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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 /m², 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 steady state 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.