PVP 14

Code: EE3T2

II B.Tech - I Semester - Regular/Supplementary Examinations
November 2019

ELECTRICAL MACHINES - I
(ELECTRICAL & ELECTRONICS ENGINEERING)

Duration: 3 hours Max. Marks: 70

PART – A

Answer ***all*** the questions. All questions carry equal marks
11x 2 = 22 M

1.

a) Why brushes of a DC machine made with soft material?
b) Why inter-poles are designed to produce more MMF (magneto motive force) than the armature MMF in the commutating zone.
c) Define critical field resistance and critical speed in a DC generator.
d) What is the resultant speed when two series generators are connected in parallel?
e) How to find direction of rotation of a DC motor?
f) What are the different speed control methods of a DC motor?
g) What is the specific application of 4 point DC motor starter?
h) What is field weakening method of speed control in case of DC motor speed control?
i) What is the purpose of field test on DC series machines?

j) What are the applications of three brush generators?

k) What is the principle of Rosenberg generator?

PART – B

Answer any ***THREE*** questions. All questions carry equal marks. 3 x 16 = 48 M

2. a) How can you say that the generated voltage in a DC generator armature winding is AC voltage? And how it is converted in to DC voltage? 8 M

b) A compensated DC machine has 20,000 AT/pole. The ratio of pole arc to pole pitch is 0.8. The interpolar air gap length and flux density are respectively 1.2 cm and 0.3 T. For rated armature current 1000 A, calculate the compensating winding AT per pole and number of turns on each interpole. 8 M

3. a) Describe the procedure for paralleling of DC generators. 8 M

b) A shunt generator is to be converted into a level compounded generator by the addition of a series field winding. From a test on the machine with shunt excitation only, it is found that the shunt current is 3.1 A to give 400 V on no load and 4.8 A to give the same voltage when the machine is supplying its full load of 200 A. The shunt winding has 1200 turns per pole. Find the number of series turns required per pole. 8 M

4. a) What is the reasons for high inrush starting currents in a DC motor? List out the effects and how to minimize these currents? 8 M

b) A DC motor takes an armature current of 110 A at 480 V. The armature circuit resistance of 0.2 Ω. The machine has 6 poles and the armature is lap connected with 864 conductors. The flux per pole is 0.05 Wb. Calculate i) the speed and (ii) the gross torque developed by the armature. 8 M

5. a) What is solid state speed control of DC motors? What way it is different from conventional methods and what are the advantages of solid state speed control of DC motors? 8 M

b) When running on no load, a 400 V shunt motor takes 5 A. Armature resistance is 0.5 Ω and field resistance is 250 Ω. Find the output of the motor and efficiency when running on full load and taking a current of 50 A. 8 M

6. a) Draw the schematic diagram of an amplidyne? And briefly explain its operation. 8 M

b) Briefly explain operation of Rosenberg generator and mention its applications. 8 M