

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER– VI (New) EXAMINATION – WINTER 2019****Subject Code: 2160911****Date: 12/12/2019****Subject Name: Computer Aided Analysis and Design for Electrical Engg.****Time: 02:30 PM TO 05:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1 (a)** State the performance parameters expected to be outputted on running any Computer Aided Design program. **03**
- (b)** Compare top down and bottom up approaches in CAD programs. State example of the same. **04**
- (c)** Explain general procedure to design DC machine optimally drawing flowchart of the same. **07**
- Q.2 (a)** State requirements of the high conductive materials **03**
- (b)** Explain properties of low, medium and high hysteresis losses material drawing hysteresis loops of any three materials. **04**
- (c)** Consider the case of a single-phase induction motor seems to draw full load current at 60% of rated load. **07**
Estimate probable causes for the same.
Discuss how Finite Analysis helps to improve design to overcome above problem. Describe steps involved in process in brief.
- OR**
- (c)** Interpret role of FE Analysis tool in conventional Computer Aided Designing process. **07**
- Explain significance and function of followings in respect to FE Analysis:
- i) Meshing
 - ii) Boundary conditions
 - iii) Static analysis
 - iv) Transient analysis
- Q.3 (a)** Suggest type of slot winding out of following options: **03**
(A) Integral slot winding (B) Fractional slot winding
For 3 phase, 4 pole, 66 slots armature.
(show calculations and justify your answer in one-two lines)
- (b)** Discuss the algorithmic steps 3-point starter design **04**
- (c)** Illustrate a case of design optimization where FE Analysis of electrostatic field with appropriate diagrams. **07**

OR

- Q.3** (a) State the significance of specific magnetic loading. **03**
- (b) Identify sequential steps for designing a small transformer. **04**
- (c) Evaluate significance of optimal selection Max-Min range of following parameters for distribution transformer. **07**
i) kg/kVA ii) Efficiency iii) inrush current iv) Maximum flux density in core.
- Q.4** (a) State criteria for selection of type of armature windings out of Lap or Wave. **03**
- (b) Estimate requirement of dummy coil for following armature winding. **04**
4 pole, 18 slot, double layer is to be designed with wave winding.
- (c) Develop algorithm for design of starting resistance for DC motor. **07**
- OR**
- Q.4** (a) State the classes of insulation in transformers based on temperature. **03**
- (b) Explain sequential steps for drawing Lap winding diagram. **04**
- (c) Predict the change in performance of DC machine with change in following design parameters: **07**
i) Pole arc to pole pitch ratio
ii) Core flux density
iii) Slots per pole per phase
- Q.5** (a) Develop algorithmic steps for the design of Tank for oil natural air forced type transformer casing. **03**
- (b) Differentiate design criteria for shunt, series and separately excited DC motors. **04**
- (c) Explain significance of different types of enclosures for rotating DC machines. **07**
- OR**
- Q.5** (a) State standard rating of distribution transformer for LT consumer. **03**
- (b) Develop heat flow diagram in rotating DC machines. **04**
- (c) Illustrate a case of design optimization where FE Analysis of electrostatic field in transformer with appropriate diagrams. **07**
