# GUJARAT TECHNOLOGICAL UNIVERSITY
### BE - SEMESTER–VII(NEW)  EXAMINATION – SUMMER 2019

**Subject Code:2172402**                                     **Date:10/05/2019**
**Subject Name:Industrial Drives & 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.**

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|---|---|---|---|
| **Q.1** | **(a)** | Compare CSI with VSI giving three points. | **03** |
| | **(b)** | Explain CSI control for Induction Motor. | **04** |
| | **(c)** | Describe the analysis of Induction Motor with (1) Unbalanced rotor impedances & (2) Non-sinusoidal voltage supply. | **07** |
| **Q.2** | **(a)** | Explain induction motor drive fed from VSI. | **03** |
| | **(b)** | Discuss drawback of IM Drive fed from a stepped wave Inverter. | **04** |
| | **(c)** | What are the similarities between a brushless dc motor and a conventional dc motor? Why it is known as a brushless dc motor? Enlist its advantages over a conventional dc motor. | **07** |

**OR**

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|---|---|---|---|
| | **(c)** | Discuss trapezoidal PMAC motor drive for servo application. | **07** |
| **Q.3** | **(a)** | Discuss advantages of stator voltage control method for constant load-torque. | **03** |
| | **(b)** | Discuss advantages of stator voltage control method for Fan type loads. | **04** |
| | **(c)** | Discuss IM's behavior for non-sinusoidal source voltages. | **07** |

**OR**

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| **Q.3** | **(a)** | Draw block diagram of a dc link converter for multi-motor ac drive. | **03** |
| | **(b)** | Explain the derivation of stator reference frame model. | **04** |
| | **(c)** | Explain the principle behind the variation of the speed of a 3-Φ IM by v/f method. Discuss this for the operation below and above rated frequency. | **07** |
| **Q.4** | **(a)** | Draw the circuit for self-controlled synchronous motor drive using load commutated thyristor-based inverter. | **03** |
| | **(b)** | Discuss reference frame theory for induction motor in brief. | **04** |
| | **(c)** | Draw and explain the thyristor configuration for a stator voltage controlled reversible-speed Induction Motor Drive. Also draw the speed-torque characteristics for a reversible induction motor drive. | **07** |

**OR**

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| **Q.4** | **(a)** | Draw the block diagram of feed-forward vector control for IM. | **03** |
| | **(b)** | Explain the basic principle of DTFC for Voltage fed PWM inverter drives. | **04** |
| | **(c)** | Explain variable-frequency operation of Induction Motor. Also draw torque characteristics for this motor at constant volts / Hz. | **07** |
| **Q.5** | **(a)** | Discuss on sensitivity of vector-controlled Induction Motor | **03** |
| | **(b)** | Discuss on compensation of vector-controlled Induction Motor | **04** |
| | **(c)** | Explain the concept of direct vector control of Induction Motor Drive. | **07** |

**OR**

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| **Q.5** | **(a)** | Brief the idea about speed control of synchronous motor by vector control method. | **03** |
| | **(b)** | Discuss dynamic d-q model of Induction Motor. | **04** |
| | **(c)** | Discuss Principle of indirect vector control with necessary diagram. | **07** |

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