Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**BE - SEMESTER–V • EXAMINATION – SUMMER • 2015**

**Subject Code: 152001** **Date: 02/05/2015**

**Subject Name: Electro Mechanical Energy Conversion**

**Time: 02.30pm-05.00pm** **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)** | Explain various types of magnetic materials. | **07** |
| | **(b)** | Explain various properties of magnetic materials. | **07** |
| **Q.2** | **(a)** | State and explain Ampere's and Biot-Savart's law. | **07** |
| | **(b)** | Draw and explain approximate equivalent circuit of an iron core reactor. | **07** |
| | | **OR** | |
| | **(b)** | Explain various methods for analyzing ferromagnetic circuits. | **07** |
| **Q.3** | **(a)** | Explain energy stored in capacitor and energy density in electric field with suitable expressions. | **07** |
| | **(b)** | Derive the equation for the force density of attraction of the magnetic field on the armature. | **07** |
| | | **OR** | |
| **Q.3** | **(a)** | Write a short note on plunger type electromagnet. | **07** |
| | **(b)** | Derive expression for induced voltages in a moving conductor placed in a magnetic field. | **07** |
| **Q.4** | **(a)** | Derive expression for force on current carrying conductor placed in a magnetic field. | **07** |
| | **(b)** | Explain rotating magnetic field in 2-phase and 3-phase induction machine. | **07** |
| | | **OR** | |
| **Q.4** | **(a)** | Explain the principle of operation of an induction motor with suitable diagrams. | **07** |
| | **(b)** | Explain magnetization characteristics of separately excite DC generator. | **07** |
| **Q.5** | **(a)** | Explain methods of starting single phase Induction motor. | **07** |
| | **(b)** | Explain construction of an induction motor. | **07** |
| | | **OR** | |
| **Q.5** | **(a)** | Explain construction and working principle of a synchronous machine. | **07** |
| | **(b)** | Explain the classification of DC generator. | **07** |

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