R22 Regulation *Subject code:4E4BC*

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech IV Semester Regular/Supplementary Examinations, June 2026

ELECTRICAL MACHINES -II

(EEE)

Maximum Marks: 60 Date:12.06.2026 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)	List out the applications of 3-phase induction motor.	1M	1	L1
b)	A 6 pole, 60Hzinduction motor is rotating at a speed of 1000 rpms find the slip?	1M	1	L1
c)	Write expressions for rotor power input and rotor copper loss of induction motor.	1M	2	L2
d)	What are the parameters obtained in blocked rotor test?	1M	2	L1
e)	Explain the reasons for generation of harmonics in alternator.	1M	3	L2
f)	What are the voltage regulation methods of alternator?	1M	3	L1
g)	What is hunting?	1M	4	L1
h)	Give the necessary conditions for synchronizing of Synchronous Machines.	1M	4	L2
i)	List different types of single-phase induction motors.	1M	5	L2
j)	Mention various applications of Single phase induction motor.	1M	5	L1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	Bloom Tx
2	a) Describe constructional features of squirrel cage induction motor? b) A 4pole, 50Hz induction motor runs with 4% slip at full load. What will be the frequency of current induced in the rotor (i) starting, (ii) at full load?	5M 5M	1	L2 L3
	OR			
3	a) Explain the production of R.M.F in a 3-phase induction motor. b) Obtain an expression for rotor current and power factor at the time of starting and running conditions of 3-phase Induction Motor.	5M 5M	1	L1 L2
4	a) Derive an expression for torque developed by 3-phase Induction motor. b) Explain the phenomenon of crawling and cogging in 3-ϕ Induction motor	5M 5M	2	L2 L3
	OR			
5	a) Calculate the relative values of starting currents and starting torques of 3-phase squired-cage induction motor, when it is started by: (i) Star-delta starter. (ii) Auto-transformer starter with 60% tapping.	5M	2 2	L3 L3

	b) Discuss briefly the various methods of speed control of 3-phase induction motors.	5M		
6	a) Explain the constructional details of round rotor and salient pole Synchronous machine. b) A 3-phase 50 Hz star connected alternator has 180 conductors per phase and flux per pole is 0.0543 Wb. Find i) e.m.f generated per phase and ii) e.m.f between line terminals. Assume the winding to be full pitched and distribution factor to be 0.96.	5M 5M	3	L2 L3
	OR			
7	a) What is armature reaction? Explain the effect of armature reaction on the terminal voltage of alternator at (i) unity power factor load (ii) Zero lagging power factor load. b) Explain the two-reaction theory applicable to salient pole synchronous machine	5M 5M	3	L4 L2
8	a) What is need for paralleling alternators? Write about necessary conditions for paralleling alternators. b) Write short notes on: sub-transient, transient, and steady state reactance's of an alternator.	5M 5M	4	L3 L3
	OR			
9	a) Draw the phasor diagram of 3-phase synchronous motor under lagging power factor load. b) Explain the operation of synchronous motor as synchronous condenser and mention its applications	5M 5M	4	L3 L2
10	a) Explain the construction and give the applications of single-phase induction motor. b) Explain the double revolving field theory for single phase induction motors.	5M 5M	5	L2 L2
	OR			
11	a) Draw and discuss the constructional details of a shaded pole motor. b) Draw the circuit diagram of a capacitor start and run single phase induction motor and explain its working.	5M 5M	5	L3 L3