Code No: RT21026 **R13** SET -1

II B. Tech I Semester Supplementary Examinations, Oct/Nov- 2017
ELECTRICAL MACHIENS-I
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answer **ALL** the question in **Part-A**
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1. a) Explain Hysteresis and eddy current losses in a DC Machine (4M)
   b) List the applications of DC shunt ,series and cumulative compound Motors (3M)
   c) Distinguish between load current and exciting current? (4M)
   d) Define Back emf with respect to DC Motor (3M)
   e) Explain the importance of Interpoles in DC machines (4M)
   f) What is the difference between speed regulation and speed control (4M)

PART -B

2. Show that the energy stored in a magnetic field is equal to the area between the flux linkages and current curve for the system and the flux linkage axis. (16M)

3. a) Prove that in a DC Generator, generated emf and current in a conductor are in the same direction, where as in the DC Motor, generated emf opposes the flow of current in a conductor. (8M)
   b) The terminal voltage of a separately excited DC Generator with constant excitation is constant and is equal to 250 V. Determine the percentage reduction in speed when the load changes from 250 KW to 150 KW. The armature resistance is 0.05Ω and total contact drop at brushes = 2.2 V. Neglect armature reaction. (8M)

4. a) Explain the terms commutation and commutation period in DC machines (8M)
   b) A 4- pole, 50 KW, 250 V wave wound, shunt generator has 400 armature conductors. Brushes are given a lead of 4 commutator segments. Calculate the demagnetizing ampere turns/pole if shunt field resistance is 50 Ω. Also calculate extra shunt field turns/pole to neutralize the demagnetization. (8M)

5. a) Explain the effects of Armature reaction and how can we reduce them (8M)
   b) A 4 – pole dc series motor has wave connected winding with 600 conductors. Total resistance of motor is 0.8Ω. When fed from 250 V dc source, the motor supplies a load of 10 KW and takes 50 A with a flux per pole of 3 m Wb. For these operating conditions, calculate the developed torque and the shaft torque. (8M)

6. Enumerate the various losses in a DC Machine. Derive the expression for the efficiency of DC generator and DC Motor (16M)

7. Write short notes on the following: (16M)
   i) Design concept of Conductor and Slot dimensions
   ii)Four Point Starter
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