Code: 9A 02303

B.Tech II Year I Semester (R09) Supplementary Examinations, May 2012

ELECTRICAL AND MECHANICAL TECHNOLOGY

(Civil Engineering)

Time: 3 hours   Max Marks: 70

All questions carry equal marks

A total of five questions are to be answered with at least two questions from each part

Use separate booklets for Part A and Part B

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PART- A

1 (a) Explain the constructional features of a D.C machine with the help of a neat sketch.

   (b) A short shunt D.C compound generator delivers 100 Amp t a load at 250 volts. The generator has shunt field, series field and armature resistance of 130Ω, 0.1Ω and 0.1 Ω respectively. Calculate the voltage generated in the armature winding. Assume 1 volt drop per brush.

2 (a) Explain the principle of operation of a transformer and derive an expression for voltage per turn of a transformer.
   (b) A 3300/250 v, 50 Hz, single phase transformer having an effective cross sectional area of 125 cm^2 and 70 turns on the low voltage winding. Calculate the value of maximum flux density and the number of turns on the high voltage winding.

3 (a) Sketch torque- speed characteristics of an induction motor and explain how the torque varies with speed.
   (b) The frequency of the ϵ.m.f in the stator of a 4 pole induction motor is 50 Hz and that in the rotor is 1.5 Hz. What is the slip and at what speed is the motor running?

4   Explain the significance of various torques relevant to the operation of indicating instruments.

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PART- B

5 (a) What do you understand by gas welding? Explain the characteristics and uses of the three basic oxyacetelin welding flame patterns.
   (b) Describe the process.

6 (a) Explain degree of reaction. Explain the working of single stage reaction turbine. Also explain pressure and velocity variations along the axis of the turbine.
   (b) With help of neat sketches describe the working of a four stroke cycle internal combustor engine.

7 (a) Derive the equations for shaft work for single stage reciprocates air compressor without clearance.
   (b) Distinguish clearly the difference between an open belt and cross belt drive.
   (c) Explain the advantages of gear drive over belt and rope drive.

8 (a) Define the term air conditioning. Explain with a neat sketch an air conditioning cycle.
   (b) Write short note on the following:
        (i) Power shovels   (ii) Concrete mixer.

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