Code No: R21025 **R10** SET - 1

II B. Tech I Semester Supplementary Examinations, May/June - 2017
ELECTRICAL MACHINES - I
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
~~~~~~~~~~~~~~~~~~~~~~~~

1. Explain in detail about the principle of conservation of energy and then explain the energy balance equation (15M)

2. a) Explain the different types of dc machine based on excitation (7M)
   b) An 8-pole lap connected armature has 40 slots with 12 conductors per slot generates a voltage of 520 V. Determine the speed at which it is running if the flux per pole is 55 m Wb. (8M)

3. a) Derive the necessary equation for the Demagnetizing AT/pole and Cross magnetizing AT/pole (10M)
   b) Explain in detail about the usage of Inter poles in DC Machines (5M)

4. a) Explain the external characteristics of a DC Compound generator (8M)
   b) Describe the process of voltage build up in a DC shunt generator. (7M)

5. a) Explain carefully the exact procedure for connecting a shunt generator in parallel with others already supplying a load. (7M)
   b) The shunt generators are together supplying 100 A to a load. Generator 1 gives 400 V on no – load and 360 V when supplying 100 A. Generator 2 gives 400 V on no – load and 350 V when supplying 100 A. Find the current supplied by each and the voltage across load. (8M)

6. a) Describe the principle of operation of DC motor. (8M)
   b) Explain the speed – current, torque – current and speed – torque characteristics of DC Shunt motor. (7M)

7. a) Why are small motors connected directly to supply lines without starters (8M)
   b) A series motor, with an unsaturated magnetic circuit and 0.5Ω total resistance, when running at a certain speed takes 60 A at 500 V. If the load torque varies as the cube of the speed, calculate the resistance required to reduce the speed by 25 % (7M)

8. Explain the Swinburne's test on DC machine and give the procedure to calculate the efficiency of both generator and motor (15M)
~~~~~~~~~~~~~~~~~~~~~~~~