

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII (Old) EXAMINATION – WINTER 2019****Subject Code: 170902****Date: 26/11/2019****Subject Name: Electrical Machine Design-I****Time: 10:30 AM TO 01:00 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) Discuss the factors affecting the selection of number of poles in D. C. Machine **07**
(b) Derive output equation of 3 – Φ core type transformer. **07**
- Q.2** (a) Prepare a technical note on classification of insulating materials as per temperature range. **07**
(b) What is design optimization? Derive necessary condition for designing a transformer with minimum cost. **07**
- OR**
- (b) Write a Short Note on Duty Cycle. **07**
- Q.3** (a) With the help of neat sketch, explain the effect of armature reaction on air gap flux in case of D.C. machine. **07**
(b) Explain diff. cooling methods used for oil immersed transformer. **07**
- OR**
- Q.3** (a) Explain Commutation in dc machine. Explain how interpole improves it. **07**
(b) Explain effect of change in frequency on losses, voltage & leakage impedance of transformer. **07**
- Q.4** (a) Estimate the leakage reactance of concentric winding in core type transformers clearly stating the assumptions used. **07**
(b) Briefly explain the principles of core design of a current transformer. **07**
- OR**
- Q.4** (a) Discuss the factors affecting the selection of specific magnetic and specific electric loadings in dc machine design. **07**
(b) Discuss the behavior of a C.T. under system short circuit. **07**
- Q.5** (a) Explain steps to design shunt field winding of a D. C. machine. **07**
(b) Explain the reasons behind providing LV winding near to transformer core and why tapings are provided on HV side. **07**
- OR**
- Q.5** (a) What is window space factor? Explain how it varies with.. **07**
(1) kVA rating and (2) kV rating
(b) Explain guidelines used for the selection of number of armature slots in D.C. machine design. **07**
