

**GUJARAT TECHNOLOGICAL UNIVERSITY**

**BE - SEMESTER-V (OLD) EXAMINATION – WINTER 2018**

**Subject Code:150901**

**Date: 04/12/2018**

**Subject Name: Electrical Machine - II**

**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) Draw connection diagrams, phasor diagrams and clock representations for Dy1 and Yd11 connections of three phase transformer. **07**
- (b) Explain Scott connection in detail also explain how we can obtain a balanced two phase supply from a balanced three phase supply by using this connection. **07**
- Q.2** (a) State and explain the essential and desirable conditions for parallel operation of two three phase transformers. **07**
- (b) Explain the open delta connection (V-V connection) in details. **07**
- OR**
- (b) 120 KVA, 3-phase, 50 Hz, 6600/400-V transformer is delta connected on H.V. side and star connected on L.V. side. The resistance of HV winding is 4.5 ohm/phase and of LV winding is 0.04 ohm/phase. If it's full load efficiency is 95% at 0.85 p.f. (lag), Calculate (i) Iron losses & copper losses at full load. (ii) Efficiency of transformer at half load and 0.8 p.f. (lead) **07**
- Q.3** (a) A 20 hp, 400 V, 50 Hz, three phase star connected induction motor has the following test data: **07**
- No-load test: 400 V, 11 A, p.f = 0.2  
Blocked rotor test: 100 V, 25 A, p.f = 0.4.  
The stator and rotor copper losses are equal at standstill. Draw the circle diagram and find out the line current, speed, efficiency and p.f at full load.
- (b) Why induction motor is taking a large current at starting? Give the list of various starters used for induction motors and also explain any one of them in detail. **07**
- OR**
- Q.3** (a) Derive the expression of torque developed by a three phase induction motor. Also obtain the condition for maximum torque. **07**
- (b) Derive the equivalent circuit of a three phase induction motor step by step. **07**
- Q.4** (a) Give the list of various methods of controlling the speed of three phase induction motor. Explain any one method in detail. **07**
- (b) Explain in detail about the terms crawling and cogging in three phase induction motor. **07**
- OR**
- Q.4** (a) With the help of double revolving field theory explain why the single phase induction motor is not a self starting. **07**
- (b) Explain the construction and working principle of double cage induction motor. **07**
- Q.5** (a) Explain the construction and operating principle of Schrage motor. **07**
- (b) Draw the constructional features and operating characteristics of shaded pole induction motor. Also state its application. **07**
- OR**
- Q.5** (a) Explain the operating principle, construction and applications of induction generator. **07**
- (b) Explain the effect of unbalanced supply voltage and variation in frequency on the operation of three phase induction motor. **07**

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