

SECTION-B

2. Show that the reaction of coupling magnetic field on the electrical or mechanical system is essential for the electromechanical energy conversion.
3. Define armature reaction in DC machine and explain its effects on machine performance.
4. Describe Ward Leonard control method. Discuss advantages and disadvantages of this method.
5. A 250V DC shunt motor has an armature current of 20A when running at 1000 rpm against full-load torque. The armature resistance is 0.5 Ohms. What resistance must be inserted in series with the armature to reduce the speed to 500 rpm at the same torque?
6. Distinguish between singly excited and doubly excited system.

SECTION-C

7. Explain, how two DC shunt generators work in parallel, and how they share the load. List out the conditions to be satisfied for running two or more DC shunt generators in parallel.
8. Two coupled coils have self and mutual inductance of $L_{11} = 3 + 0.5x$; $L_{22} = 2 + 0.5x$; $L_{12} = L_{21} = 0.3x$ over a certain range of linear displacement x . The first coil is excited by a constant current of 15A and the second by a constant current of -8A. Find out :
 - a) Mechanical work done if x changes from 0.6 to 1m.
 - b) Energy supplied by each electrical source in part (a).
9.
 - a) Explain the speed control of DC series motor by :
 - i) Field diverters
 - ii) Variable resistance in series with motor.
 - b) List the different losses in a DC machine. Which of these losses are constant? Derive a condition for maximum efficiency.

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