

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-III (OLD) EXAMINATION – WINTER 2018****Subject Code:131701****Date:05/12/2018****Subject Name:Electrical Machines****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) Explain working principle of transformer in detail and also derive E.M.F. Equation of transformer. **07**
- (b) Develop equivalent circuit of a 1-phase transformer. Draw the phasor diagrams for no-load and load conditions. **07**
- Q.2** (a) Why 1-phase induction is not self-start? Explain starting methods of 1-phase induction motor. **07**
- (b) Explain 3-point starter use to start DC motor. **07**
- OR**
- (b) Obtain the equivalent circuit of a 200/400 –V, 50 Hz, 1 Phase Transformer from the following test data,
O.C.Test: 200 V, 0.7 A, 70 W - on L.V. side
S.C. Test: 15 V, 10 A, 85 W - on H.V. side.
Calculate the secondary voltage when delivering 5 KW at 0.8 p.f. lagging, the primary voltage being 200V. **07**
- Q.3** (a) What is armature reaction? What are the methods to improve armature reaction? **07**
- (b) Explain Equivalent circuit of three phase induction motor. **07**
- OR**
- Q.3** (a) Draw and explain the internal and external characteristics of d.c. shunt generators. **07**
- (b) Explain different speed control methods for 3 phase induction motor. **07**
- Q.4** (a) Explain Parallel operation of two three phase transformers with necessary conditions. **07**
- (b) A 4-pole, lap-wound, d.c. shunt generator has a useful flux per pole of 0.07 Wb. The armature winding consists of 220 turns each of 0.004 Ω resistance. Calculate the terminal voltage when running at 900 r.p.m. if the armature current is 50 A. **07**
- OR**
- Q.4** (a) What is voltage regulation? Explain synchronous impedance method for finding voltage regulation of alternator. **07**
- (b) What is hunting? Why damper winding use to reduce hunting? What are the applications of synchronous motor? **07**
- Q.5** (a) State and explain condition of synchronizing alternator with infinite bus bar. **07**
- (b) Explain the Swinburne's test of a d.c. machine for finding losses with necessary Diagram. **07**

OR

- Q.5** (a) Derive the condition for Maximum torque for induction motor and explain Torque - Slip characteristics. **07**
- (b) An 18.65-kW, 4-pole, 50-Hz, 3-phase induction motor has friction and windage Losses of 2.5 per cent of the output. The full-load slip is 4%. Compute for full load (a) the rotor Cu loss (b) the rotor input (c) the shaft torque (d) the gross electromagnetic torque. **07**
