GUJARAT TECHNOLOGICAL UNIVERSITY
P.D.D.C. Sem- II Remedial Examination Nov / Dec. 2010
Subject code: X20903   Subject Name: ELECTRICAL MACHINES I &II
Date: 01 / 12 / 2010   **Time: 10.30 am – 01.00 pm**
                                                             Total Marks: 70

Instructions:
1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Explain construction of dc machine   **07**
        (b) Explain different speed control methods for dc series & dc shunt motor   **07**

Q.2 **(a)** Explain Critical speed & critical field resistance relating to dc shunt machine **07**
        (b) Determine developed torque and shaft torque of 220 V ,4 -pole series motor   **07**
            with 800 conductors wave –connected supplying a load of 8.2 KW by taking
            45A from the mains .The flux per pole is 25 mwb and its armature circuit
            resistance is 0.6 Ω
                                              OR
        (b) Explain working principle of dc motor   **07**

Q.3 **(a)** Explain working principle of transformer under loaded condition with vector   **07**
            diagrams
        (b) Explain construction of transformer   **07**
                                              OR
Q.3 **(a)** Explain open circuit and short circuit test on single phase transformer   **07**
        (b) Consider a 20 KVA , 2200/220 V ,50 Hz transformer   **07**
            The O.C and S.C test results are as follows
            O.C.test: 220 V   4.2 A   148 W   (LV side)
            S.C.test: 86 V   10.5 A   360 W   (HV side)
            Determine the regulation at 0.8 p.f.lagging and at full load. What is the p.f.
            on short circuit
Q.4 **(a)** Explain construction of three phase induction motor   **07**
        (b) Explain working principle of three phase induction motor   **07**
                                              OR
Q.4 **(a)** Explain torque-slip characteristic of three phase induction motor   **07**
        (b) A 746 KW , 3–Phase, 50 –Hz, 16-pole induction motor has a rotor   **07**
            impedance of(0.02 +j0.15)Ω at standstill. Full-load torque is obtained at 360
            rpm. Calculate(i) the ratio of maximum to full-load torque (ii) the speed of
            maximum torque
Q.5 **(a)** Explain the synchronous impedance method to   predetermine voltage   **07**
            regulation of alternator
        (b) Explain different Methods of starting of synchronous motor   **07**
                                              OR
Q.5 **(a)** Explain the MMF method to predetermine voltage regulation of alternator   **07**
        (b) From the following test results , determine the voltage regulation of a 2000-   **07**
            V , 1 –phase alternator delivering a current of 100 A at (i) unity power
            factor(ii) 0.71 lagging power factor
            Test results:-Full-load current of 100 A is produced on short-circuit by a field
            excitation of 2.5 A. An e.m.f of   500 V is produced on open-circuit by the
            same excitation . the armature resistance is 0.8Ω
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