Code No: RR210303 **RR**

II B.Tech I Semester(RR) Supplementary Examinations, May/June 2010
ELECTRICAL ENGINEERING
(Mechanical Engineering)

Time: 3 hours **Max Marks: 80**

Answer any FIVE Questions
All Questions carry equal marks

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1. (a) Explain the coefficient of Mutual Inductance.
   (b) Two identical coils X and Y of 1000 turns each lie is parallel planes such that 80%. If flux produced by one coil links with the other. If a current of 5A flowing in X produces a flux of 0.5m wb is it, find the mutual inductance between X and Y. [6+10]

2. (a) Relation between Average value and RMS value.
   (b) Calculate form factor for Half wave rectified current. [8+8]

3. (a) With neat sketches, explain the construction and functions of the various parts of a d.c. machine.
   (b) Calculate the emf generated by a 6 pole lap wound armature with 65 slots and 12 conductors per slot, when driven at 1000 rpm. The flux/pole is 0.02 Wb. [10+6]

4. (a) Explain the classification of dc motors with neat diagrams and corresponding voltage equations for each.
   (b) The armature of a dc machine has a resistance of 0.1 Ω and is connected to a 230V supply. Calculate the back emf when it is running as a motor taking 80A. [12+4]

5. (a) On what factors the induced EMF in the transformer windings depends. Justify the answer with appropriate derivation.
   (b) A double wound 1- phase transformer is required to step down from 1900V to 240V, 50Hz . It is to have 1.5V per turn . Calculate the required number of turns on the primary and secondary windings respectively. The peak value of flux density is required to be not more than 1.5 wb/m^2 . Calculate the required cross sectional area of the steel core. If the output is 10KVA . Calculate the secondary current. [8+8]

6. Explain about Delta/Delta connection of Transformers in detail A500 -KVA, 3-phase 50 Hgs Transformer has a voltage Ratio (line voltages) of 33/11 KV and is Delta/Star connected. The resistances per phase are : High voltage 35Ω, low voltage 876 Ω and the Iron loss is 3050 W. Calculate the efficiency at full load and one-half of full load respectively
   (a) at unity PF
   (b) 0.8 PF. [16]

7. (a) Explain the calculation part of %regulation after conducting OC and SC tests using EMF method.
   (b) 100KVA , 3KV, 50Hz, 3-phase star connected alternator has effective arrmature resistance of 0.2 Ohms . The field current of 30Amps produces SC current of 180 Amps and an OC volts of 1060V (line value). Calculate the full load voltage regulation at 0.707 PF lag and 0.8PF leading. Draw the phaser diagram. [8+8]

8. A voltage of 80.0V is applied to a circuit comprising two resistors of resistance 105Ω and 55Ω respectively. The voltage across the 55Ω resistor is to be measured by a voltmeter of internal resistance 100Ω/V. Given that the meter is set to a scale of 0-50V. Determine the voltage indicated. [16]

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