AMIRAJ
COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT : ELECTRICAL
SEMESTER: 7TH
SUBJECT NAME: DESIGN OF AC MACHINE
SUBJECT CODE : 2170909
FACULTY NAME: SUNIL PATEL

ASSIGNMENT: 5 DESIGN OF ALTERNATOR

1. Determine main dimensions and turns per phase of a 3 MVA, 11 kV 50 Hz 32 pole three phase star connected alternator. Assume average gap density of 0.55 wb/m2, ac = 30000, winding factor 0.955. Use L/τ ratio of 1.2.

2. A 2500 kVA 32 pole three phase , 60 Hz, 2400 V, star connected salient pole alternator has the following design data: Stator bore = 2.5 m; core length = 0.44m; turns/phase = 224; winding factor =0.95; length of air gap 10 mm; air gap contraction factor = 1.11; ratio of pole arc to pole pitch = 0.69; ratio of amplitude of fundamental of gap flux density to maximum gap density = 1.068; per unit leakage reactance = 0.14. Determine direct and quadrature axis synchronous reactance.

3. Discuss algorithm and develop flow chart for main dimension design of a low speed alternator.

4. Briefly answer following:
   (1) Why are conductors in the overhang are braced?
   (2) Why the stator winding of all synchronous generators is usually star connected with neutral earthed?
   (3) What are the advantages of circular poles?
   (4) Why does the rotors of turboalternators are slotted for only two third of its periphery?

5. Explain factors affecting specific electric loading and specific magnetic loading of alternator.