PVP 12

Code: EE3T1

II B.Tech - I Semester – Regular Examinations – December 2014

ELECTRICAL MACHINES - I
(ELECTRICAL & ELECTRONICS ENGINEERING)

Duration: 3 hours Marks: 5x14=70

Answer any FIVE questions. All questions carry equal marks

1 a) Explain the working principle of a dc generator. 7 M

b) A 6-pole, loop wound dc armature has 70 slots with 20 conductors/slot. The ratio of pole arc to pitch is 0.68; the diameter of bore of the pole shoe is 0.46m and the length of pole shoe is 0.3m. If the air gap flux density is $0.3wb/m^2$ and the emf induced in the armature is 500V, find the speed at which it runs. 7 M

2 a) Explain the armature reaction of dc generators. 7 M

b) Explain the significance of compensating windings and inter-poles in dc generators. 7 M

3 a) What is meant by critical speed and critical field resistance? Explain any method of determining these parameters of generators. 7 M

b) Explain various losses and condition for maximum efficiency of dc generators. 7 M

4 a) Explain the parallel operation of series generators and their load sharing principles. 7 M

b) Explain the use of equalizer bar and cross connection of field windings in parallel operation of dc generators. 7 M

5 a) What is torque? Explain the torque production in dc motors. 7 M

b) A 4-pole, 440V shunt motor takes 6A on no load. The no load speed being 750rpm. It has a shunt field current of 1.5A. Calculate the full load speed of the motor, if it takes 100A at full load. Armature resistance being 0.25Ω and contact drop per brush is 1V. Armature reaction weakens the field by 5%. 7 M

6 a) Explain the Ward-Leonard method of speed control of motors. 7 M

b) What are the draw backs of three point starter? Explain the working of Four pint starter. 7 M

7 a) Classify the methods of testing dc motors and compare their relative merits and demerits. 7 M

b) The Hopkinson's test on two dc machines yields the following; line voltage =250A, line current excluding field currents = 50A, motor armature current = 380A and field current = 5A for generator and = 2.4 A for motor at full load. Calculate the efficiency of the machine. Armature resistance of each machine is 0.02Ω. 7 M

8 a) Explain the principles of cross field dynamos. 7 M

b) Discuss the features of amplidyne. 7 M