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B. TECH
(SEM-V) THEORY EXAMINATION 2023-24
ELECTRICAL MACHINES-II

Time: 3 Hours

Total Marks: 100

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt all questions in brief.

2 x 10 = 20

Q no.	Question	Marks	CO
a.	What is a distributed winding and distributed factor?	2	CO1
b.	Write a short note on two phase rotating field.	2	CO1
c.	What do you mean by hunting of synchronous motor?	2	CO2
d.	What is the role of damper winding?	2	CO2
e.	Draw V curve of 3 phase synchronous motor and state their significance.	2	CO2
f.	What is the capability curve of a synchronous generator?	2	CO3
g.	Explain how the rotor resistance starting of slip ring induction motor reduces starting current and increase starting torque.	2	CO4
h.	Explain cogging of three phase induction motor.	2	CO4
i.	What is the role of compensating winding in universal motor?	2	CO5
j.	What do you mean by torque in synchronous watt?	2	CO5

SECTION B

2. Attempt any three of the following:

Q no.	Question	Marks	CO
a.	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.	10	CO1
b.	Derive an expression for finding regulation of salient pole synchronous alternator using two reaction theory Draw its phasor diagram.	10	CO2
c.	Explain with neat diagram the torque slip characteristics of three phase induction motor.	10	CO3
d.	Explain revolving field theory of single-phase induction motor	10	CO4
e.	Explain power angle characteristic of the synchronous machine and describe the operation of synchronous machine at constant load with variable excitation.	10	CO2

SECTION C

3. Attempt any one part of the following:

Q no.	Question	Marks	CO
a.	Derive emf equation for an alternator. Also, develop expressions of pitch factor and distribution factor	10	CO1
b.	A 3-phase, 2-pole, 50 Hz, star-connected turbo-alternator has 54 slots with 4 conductors per slot. The pitch of the coil is 2 slots less than the pole pitch. Determine the useful flux per pole required to generate a line voltage of 3.3 kV.	10	CO1

4. Attempt any one part of the following:

Q no.	Question	Marks	CO
a.	The open and short circuit test reading for a 3 phase, star connected, 1000 KVA, 2000V, 50Hz, synchronous generator is: 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	10	CO3
b.	Write short notes on (i) Capacitor start motor (ii) Shaded pole motor and (iii) Repulsion motor	10	CO5

5. Attempt any one part of the following:

Q no.	Question	Marks	CO
a.	Explain brushless D.C. motor. Also give specific applications of it.	10	CO5
b.	Derive the condition of maximum torque in three phase induction motor and find the magnitude of maximum torque.	10	CO3

6. Attempt any one part of the following:

Q no.	Question	Marks	CO
a.	Differentiate and explain deep bar and double cage rotor construction and operation.	10	CO4
b.	With the help of circuit diagram discuss speed control of induction motor by (i) consequent pole method (ii) Rotor rheostat control and (iii) stator voltage control.	10	CO4

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Attempt any one part of the following

Q no.	Question	Marks	CO
a.	Develop equivalent circuit diagram of single-phase induction motor based on double revolving field theory.	10	CO5
b.	What is armature reaction? Explain the effect of load power factor on armature reaction	10	CO5

