirrel cage induction motor. **[10]**

OR

Q8) a) Explain the different types of leakage flux in an induction motor. **[8]**

b) Explain the procedure for calculation of total mmf for the magnetic circuit of three phase induction motor.

Calculation of total mmf = mmf for air -gap + mmf for stator teeth + mmf for rotor teeth + mmf for stator core + mmf for rotor core. **[10]**

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