*Roll No. .....*

# OLE-3240

## B. Tech. 5th Semester (EE) Examination – April, 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 Unit. Question No. **1** is ***compulsory***. All questions carry equal marks.

**1.** (a) What is magnetic loading ? 3

(b) Deduce an expression for output equation of d.c. machine. 3

(c) Compare leakage flux and leakage reactance ? 3

(d) What do you mean by term optimization in electrical machine design ? 3

(e) What do you mean by winding factor in an electrical machine ? 3

## UNIT – I

**2.** Develop an output equation of a.c. machine and discuss various factors affecting size of rotating machine. 15

**3.** (a) Derive an expression for relation between rating and main dimension of rotating machine. 7.5

(b) A 350 KW. 500V. 450 r.p.m .. 6 pole dc generator is built with an armature diameter of 0.87m and a core length of 0.32m. The lap wound armature has 660 conductors. Calculate the specific electric and magnetic loading. 7.5

## UNIT – II

**4.** Describe the stator design of an induction motor in details. 15

**5.** In the design of 30hp. 3-phase, 440 volt. 960rpm. 50 hz, delta connected induction motor, assume the specific electrical loading of 25000 ac/m. specific magnetic loading of 0.46wb/$m^2$. Full load efficiency 86%, pf 0.87 and estimate the following (i) stator core dimension (ii) number of stator slots and winding turns. 15

## UNIT – III

**6.** (a) Derive an output equation for 1-phase and 3-phase transformer. 7.5

(b) Describe the detailed design procedure for yoke and core design of a transformer. 7.5

**7.** (a) Discuss the design of stator slot and winding of a synchronous machine. 7.5

(b) Discuss the magnetic circuit and field winding of a synchronous machine. 7.5

## UNIT – IV

**8.** (a) Enlist the advantages of CAD for machine design along with its limitations. 7.5

(b) Discuss computerization of design procedure for a d.c. motor. 7.5

**9.** Write short note on : 15

(a) Optimization technique for machine design

(b) Discuss analysis and synthesis method in brief