| Seat No.: | Enrolment No. |
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GUJARAT TECHNOLOGICAL UNIVERSITY

| Zh: | oot o | BE – SEMESTER V • EXAMINATION – WINTER - 2012 code: 152001 Date: 11-01-2013 | |
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| • | | Name: Electromechanical Energy Conversion | |
| • | | :30 pm to 05:00 pm Total Marks: 70 | |
| Instr | | - | |
| | 1. 2. | Attempt all questions. Make suitable assumptions wherever necessary. Figures to the right indicate full marks. | |
| Q.1 | | Explain various types of magnetic materials. Explain flux of an electric field through a surface. | 07 07 |
| Q.2 | (a) (b) | Derive the expression for magnetic field due to current in straight wire OR | 07 07 |
| | (b) | State and explain Ampere's and Biot-Savart's law. | 07 |
| Q.3 | (a) | Explain energy stored in capacitor and energy density in electric field with suitable expressions | 07 |
| | (b) | on the armature | 07 |
| 0.3 | (a) | OR | 07 |
| Q.3 | (a) (b) | Write a short note on electromagnet. A steel ring has a mean diameter of 20 cm and a cross section of 25 cm ² and a radial air gap of 0.8 mm is cut across it. When excited by a current of 1 A through a coil of 1000 turns wound on the ring, it produces an air gap flux of 1 mWb. Neglecting leakage and firing, calculate relative permeability of steel and total reluctance of the magnetic circuit. | 07 |
| Q.4 | (a) (b) | | 07 07 |
| Q.4 | (a) | What do you mean by rotating magnetic field? Explain the rotating magnetic field in three phase A.C. motor with necessary diagrams. | 07 |
| | (b) | Explain magnetization characteristics of DC machine. | 07 |
| Q.5 | (a) (b) | | 07 07 |
| Q.5 | (a) | Why single phase induction motor is not self started? Explain the methods used to start the single phase induction motor in brief. | 07 |
| | (b) | Discuss the synchronous machine (from construction and working point of view). | 07 |
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