

Total No. of Questions : 4]

SEAT No. :

PD109

[Total No. of Pages : 2

[6410]-430

T.E. (Electrical Engineering) (Insem)

COMPUTERAIDED DESIGN OF ELECTRICAL MACHINES

(2019 Pattern) (Semester - II) (303149)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

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

Q1) a) Write important Specifications of three phase transformers as per IS 2026 (Part I) [5]

b) Write the advantage and disadvantages of three phase transformer over a bank of three single phase transformers. [4]

c) Derive the equation for cooling temperature - time characteristics. Sketch the cooling - time characteristics. [6]

OR

Q2) a) Explain radiation mode of the heat dissipation of electrical machines. [5]

b) Explain the significance of mitred joints in the design of core of the transformers. [4]

c) The exciting coil of the electromagnet has cross - section of $120 \times 50 \text{ mm}^2$ and the length of mean turn is 0.8m. It dissipates 150 W continuously. Its cooling surface is 0.125 m^2 and specific heat dissipation is $30 \text{ W/m}^2 \text{ } ^\circ\text{C}$. Calculate the final steady temperature rise of the coil surface. Also calculate the hot spot temperature rise if the thermal resistivity of the insulating material used is $8 \Omega\text{m}$. The space factor is 0.56. [6]

P.T.O.

- Q3)** a) Derive the condition for minimum cost of the transformer for the optimum transformer design. [4]
- b) Explain why the core of the transformers is stepped. [4]
- c) The distribution transformer ratings, 250 kVA, 11 kV/433 V, Delta-Star connections, 50Hz, tapings $\pm 2.5\%$ and $\pm 5\%$ on HV winding. Calculate [7]
- Voltage per turn,
 - Size of HV and LV winding conductors. Assume suitable data for the calculations.

OR

- Q4)** a) Derive the condition for minimum loss of the transformer for the optimum transformer design. [4]
- b) Write short note on continuous disc type winding of transformers. [4]
- c) With justification, explain the effect of design of window on: [7]
- Leakage reactance,
 - Voltage regulation,
 - Mechanical forces developed and
 - Magnetising current of transformers.

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