

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-III (OLD) - EXAMINATION – SUMMER 2017

Subject Code: 130904

Date: 07/06/2017

Subject Name: Electrical Machines-1

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 DC motor also list types of DC motors **07**
(b) Explain voltage build up process of DC shunt generator **07**
- Q.2** (a) Explain three point starter of DC motor **07**
(b) Explain critical resistance for DC shunt generator. also derive E.M.F equation of a DC generator **07**
- OR**
- (b) A 220 V, D.C shunt motor at no-load takes a current of 2.5 A. The resistance of the armature and shunt field are 0.8Ω and 200Ω respectively. Estimate the efficiency of the DC motor by Swinburne's test when the input current is 20 A. **07**
- Q.3** (a) Explain torque-slip characteristics of three phase induction motor **07**
(b) Explain working principle of three phase induction motor **07**
- OR**
- Q.3** (a) Explain various methods of measurement of slip of three phase induction motor **07**
(b) A 12-pole, 3-phase, 600 V, 50 Hz, star-connected induction motor has rotor-resistance and stand-still reactance of 0.03 and 0.5 ohm per phase respectively. Calculate **07**
(a) Speed of maximum torque (b) ratio of full load torque to maximum torque, if the full-load speed is 495 rpm.
- Q.4** (a) Explain open circuit and short circuit test of single phase transformer to determine voltage regulation and efficiency. **07**
(b) Explain operation of single phase transformer at no load and on load with vector diagram **07**
- OR**
- Q.4** (a) Explain auto transformer **07**
(b) Explain necessary and desirable conditions for parallel operation of single phase transformers **07**
- Q.5** (a) Explain pitch factor and distribution factor of alternator **07**
(b) Explain synchronous impedance method to determine the voltage regulation of alternator **07**
- OR**
- Q.5** (a) Explain conditions of parallel operation of synchronous generators **07**
(b) Explain MMF method to determine the voltage regulation of alternator **07**
