Printed Pages : **EEE023**

(Following Paper ID and Roll No. to be filled in your Answer Books)										
PAPER ID :	**Roll No.**									

B.TECH

Theory Examination (Semester-VI) 2015-16

CONVENTIONAL & CAD OF ELECTRICAL MACHINES

Time : 3 Hours ***Max. Marks : 100***

1.Attempt all parts. All parts carry **equal** marks. **(2 x 10 =20)**

a) Define Magnetic Loading Effect.

b) Why is 1/3 periphery of the rotor unslotted for Turbo generator?

c) Enlist the properties of CRGO Steel.

d) Name the factors which affect the size of the rotating machines.

e) Why do small machines have lower specific magnetic loadings?

f) Develop the output equation of a dc machine.

g) What is an Electrical Loading?

h) Enlist the limitations of computer aided design.

i) What is slot leakage reactance for a 3 phase alternator?.

j) How does the short circuit ratio affect the synchronous machine design?

SECTION-B

2. Attempt any **five** questions from this section. **(10 x 5 = 50)**

a) Discuss in detail about the cooling methods adopted in transformer.

b) A 15kW 230 V, 4 pole dc machine has the following data: armature diameter = 0.25m; armature core length = 0.125 m; length of air gap at pole centre = 2.5 mm; flux per pole = 11.7 x 10^{-3}Wb, ratio (pole arc/ pole pitch) = 0.66. Calculate the mmf required for the air gap, if the armature surface is treated as smooth.

c) The tank of a 500kVA, 1-phase, 50 Hz, 6600/400V transformer is 110cm x 65 cm x 155 cm. If the full load loss is 6.2 kW, find the suitable arrangements for the cooling tubes to limit the temperature rise to 35°C. Take the diameter of the cooling tubes as 5 cm and average length of the tubes as 110cm.

d) Mention the factors which influence the choice of specific magnetic loading and explain them.

e) (i) Write short notes on Computer Aided design. Mention its advantages.
(ii) With the help of flowchart, explain the synthesis method of design.

f) Classify the electrical machines from the view point of manufacturing process and explain them.

g) A 600 rpm, 50 Hz, 10000 volt, 3 phase synchronous generator has the following design data: Specific magnetic loading = 0.48 Wb/m^2; current density = 2.7 A/mm^2; slot space factor = 0.35; number of slots = 144; slot size 120 x 20 mm; stator bore = 1.92 m; stator core length = 0.4m.

h) Draw the flow chart for overall design of Transformer. The design must include all standard specifications.

SECTION-C

Attempt any **two** questions from this section. **(15 x 2 = 30)**

3. The following particulars refer to the shunt field coil for a 440V, 6 pole, dc generator: MMF per pole = 7000 A; depth of winding = 50 mm; length of inner turn = 1.1 m; length of outer turn = 1.4 m; loss radiated from outer surface excluding ends = 1400 W/ m^2; space factor = 0.62; resistivity = 0.02 Ω/m and mm^2. Calculate the diameter of the wire, length of coil, number of turns and exciting current. Assume a voltage drop of 20 per cent of terminal voltage across the field regulator.

4. Write a program to design a 30 kW, 440 V, 3 phase, 6 pole 50Hz delta connected squirrel cage induction motor, the design must include:
   (i) Main dimensions of the slator frame.
   (ii) Number of turns per phase in stator winding.
   (iii) Number of stator slots

5. (i) What is the role of damper bars in the alternator, write a computer program for the field winding design of a 3 phase alternator.
   (ii) Derive the output equation for a 3-phase alternator and explain the effect of specific electrical loading and magnetic loading on the output of the alternator, also discuss, how main dimensions are estimated.