

PARUL UNIVERSITY
FACULTY OF ENGINEERING & TECHNOLOGY
M.Tech. Summer 2017 - 18 Examination

Semester: 2**Subject Code: 03203155****Subject Name: Electrical Machine Modelling****Date: 28/05/2018****Time: 2:00 pm to 4.30 pm****Total Marks: 60****Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

- Q.1** A) State the principles of Electromechanical energy conversion (05)
B) A two winding magnetically coupled system has N_1 turns in primary and N_2 turns in secondary windings. Show the relationship between magnetizing inductances L_{m1} and L_{m2} of the windings respectively (05)
C) Distinguish between the leakage flux and fringing flux. (05)
- Q.2** Answer the following questions. (Attempt any three) (Each five mark) (15)
A) Define and write relation for stored magnetic energy
B) Explain Reference frame theory.
C) Enumerate the merits of the application of reference frame theory to electrical machines
D) Explain why two phase quantities appear as constant quantities in synchronously rotating reference frame
- Q.3** A) Obtain the energy balance equation of an electro mechanical system (07)
B) Derive the expressions for stored magnetic energy in a singly excited system (08)
- OR**
- B) Explain λ - i characteristic of magnetic system. Also derive expression for co-energy density. Assume λ - i relationship of magnetic circuit is linear (08)
- Q.4** A) Derive the general expression for force and torque of a singly excited rotating actuator. (07)
- OR**
- A) Describe the formulation of transformation of 3 phase variables to a stationary reference frame (07)
B) Apply $qd0$ transformation to series RL circuit and derive an expression for current and voltage without mutual inductance (08)