



R17 Regulation

Subject code: 1P7BA

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech IV Year I Semester Supplementary Examinations, April 2024

**Power Semiconductor Drives
(EEE)**

Maximum Marks: 70

Date: 29.04.2024 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. Total 10 questions it consists.
 4. Part-B 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)

- 1 Draw speed- torque characteristics of a separately excited DC motor.
- 2 What is meant by electrical drives?
- 3 What is plugging?
- 4 List the advantages of rotor resistance control
- 5 Define Slip power.
- 6 Step-up chopper is connected to 100V DC source operating with $\alpha=0.6$. Find the average output voltage?
- 7 If type A chopper is connected to a DC source of E_s and is operating with duty cycle of α and supplying continuous current, output voltage is?
- 8 What is meant by stator voltage control?
- 9 Give some application of load commutated inverter fed synchronous motor drive.
- 10 What is meant by margin angle of commutation?

Part-B

Answer All the following questions.

(5X10M=50Marks)

- 11 Explain in detail the operation of a 1-phase Semi converter feeding a d.c series motor with reference to voltage and current waveforms, assume motor current is continuous and draw speed-torque characteristics. [10]

OR

- 12 Explain in detail the operation 1-phase full converter continuous current operation for separately excited DC motor and Sketch Toque and speed characteristics. [10]

- 13 Derive the expressions for average motor current, ripple in motor current and average torque for chopper fed separately excited D.C motor. [10]

OR

- 14 Describe the three phase four quadrant operation of DC drive using Dual converter. [10]

- 15 Describe the performance of VSI based induction motor and list the advantages and disadvantages. [10]

OR

- 16 Draw the speed-torque characteristics of the poly phase induction motor. Also explain a) motoring b) Generating and c) Breaking region [10]
- 17 Explain the operation of three phase slip ring induction motor when static krammer drive is employed. Draw the speed torque characteristics and phasor diagram. [10]
- OR
- 18 Draw and explain the equivalent circuit of a wound rotor induction motor when voltage is injected in the rotor circuit. [10]
- 19 With a neat block diagram explain the closed loop operation of synchronous motor drives. [10]
- OR
- 20 Discuss various methods of speed control of Synchronous motor in detail. [10]