

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-III(New) EXAMINATION – SUMMER 2016

Subject Code:2131005

Date:04/06/2016

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.

		MARKS
Q.1	Answer the following Questions	14
1	Which winding of a step up transformer has more number of turns (a) low voltage winding (b) high voltage winding (c) tertiary winding (d) either (a) or (b)	
2	Which side is short-circuited while performing short-circuit test on a transformer (a) L.V. side (b) H.V. side (c) star point (d) primary side	
3	Just at start of a three-phase induction motor, the slip is (a) zero (b) infinite (c) one (d) between zero and one	
4	The speed regulation of a synchronous motor is (a) 100 % (b) 50 % (c) 1 % (d) 0 %	
5	Starter is connected on rotor side in (a) synchronous motor (b) squirrel cage induction motor (c) slip ring induction motor (d) none of the above	
6	The output voltage of a simple DC generator is (a) pure DC (b) pulsating DC (c) AC sinusoidal (d) AC square wave	
7	The frequency of rotor current in induction motor is given by relation (a) $f_r = pn/120$ (b) $f_r = 120f/p$ (c) $f_r = sf$ (d) $f_r = f/s$	
8	The function of pole shoe in DC machine is (a) to spread out the flux in air gap (b) to reduce reluctance (c) to support field coils (d) all of the above	
9	A line which connects distributor to substation is called (a) distributor (b) service main (c) feeder (d) none of these	
10	Define load factor.	
11	Define power factor.	
12	What is Ferranti effect ?	
13	What is armature reaction ?	
14	What is synchronous condenser ?	
Q.2	(a) Explain working principle of single phase transformer.	03
	(b) State conditions for parallel operation of two transformer.	04
	(c) Explain V–V connection for 3-phase transformer.	07
	OR	
	(c) Explain open circuit test on single phase transformer with diagram.	07
Q.3	(a) A 440V, 3-phase, 50Hz, 6-pole induction motor has 0.04 Ω rotor resistance/phase. Its maximum torque occurs at 860 r.p.m. Find the developed torque as a percentage of maximum torque at starting.	03

- (b) Explain different starting methods for single phase induction motor. 04
- (c) Explain rotating magnetic field produced in 3-phase induction motor with neat diagram. 07

OR

- Q.3 (a) Derive EMF equation of single phase transformer. 03
- (b) Enlist different starters used for 3-phase induction motor. Explain any one in detail. 04
- (c) Draw and explain torque-slip characteristic of induction motor. 07
- Q.4 (a) Write function of super heater, economizer and air-pre heater. 03
- (b) What is diversity factor and plant utilization factor ? 04
- (c) Explain 3-phase 3-wire and 3-phase 4-wire distribution system. 07

OR

- Q.4 (a) Explain classification of transmission line. 03
- (b) What is pitch factor and distribution factor in alternator ? 04
- (c) Explain synchronous impedance method for finding voltage regulation of alternator. 07
- Q.5 (a) Explain different types of DC generator. 03
- (b) A long shunt compound generator delivers a load current of 20A at 250V. It has armature, series field and shunt field resistances are 0.15 Ω , 0.05 Ω and 250 Ω respectively. Find generated voltage. Neglect brush voltage drop. 04
- (c) Define commutation and explain methods of improving it. 07

OR

- Q.5 (a) Explain working principle of DC motor. 03
- (b) Explain different starting methods for synchronous motor. 04
- (c) Explain speed control methods for DC shunt motor. 07
