7. Discuss in detail the design of the field system for non salient pole alternator. 15

SECTION – D

8. (a) Discuss the factors which govern the choice of number of poles in a d.c. machine. 7.5

(b) Design a 4 pole, 10KW, 220V, 1000rpm., d.c. shunt motor with respect to the following

1. Output coefficient
2. The diameter and length of armature

Assume : Specific magnetic loading = 0.45 Tesla

Specific electric loading = 17500 ampere conductor per meter

Ratio of gross axial length to pole pitch= 0.68 7.5

9. (a) Define the following terms : 15

(i) Optimization

(ii) Standardization.

(b) Discuss any one approach of CAD in designing of electrical machines with proper flow chart. 15

Roll No. .....

3240

B. Tech. 5th Semester (EE) Examination – March, 2021

COMPUTER AIDED ELECTRICAL MACHINE DESIGN

Paper : PCC-EE-313-G

Time : Three Hours] *[Maximum Marks : 75*

Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.

Note : Attempt *five* questions in all, selecting *one* question from each Section. Question No. 1 is *compulsory*. All questions carry equal marks.

1. (a) List the limitations of Electrical machine design.

(b) Discuss the effects on the performance of a three phase squirrel cage Induction motor when Air gap length is increased.

(c) Explain the term 'Window Space Factor 'as used for transformer design.

(d) Explain the limitations of Computer Aided design.

(e) Discuss the term output coefficient in case of DC machine.

(f) Enlist the advantages of Computer Aided design.

$2.5 \times 6 = 15$

SECTION – A

2. (a) Discuss Modern trends in design and manufacturing techniques. 7.5

(b) Explain the factors influencing the size of rotating electrical machine. 7.5

3. (a) Define the following : 7.5

(i) Specific electric loading

(ii) Specific Magnetic loading

(b) Discuss the factors on which choice of specific electric and specific magnetic loading depends. 7.5

SECTION – B

4. (a) Deduce an expression for a 3 phase induction motor showing the relationship between the output, its main dimensions, speed, the specific electric and magnetic loading, efficiency and power factor. 7.5

(b) Design the following information for a 30KW, 440V, 3 phase, 6 pole, 50Hz delta connected Squirrel cage induction motor.

1. Main dimensions.
2. Number of turns per phase in the stator winding
3. Number of stator slots
4. Number of conductors per slot.

Assume specific magnetic loading = 0.48 tesla

Specific electric loading = 26000 ampere Conductor per meter

Full load efficiency= 88 per cent

Full load power factor = 0.86 7.5

5. Discuss in detail the stator design of three phase induction motor. 15

SECTION – C

6. (a) Derive an output equation for a 3phase transformer. Explain why stepped core is used in transformer ? 7.5

(b) Deduce an expression between volts per turn and K. V.A. rating of a transformer. 7.5