

Code: 9A02308

B.Tech II Year I Semester (R09) Supplementary Examinations June 2017

ELECTRICAL MACHINES - I
(Electrical & Electronics Engineering)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions
All questions carry equal marks

- 1 With the help of neat diagram, obtain the expression for the energy stored in a magnetic system for a simple attracted armature type relay. Explain the operation of the system.
- 2 Explain with the help of neat and relevant diagrams, how the emf induced in the armature conductors of a dc generator can be made unidirectional.
- 3 Discuss about the following in detail:
 - (a) Resistance Commutation.
 - (b) Delayed Commutation
- 4
 - (a) What is critical speed? How it is obtained with the help of OCC.
 - (b) The magnetization curve for a dc generator running at 800 rpm is as follows:

Field Current (I_f) :	1.6	3.2	4.8	6.4	8	9.6	11.2
emf (E_0) :	148	285	390	460	520	560	590

Find the critical speed, if field winding resistance is 60 Ω
- 5
 - (a) Distinguish between external and internal characteristics of dc generators.
 - (b) Draw the load characteristics of a separately-excited dc generator and explain.
- 6
 - (a) Why the emf induced in an armature of a dc motor is called as 'back emf'? Explain.
 - (b) The flux per pole of a 6-pole dc motor is 30 mWb. What total number of ampere-conductors must be carried by the armature to produce a torque of 300 N-m?
- 7 Draw neatly the diagram which gives constructional features of a 4-point starter. Explain the function and operation of each component. Mention the advantages and disadvantages.
- 8
 - (a) The following readings are obtained when performing a brake test on dc shunt motor.
The readings of spring balances are 8 kgs and 30 kgs
Diameter of brake drum = 42 cm
Speed of the motor = 1000 rpm
Applied voltage = 220 V
Line current = 50 A.
Calculate output power and efficiency.
 - (b) A 500 V DC shunt motor takes a current of 5 A on no-load. The resistances of the armature and field circuit are 0.2 Ω and 300 Ω respectively. Find the efficiency, when taking load current of 125 A, and percentage change in speed.
