



PAPER ID-310689

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Subject Code: REE501

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BTECH
(SEM V) THEORY EXAMINATION 2024-25
ELECTRICAL MACHINES-II

TIME: 3 HRS**M.MARKS: 70****Note:** Attempt all Sections. In case of any missing data; choose suitably.**SECTION A****1. Attempt all questions in brief.****2 x 07 = 14**

Q no.	Question	CO	Level
a.	Define the terms pitch factor and distribution factor of an alternator.	1	K3
b.	Illustrate the conditions of parallel operation of alternators.	1	K3
c.	What is the function of synchronous condenser?	2	K4
d.	What are the effects of hunting in synchronous motor?	2	K4
e.	Calculate the slip for 2-pole, 50 Hz induction motor running at 2950 rpm.	3	K4
f.	What are the advantages of skewing rotor bars in squirrel cage induction motor?	4	K4
g.	List various starting methods of single-phase induction motor?	5	K3

SECTION B**2. Attempt any three of the following:****07 x 3 = 21**

a.	Examine in detail "Synchronous Impedance method" of determining voltage regulation in cylindrical rotor alternator.	1	K3
b.	With the help of suitable diagram explain Two-Reaction Theory in three phase synchronous motors.	2	K4
c.	Derive the expression for torque developed in a 3-phase induction motor. State the condition of maximum torque. A 3-phase induction motor has a starting torque of 100% and a maximum torque of 200% of the full load torque. Determine (a) slip at which maximum torque occurs (b) full load slip.	3	K4
d.	What is the need of the starter in 3-Phase induction motor? With a neat sketch describe autotransformer method of starting.	4	K4
e.	Develop the equivalent circuit of 1-phase induction motor based on double revolving field theory.	5	K3

SECTION C**3. Attempt any one part of the following:****07 x 1 = 07**

a.	A 3-phase, 2-pole, 50 Hz, star connected turboalternator 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.	1	K3
b.	Investigate the effect of armature reaction in alternators at (i) unity power factor (ii) zero power factor lagging and (iii) zero power factor leading.	1	K3

4. Attempt any one part of the following:**07 x 1 = 07**

a.	With the help of phasor diagrams explain the operation of synchronous motor at constant load and variable excitation. Also, draw the V-curves and state its significance.	2	K4
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b.	Explain in detail the concept of “hunting” in a 3-phase synchronous motor.	2	K4
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5. Attempt any one part of the following: 07 x 1 = 07

a.	Explain with the help of diagram No-Load test and Blocked-Rotor test on a 3-phase induction motor.	3	K4
b.	An 18.65 kW, 4 pole, 50 Hz, 3-phase induction motor has friction and windage loss of 2.5 percent of the output. The full load slip is 4 %. Compute for full load (i) rotor copper loss (ii) rotor input and (iii) shaft torque.	3	K4

6. Attempt any one part of the following: 07 x 1 = 07

a.	With the help of neat diagram explain star-delta starter in a 3-phase induction motor. Also, state its limitations.	4	K4
b.	Explain the following methods of speed control for 3-phase induction motors: (i) Rotor Rheostat Resistance control (ii) Stator voltage control	4	K4

7. Attempt any one part of the following: 07 x 1 = 07

a.	Investigate “Double Revolving Field Theory” in 1-phase induction motor.	5	K3
b.	Elaborate on: (i) Universal motor (ii) Repulsion motor	5	K3