

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-VII (NEW) EXAMINATION – SUMMER 2022****Subject Code:2172402****Date:01/06/2022****Subject Name:Industrial Drives and Control-II****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) Define Power Electronics. Explain advantage and disadvantage of Power Electronics. **03**
- (b) Explain the four functions of Power Electronics Modulator in Electric Motor Drive **04**
- (c) Define Electric Motor Drive. Draw the detailed block diagram of AC Motor Drive and explain its advantages and disadvantages over DC Motor Drive. **07**
- Q.2** (a) List and describe in brief speed control methods for AC motor. **03**
- (b) Explain why the control of a three-phase induction motor is more difficult than D.C. motors. **04**
- (c) Draw and Explain block diagram of single quadrant closed loop speed control of 3- Φ IM using 3- Φ Voltage controller. **07**
- OR**
- (c) Draw and Explain block diagram of four quadrant closed loop speed control of 3- Φ IM using 3- Φ Voltage controller. **07**
- Q.3** (a) Explain concept of Field Oriented Control. **03**
- (b) Draw the Speed torque curve of an IM with Unbalanced Stator Voltage and Single Phasing diagram with necessary nomenclature: **04**
- (c) Compare FCCSI and LCCSI in terms of motor type, power, Speed range, accuracy, maximum speed, performance, advantage, disadvantage, and application. **07**
- OR**
- Q.3** (a) Explain concept of Direct Torque Control. **03**
- (b) Draw the Open Circuit and Closed-Circuit Transition of Auto Transformer Starter diagram with necessary nomenclature: **04**
- (c) Compare Kramer Drive and PWM VSI in terms of motor type, power, Speed range, accuracy, maximum speed, performance, advantage, disadvantage, and application. **07**
- Q.4** (a) Discuss the dynamic modeling of Induction machines in brief giving necessary equations and figures. **03**
- (b) List the braking method of Induction Motor and explain any one with necessary diagram. **04**
- (c) Draw and explain indirect vector control block diagram with open loop flux control **07**
- OR**
- Q.4** (a) State why is dynamic model required to derive over steady state model and the necessary assumptions made to derive the dynamic model. **03**
- (b) List the braking method of Induction Motor and explain any one with necessary diagram. **04**
- (c) Explain the block diagram of direct vector control with rotor flux orientation. Draw necessary Phasor diagrams. **07**
- Q.5** (a) List different converters for SRM drives. **03**
- (b) List the starting method of Induction Motor and explain any one with necessary diagram. **04**
- (c) Draw and explain four phase SRM drive using waveform explaining commutation angle generation for one phase. **07**
- OR**
- Q.5** (a) Write Technical note on: Sinusoidal PMAC motor drive **03**
- (b) List the starting method of Induction Motor and explain any one with necessary diagram. **04**
- (c) Explain principle of direct torque control scheme using necessary block diagram and switching logic. **07**