

Total No. of Questions : 4]

PA-10047

SEAT No. :

[Total No. of Pages : 2

[6009]-330

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

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

- 1) Solve Q.1 or Q.2, Q.3 or Q.4.
- 2) Figures to the right indicate full marks.
- 3) Neat diagrams must be drawn wherever necessary.
- 4) Assume suitable additional data, if necessary.
- 5) Use of non-programmable calculator is allowed.

- Q1)** a) State and Explain the different modes of heat dissipation. [6]
- b) Write various specifications of a transformer as per IS 2026 part - I. [4]
- c) A field coil has a dissipating surface of 0.15m^2 & a length of mean of 1m. It dissipates loss of 150 watts, the emissivity being 34 watts/m^2 . °c. Estimate the final steady temperature rise of the coil its and its time constant if the cross section of the coil is $100 \times 50\text{ mm}^2$, Specific heat of copper is $390\text{ J/kg. }^\circ\text{c}$. The space factor 0.56. copper weighs 8900kg/m^3 . [5]

OR

- Q2)** a) Derive the expression for heating curve with usual notations and hence define heating time constant. [6]
- b) Write the functions of Tap changer, pressure release valve, conservator and breather? [4]
- c) What are different types of winding used in a transformer? Explain any two. [5]

P.T.O.

- Q3)** a) Derive the output equation of a three phase transformer with usual notation. [5]
- b) Explain the procedure for the design on tank with cooling tubes and derive the relation for the number of cooling tubes. [4]
- c) A 200 KVA, 6600/400V, three phase transformer, delta/star connected, 50 Hz, core type transformer has the following particulars: Maximum flux density = 1.3 wb/m², current density = 2.5A/mm², window space factor = 0.3, Overall height = overall width and use three stepped core, stacking Factor = 0.9, emf per turn = 10 volts. Width of largest stamping = 0.9d and net iron area = 0.6d² Calculate overall core dimensions. [6]

OR

- Q4)** a) Derive the relation (A_i / area of circumscribing circle) and (A_{gi} / area of circumscribing circle) for square core [4]
- b) Derive expression for the condition of transformer design for minimum cost in terms of total cost of iron and copper cost for three phase transformer. [5]
- c) Design a suitable cooling tank with cooling tubes for a 500 kVA, 6600/440V, 50Hz, 3 phase transformer with the following data. Dimensions of the transformer are 100 cm height, 96 cm length and 47 cm breadth. Total losses = 7 kw. Allowable temperature rise for the tank walls is 35°C. tubes of 5 cm diameter area to be used. Determine the number of tubes required. [6]
