



Regulation R18

Subject code: 2P4BC

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech IV Semester Supplementary Examinations, February 2024
ELECTRICAL MACHINES-II
(EEE)

Maximum Marks: 70

Date: 21.02.2024 Duration: 3 hours

- Note:
1. This question paper contains two parts A and B.
 2. Part A is compulsory which carries 20 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

(10X2M=20 Marks)

		Marks	CO	Blooms Tx
1	What are the advantages of slip ring over squirrel cage rotor?	2	CO1	L1
2	State the principle of 3-phase induction motor and why it is called as an asynchronous motor?	2	CO1	L1
3	What is circle diagram of an induction motor	2	CO2	L1
4	List out the methods of speed control of squirrel cage type 3-phase induction motor	2	CO2	L2
5	Write down the formula for distribution factor	2	CO3	L1
6	What is synchronous reactance ?	2	CO3	L1
7	List the factors that affect the load sharing in parallel operating generators?	2	CO4	L2
8	State the condition to be satisfied before connecting two alternators in parallel	2	CO4	L1
9	Explain the phenomenon of hunting?	2	CO5	L2
10	Give the working principle of universal motor?	2	CO5	L1

Part-B

Answer All the following questions.

(5X10M=50Marks)

11	Describe the principle, construction and operation of 3 phase Induction motor.	10	CO1	L2
OR				
12	Derive the torque equation of an induction motor. Mention the condition for maximum torque.	10	CO1	L2
13	A three phase, 15 kW, 400 V, 50 Hz, 4-pole, delta connected squirrel cage induction motor has the following data: No-load: 400 V, 5.0 A, p.f. 0.2 Blocked rotor: 120 V, 20.0 A p.f. 0.6 The ratio of stator to rotor copper losses on short circuit is	10	CO2	L4

	assumed to be unity. Draw the circle diagram and determine (a) the full load current and power factor (b) the maximum power developed (c) starting torque.			
	OR			
14	Explain the various speed controlled methods of a 3-phase IM.	10	CO2	L2
15	a) What is armature reaction? With the help of neat diagrams explain its effect on main flux in synchronous machines.	5	CO3	L3
	b) Explain the following terms related 3-phase a.c. windings. i) Single-layer and double-layer windings. ii) Full-pitch and short-pitch windings. iii) Integral slot and fractional slot windings.	5		L2
	OR			
16	a) Discuss about experimental determination of X_d and X_q of salient pole alternator using slip test.	5	CO3	L3
	b) A 3- phase generator rated at 25 MVA, 13.8 kV is operating at normal terminal voltage and rated load at 0.8 pf lag. The direct axis synchronous reactance is 7.62Ω , Quadrature axis synchronous reactance is 4.57Ω and the armature resistance is $0.15\Omega/\text{ph}$. Determine the direct axis and quadrature axis components of armature current and internal induced voltage. Also find the regulation	5		L4
17	a) Explain the power developed by synchronous motor ?	5	CO4	L2
	b) A 400V 50HZ 6 pole 3-phase star connected synchronous motor has a synchronous reactance of 4ohms/phase and a resistance of 0.5ohm/phase. on full load, the excitation is adjusted so that machine takes an armature current of 60A at 0.866 p.f leading	5		L4
	OR			
18	Explain the different methods of starting of synchronous motors	10	CO4	L3
19	a) Draw the equivalent circuit diagram of single-phase induction motor.	5	CO5	L4
	b) Explain the principle of operation of stepper motor and ac series motor.	5		L2
	OR			
20	a) Explain the working of a single induction motor.	5	CO5	L3
	b) What is hunting and how it can be suppressed?	5		L2