Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(Electrical & Electronics) (E-1 2013 Batch) (Sem.–6)

ELECTRICAL MACHINE DESIGN

Subject Code : BTEEE-603A

M.Code : 71137

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

SECTION-A

1. Answer briefly :

a) Give the temperature range for class E insulators with two examples.

b) How Eddy current losses can be reduced?

c) The resistance of motor winding is 252 ohm at 20°C.The resistance of the winding rises to 303 ohm. Calculate the temperature rise of the winding if the winding is made up of copper and ambient temperature is 20° C.

d) What is meant by TEFC and TESAC machine?

e) What is cooling time constant?

f) What is difference between distribution and power transformer?

g) Give the advantages of continuously transposed conductors over conventional paper covered conductors.

h) What are the factors to be considered while designing transformer tank?

i) What is the effect of flux density in air gap on power factor and iron loss in induction motors?

j) What is short time rating?

SECTION-B

Q2. What are the different methods used for the measurement of temperature rise in machines?

Q3. A 500 MW direct water cooled turbo alternator has a stator copper loss of 800 KW. The water inlet temp. is 38°C and the outlet temp. is 68°C. Calculate amount of water required sec. Also calculate the area of water duct in each sub conductor if there are 48 slots with 2 conductors slot and each conductor is subdivided into 32 sub conductors. The velocity is not to exceed 1m/sec. If the pumping pressure is 300 KN /m^2, calculate the power of water pump if its efficiency is 0.6.

Q4. Explain the different types of cores used in transformers.

Q5. The losses in a 11KW three phase 4000V, 50 Hz, 1000 rpm induction motor are : Copper losses = 950W, Iron losses = 500W and Friction & windage losses = 110W Find the output losses & efficiency of a similar motor designed with each linear dimension of the given motor.

Q6. Explain the method used for reduction of harmonic torques in induction motors.

SECTION-C

Q7. A 400 KVA transformer has its max. efficiency at 80% of full load during a short full load heat run the temp. rise after 1 hour and 2 hours is observed to be 24°C and 34°C respectively. Find the thermal time constant and final study temp. rise of the transformer. If by use of a fan the rate of heat dissipation is increased by 50%, find the new KVA rating possible (a) for the same final temp. rise as before and (b) if the allowable temp. rise taken as 50°C.

Q8. What is specific permeance? Find an expression for effective specific permeance of induction motor.

Q9. What are the mechanical forces produced in transformer? Find an expression for axial force and radial force.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.