



R22 Regulation

Subject code: 4E4BC

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A+' Grade)

TKRCET
Institium in Chastitatem | Information in Excellence

B.Tech IV Semester Supplementary Examinations, December 2025

ELECTRICAL MACHINES – II

(EEE)

Maximum Marks: 60

Date: 20.12.2025

Duration: 3 hours

- Note:
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 10 marks. Answer all questions in Part A.
 3. Part B consists of 5 Units. Answer any one full question from each unit.
 4. Each question carries 10 marks and may have a, b, c, d as sub questions.

Part-A

All the following questions carry equal marks (10X1M=10 Marks)		Marks	CO	Bloom Tx
1.a)	How does the rotor speed differ from synchronous speed?	1M	CO1	BL2
b)	State the applications of Squirrel cage rotor.	1M	CO1	BL1
c)	Write the relation between rotor input, copper losses and mechanical power developed.	1M	CO2	BL1
d)	Give the expression for starting torque and maximum torque of an induction motor.	1M	CO2	BL1
e)	What are the advantages of salient pole type construction used for synchronous machines?	1M	CO3	BL2
f)	Present the necessity of chording in the armature winding of a synchronous machine.	1M	CO3	BL2
g)	What is meant by synchronization of alternators?	1M	CO4	BL1
h)	How does a change of excitation affect its power factor?	1M	CO4	BL2
i)	State the limitations of shaded pole motors.	1M	CO5	BL1
j)	How the direction of a capacitor-start motor can be reversed?	1M	CO5	BL2

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	Bloom Tx
2	a) Describe the constructional features of squirrel cage and wound rotor induction machines.	5M	CO1	BL2
	b) Explain how rotating magnetic field of constant amplitude is produced.	5M		
OR				
3	a) A 6-pole, 3-phase, 50 Hz induction motor is running at full load with a slip of 4%. The rotor is Star connected and its resistance and standstill reactance are 0.25 Ω and 1.5 Ω per phase. The emf between slip rings is 100V. Find the rotor current per phase and power factor assuming the slip rings are Short circuited.	5M	CO1	BL3
	b) Derive and explain rotating magnetic field in a three phase induction motor.	5M		

4	A 6-pole, 50Hz, 3-phase induction motor runs at 960 rpm when the torque on the shaft is 200 Nm. If the stator losses are 1500 W and the friction and windage losses are 500 W. Find (i) rotor copper loss and (ii) the efficiency of the motor.	10M	CO2	BL3
	OR			
5	Discuss how the speed of induction motor is controlled by injecting emf into the rotor Circuit.	10M	CO2	BL2
6	Describe the procedural steps to find voltage regulation of synchronous generator by MMF method.	10M	CO3	BL2
	OR			
7	Explain the steps involved to find X_d and X_q from Slip Test.	10M	CO3	BL3
8	Derive the expression for power developed of an alternator connected to infinite bus bar with Power angle characteristics.	10M	CO4	BL3
	OR			
9	Draw the simplified equivalent circuit of synchronous motor and examine the effect of loading in synchronous motor at various power factors with help of phasor diagrams.	10M	CO4	BL5
10	Using the Double Field Revolving Theory, explain why a single-phase induction motor is not self-starting. Also derive the equivalent circuit of a single-phase induction motor and provide the necessary equations.	10M	CO5	BL4
	OR			
11	a) Explain with suitable diagram the working principle of split-phase induction motor. b) Explain in detail the operation of capacitor start and run induction motor.	5M 5M	CO5	BL3