14/12/2024 ELECTRICAL SEM-VII C SCHEME EMD (DLOC-V) QP CODE: 10065394

Duration – 3 Hours **Total – 80**

N.B.:- (1) Question No.**1** is compulsory.
(2) **Attempt** any **three** questions out of remaining **five** questions.
(3) Assume suitable data if necessary and justify the same.

Q 1. Answer the following questions. **20**
a) Explain analysis method in CAD.
b) Explain the working of Permanent Magnet Synchronous Machines
c) Write short note on Window Space Factor.
d) Explain types of insulating materials in detail.

Q 2 a) Explain the effect of choice of electrical loading and magnetic loading on the design of electrical machine? **10**

Q 2 b) Derive the output equation of 3 phase induction motor. **10**

Q 3 a) Find the main dimensions of a 15 kW, 3 phase, 400 V, 50 Hz, 2810 r.p.m. squirrel cage induction motor having an efficiency of 0.88 and a full load power factor of 0.9. Assume specific magnetic loading = 0.5 Wb/m^2; specific electric loading 25000 A/m. Take the rotor peripheral speed as approximately 20 m/s at synchronous speed. **10**

Q 3 b) Explain the estimation of full load MMF in synchronous machines. **10**

Q 4 a) Find the main dimensions of 100 MVA, 11 KV, 50 Hz, 40 pole salient pole generator assuming air gap flux density as 0.65 Wb/m^2 and ampere conductors as 40000 per meter. The peripheral speed should not exceed 60 m per second. **10**

Q 4 b) Explain the design of damper winding in synchronous machines.. **10**

Q 5 a) A 250 kVA, 6600/400 V, 3 phase core type transformer has a total loss of 4800 W at full load. The transformer tank is 1.25 m in height and 1 m x 0.5 m in plan. Design a suitable scheme for tubes if the average temperature rise is to be limited to 35° C. The diameter of tubes is 50 mm and are spaced 75 mm from each other. The average height of tubes is 1.05 m. Specific heat dissipation due to radiation and convection is respectively 6 and 6.5 W/m^2 -°C. Assume that convection is improved by 35 per cent due to provision of tubes. **10**

Q 5 b) Explain sizing of electric motors for electric vehicle? **10**

Q 6 a) Differentiate between conducting properties of Cu and Al. **10**

Q 6 b) i) Draw and explain flowchart of Hybrid method in Computer aided designs. **05**
ii) Mention the types of cooling methods used in transformer and explain anyone. **05**

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