

Code: R7210206**B.Tech II Year I Semester (R07) Supplementary Examinations December 2015****ELECTRICAL MACHINES - I****(Electrical & Electronics Engineering)****(For 2008 regular admitted batch only)****Time: 3 hours****Max. Marks: 80**

Answer any FIVE questions
All questions carry equal marks

- 1 (a) Derive the energy – balance equation for an electro mechanical system.
(b) Define the terms electrical port, conversion device, mechanical port and spring.
- 2 (a) Write in detail about the dc generator principle and operation.
(b) A 6 pole lap wound dc generator has 600 conductors on its armature. The flux per pole is 0.02 Wb. Calculate the speed at which the generator must be run to generate 300 V and what would be the speed, if the generator were wave wound?
- 3 (a) Define and write in detail about the resistance commutation and e.m.f commutation.
(b) A 4 – pole, lap wound generator having 480 armature conductors supplies a current of 150 A. If the brushes are given an actual lead of 10° , calculate the demagnetizing and cross magnetizing AT per pole.
- 4 (a) Draw and explain in detail about the no-load saturation curve of a dc generator.
(b) A compound generator is to supply a load of 250 lamps, each rated at 100 W, 250 V. The armature, series, and shunt windings have resistances of 0.06Ω , 0.04Ω and 50Ω respectively. Determine the generated e.m.f when the machine is connected in (i) Long shunt. (ii) Short shunt. Take drop per brush as 1 V.
- 5 (a) Write the importance of equalizing bar for two compound generators operating in parallel.
(b) Draw and describe the terminal characteristics of shunt generator.
- 6 (a) Draw and explain in detail about the characteristics of compound motor.
(b) A 230 V, 60 HP dc shunt motor has armature resistance of 0.05Ω and field circuit resistance R_f of 46Ω . The no-load speed is 1000 r.p.m. Find the speed when line current is: (i) 75 A. (ii) 150 A. (iii) 250 A. Assume that the motor has compensating winding.
- 7 (a) Explain in detail about the ward Leonard control method of dc motors.
(b) Draw and explain the construction of 3-point starter for dc shunt motor.
- 8 (a) Define the terms Eddy current losses, Hysteresis loss, Stray loss, and Copper losses.
(b) The Hopkinson test on two identical shunt machines gave the following results; input voltage is 500 V, input current is 15 A, output current of generator is 120 A, field current of generator is 4 A, field current of motor is 3 A and armature resistance of each machine is 0.06Ω . Find efficiency of motor and generator.
