00874

B.Tech. IN ELECTRICAL ENGINEERING (BTELVI)

Term-End Examination

June, 2011

BIEE-008 : ELECTRO MECHANICAL ENERGY CONVERSION - I

Time : 3 hours *Maximum Marks : 70*

Note : *Attempt **any five** questions. All questions carry **equal** marks.*

1. (a) What do you understand by electromechanical energy conversion ? State three types of electro mechanical energy conversion devices with examples. 7

   (b) Derive the expression for magnetic stored energy density for a singly excited system. 7

2. (a) Define armature reaction in d.c. machine and explain its effects on machine performance. 7

   (b) Explain how A.C. (Alternating current) generated in the armature circuit of a d.c. machine, is rectified to d.c. by, means of a commutator. 7

3. (a) Describe in brief, the function of interpoles and compensating winding in d.c. machines. 7

(b) A separately excited DC generator with speed of 1200 rpm, supplies a load of 200A at 125 V. What will be its new armature current if speed is changed to 1000 rpm keeping field excitation constant ? 7

Assume $R_a = 0.04\ \Omega$ and total brush drop is 2V. Assume also that load resistance is constant.

4. (a) Explain the speed-load characteristics of shunt, series and compound motors. 7

(b) Derive the torque equation for a d.c. machine. 7

5. (a) Explain the principle and working of a single phase transformer with neat circuit diagram. 7

(b) Discuss the difference between the core type and shell type construction of transformers. 7

6. (a) A transformer on no - load has a core loss of 50W, draws a current of 2A and has induced emf of 230V. Determine 7

(i) No - load power factor

(ii) Core loss component

(iii) Magnetizing current

(b) Describe various 3ϕ transformer connections and compare them. 7

7. Write short notes on ***any two*** of the following : **2x7=14**

(a) SC and OC tests

(b) Auto transformers

(c) Speed control of d.c. motors