Enrolment No./Seat No_____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**BE- SEMESTER–VII EXAMINATION – WINTER 2025**

**Subject Code:3172402 Date:24-11-2025**

**Subject Name:Industrial Drives and Control**

**Time:10:30 AM TO 01:00 PM Total Marks:70**

**Instructions:**

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Simple and non-programmable scientific calculators are allowed.**

| | | | MARKS |
|---|---|---|---|
| **Q.1** | **(a)** | Define term "Solid state control". | **03** |
| | **(b)** | Draw block diagram of DC drive. Explain in brief about its components. | **04** |
| | **(c)** | Explain working principle of speed control of DC motor with single phase Semi-controlled full bridge converter. | **07** |
| **Q.2** | **(a)** | Draw and explain "Torque proportional to square of the speed" characteristic. | **03** |
| | **(b)** | Draw and explain Constant load torque characteristics. | **04** |
| | **(c)** | Write a brief note on different type of loads for drive system. | **07** |
| | | **OR** | |
| | **(c)** | Write a short not on steady state stability of Electric Drive system, | **07** |
| **Q.3** | **(a)** | Draw speed-torque characteristic of DC separately excited motor. | **03** |
| | **(b)** | What is continuous conduction of DC motor? | **04** |
| | **(c)** | Write a technical note on: Load equalization in Electrical drives. | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | What is duty cycle? Explain it with reference to chopper circuit. | **03** |
| | **(b)** | What is Constant Power operation of Drive? | **04** |
| | **(c)** | Draw and explain Closed loop speed control scheme for DC motor with appropriate block diagram. | **07** |
| **Q.4** | **(a)** | Explain term "Harmonics" | **03** |
| | **(b)** | Why DC series motor is used for high torque application? | **04** |
| | **(c)** | Explain speed control of DC motor with chopper circuit with neat diagram. | **07** |
| | | **OR** | |
| **Q.4** | **(a)** | Draw characteristics of Induction motor(IM). | **03** |
| | **(b)** | What is sub-synchronous motoring? Explain. | **04** |
| | **(c)** | Explain working of Static Scherbius drive system with neat diagram. | **07** |
| **Q.5** | **(a)** | Explain ABC reference frame in brief. | **03** |
| | **(b)** | What is Solar powered Drive? Explain in brief. | **04** |
| | **(c)** | Write a short note on Servo motor drive. | **07** |
| | | **OR** | |
| **Q.5** | **(a)** | What is stator control of induction motor? Explain in brief. | **03** |
| | **(b)** | Explain term "Synchronous speed". | **04** |
| | **(c)** | Write a short note on Direct torque control. | **07** |

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