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SEAT No. :

**P227**

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**Oct./BE/Insem. - 543**

**B.E. (Electrical)**

**SPECIAL PURPOSE MACHINES**

**(2015 Course) (Semester - I) (403144 (E)) (Elective - II)**

*Time : 1 Hour]*

*[Max. Marks :30*

*Instructions to the candidates:*

- 1) *Attempt Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Assume Suitable data if necessary.*

**Q1) a)** How principle of conservation of energy is used for modelling machine modelling? [5]

b) What is co-energy? How it is differ from energy stored in magnetic circuit? [5]

OR

**Q2)** Derive mathematical expression for force and torque from co-energy. [10]

**Q3)** Explain and compare following types of permanent magnet brushless motors [10]

- a) Trapezoidal brushless motor
- b) Sinusoidal brushless motor

OR

**Q4)** Derive the relation of torque generated in brushless D.C. motor and hence draw torque speed characteristics. [10]

**Q5)** Explain the concept of  $abc - \alpha\beta$  and  $\alpha\beta - dq$  transformations as used in machine modeling. [10]

OR

**Q6)** Explain the FoC scheme of constant  $\delta = 90$  with the help of phasor diagram and block diagram. [10]