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BIEE-004

B.Tech. VIEP - ELECTRICAL ENGINEERING - III (BTELVI)

00716

Term-End Examination

June, 2014

BIEE-004 : ELECTRICAL MACHINE - I

Time : 3 hours *Maximum Marks : 70*

Note : *Answer **any five** questions. Use of scientific calculator is **allowed**.*

1. (a) Discuss the constructional features of a d.c. Machine and draw a neat sketch of a d.c. generator. 7

   (b) What do you mean by commutation ? Write different methods of achieving sparkless commutation. 7

2. (a) What is the basic principle of working of a d.c. generator ? Also give induced e.m.f. equation of a d.c. generator. 7

   (b) A long shunt-compound generator delivers a load current of 50 A at 500 V and has armature, series field and shunt field resistances of 0.05 Ω, 0.03 Ω and 250 Ω respectively. Calculate the generated voltage and the armature current. 7

3. (a) Allow 1 V per brush for contact drop. Sketch the speed-Torque characteristics of a d.c. 7
   (i) shunt motor;
   (ii) cumulative compound motor, and
   (iii) series motor.
   Mention the applications of these motors.

(b) A 4-pole, 250V series motor has a wave-connected armature with 1254 conductors. The flux per pole is 22 mWb, where the motor is taking 50 A. Armature resistance is 0.2 Ω, and series field resistance is 0.2 Ω. Calculate the speed. 7

4. (a) What are the factors to be considered for selection of a motor for a specific job ? 7

(b) What are the methods by which the speed of a d.c. shunt motor can be controlled ? State the advantages and disadvantages of each method. 7

5. (a) Explain the working principle of a transformer. Draw the phasor diagram for a transformer on no load. 7

(b) What are the various losses taking place in a transformer ? State the parts of transformer in which they occur. Classify them into constant and variable losses. 7

6. (a) Explain in detail the open circuit (o.c.) and shunt circuit (s.c.) tests of a single phase transformer. 7

(b) Derive e.m.f. equation for a single phase transformer. 7

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

(a) Parallel operation of three phase transformer

(b) Three-phase to Two-phase conversion

(c) Efficiency and voltage regulation in a transformer