

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII (NEW) EXAMINATION – SUMMER 2022****Subject Code:3172402****Date:01/06/2022****Subject Name:Industrial Drives and Control****Time:02:30 PM TO 05:00 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.

- Q.1** (a) Draw the block diagram of Electric Drive and explain it in brief. **03**
 (b) Explain the four function of Power Electronics Modulator in Electric Motor Drive. **04**
 (c) Draw and Explain block diagram of single quadrant closed loop speed control of 3- Φ IM using 3- Φ AC Voltage controller. **07**
- Q.2** (a) Enlist criteria of selection of DC motor. **03**
 (b) Explain steady state & transient stability of electric drive. **04**
 (c) Explain the two quadrant operation of Chopper Controlled separately excited DC motor with suitable diagram. **07**
- OR**
- (c) Explain closed loop control scheme of separately excited DC motor for control of below & above base speed. **07**
- Q.3** (a) Explain single phasing in brief. **03**
 (b) List the difference between Active and Passive Load Torque. **04**
 (c) Explain the principle behind the variation of the speed of a 3- Φ IM by v/f method for Operation below rated frequency. **07**
- OR**
- Q.3** (a) Discuss effect of harmonics on IM. **03**
 (b) List the breaking method of Induction Motor and discuss Plugging with necessary diagram. **04**
 (c) Explain any one method of slip power recovery scheme. **07**
- Q.4** (a) Explain the Principle of Vector control. **03**
 (b) Enlist methods of improving power factor and explain any one in detail. **04**
 (c) Enlist speed control methods for synchronous motor. Discuss adjustable frequency operation in brief. **07**
- OR**
- Q.4** (a) Draw block diagram of feed-forward vector control for IM. **03**
 (b) Discuss reference frame theory for induction motor in brief. **04**
 (c) Give comparison of IM operation with balanced source voltage and unbalanced source voltage. **07**
- Q.5** (a) Analyze the Induction Motor with Non Sinusoidal source Voltages in brief. **03**
 (b) Write Technical note on : Sinusoidal PMAC motor drive **04**
 (c) Write a short note: Dynamic d-q model of Induction Motor **07**

OR

- Q.5** (a) Discuss the limitation of sub synchronous speed operation in AC Drives. **03**
(b) Discuss the requirement of servo motor drive in detail. **04**
(c) Explain the basic principle of DTFC for Voltage fed PWM inverter drives. **07**
