

B.TECH
(SEM V) THEORY EXAMINATION 2019-20
ELECTRICAL MACHINE II

Time: 3 Hours

Total Marks: 70

Note 1. Attempt Sections as per the instructions given in the question paper suitably.

SECTION A

1. Attempt 7 questions briefly. 2 x 7 = 14

- a. Explain the term cogging.
- b. Define pitch factor and distribution factor of an alternator.
- c. Briefly explain the working principle of repulsion motor.
- d. Draw V-Curve and Inverted V-Curve of 3 phase synchronous motor
- e. Briefly explain the concept two phase rotating field.
- f. Differentiate between cylindrical and salient pole type rotors construction and operation..
- g. Why the induction motor can't run at synchronous speed?

SECTION B

2. Attempt any three of the following: 7 x 3 = 21

- a. Explain synchronous impedance method of determining the regulation of alternator.
- b. Explain the procedure of no load and block rotor tests on a 3 phase induction motor. How are the parameters of equivalent circuit determined from test results.
- c. The open and short circuit test reading for a 3 phase, star connected, 1000 KVA, 2000V, 50Hz, synchronous generator are :

Field Amps ;	10	20	25	30	40	50
O.C. Terminal V:	800	1500	1760	2000	2350	2600
S.C armature current(A):	--	200	250	300	--	--

The armature effective resistance is 0.2 ohm per phase. Draw the characteristic curves and estimate the full load percentage regulation at (a) 0.8 p.f. lagging (b) 0.8 p.f. leading
- d. Explain construction and working of a single phase induction motor, also Explain any two types with neat circuit diagram..
- e. Derive the relation for torque developed in 3 phase induction motor; also derive the condition for maximum torque.

SECTION C

3. Attempt any one part of the following: 7 x 1 = 7

- (a) What is armature reaction? Explain the effect of load power factor on armature reaction.
- (b) Two 50 MVA, 3 phase alternator operate in parallel. The setting of governors are such that the rise in speed from full load to no load is 2% in one machine and 3 % in the other, the speed load characteristic being straight lines in both cases. If each machine is fully loaded, What would be the load on each machine when the total load is 60W.

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4. Attempt any one part of the following:**7 x 1 = 7**

- (a) Explain the process of hunting and damping in synchronous motor.
- (b) Explain the effect of varying excitation on armature current and power factor in a synchronous motor also draw phasor diagram.

5. Attempt any one part of the following:**7 x 1 = 7**

- (a) Describe two reaction theory for a salient pole synchronous machine.
- (b) A pole, 3 phase, 50 Hz induction motor is running at a speed of 650 rpm with an input power of 40 KW. The stator copper loss at this operating condition is known to be 1000W while the rotational losses are 500 W. Find (a) the rotor copper loss, (b) the gross torque developed, (c) the gross mechanical power developed, and (d) the net torque and mechanical power output.

6. Attempt any one part of the following:**7 x 1 = 7**

- (a) What is the effect of space harmonics in induction motor?
- (b) Differentiate and explain deep bar and double cage rotor construction and operation.

7. Attempt any one part of the following:**7 x 1 = 7**

- (a) Develop an equivalent circuit of an induction motor and explain in detail.
- (b) Explain brushless D.C. motor. Also give specific applications of it.

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