



**M.E. DEGREE EXAMINATIONS: JUNE 2015**

(Regulation 2014)

Second Semester

**POWER ELECTRONICS AND DRIVES**

P14PET204: Special Electrical Machines and Their Controllers

**Time: Three Hours**

**Maximum Marks: 100**

**Answer all the Questions:-**

**PART A (10 x 1 = 10 Marks)**

1. Synchronous reluctance motor torque profile is improved by [K<sub>2</sub>]
  - a) Excitation of field
  - b) Axial laminated rotor
  - c) Increased speed
  - d) Increased rotor resistance
2. Essential components of Synchronous reluctance motor drive are, A. RPS B. Commutator [K<sub>1</sub>]  
C. Inverter D. Slip rings
  - a) A and B
  - b) B and C
  - c) B and D
  - d) A and C
3. Assertion (A): RPS is used in SRM; [K<sub>2</sub>]  
Reason (R): SRM is excited at positive torque region
  - a) A and R are true and related
  - b) A is true and R is not true
  - c) A is not true and R is true
  - d) A and R are not true
4. Match the following [ A. Hall sensor B. Soft switching C. Freewheeling], [1. ZCS 2. RPS [K<sub>1</sub>]  
3. Current regulation]
  - a) A-1, B-2, C-3
  - b) A-3, B-2, C-1
  - c) A-2, B-1, C-3
  - d) A-2, B-3, C-1
5. Find the correct sequence of steady state operations in self control of PMSM [K<sub>2</sub>]  
A. Obtain motor signals B. Excite the phase windings C. Switch the inverter
  - a) A-B-C
  - b) B-A-C
  - c) C-B-A
  - d) A-C-B
6. PMSM on vector control behaves as [K<sub>2</sub>]
  - a) Induction motor
  - b) Separately excited DC motor
  - c) Reluctance motor
  - d) Stepper motor



24. Explain the vector control scheme of PMSM with block diagram [K<sub>2</sub>]
25. Derive EMF equation of BLDC motor [K<sub>2</sub>]
26. Draw and explain the dynamic characteristics of stepper motor [K<sub>2</sub>]

**PART D (4 x 10 = 40 Marks)**

27. With block diagram and algorithm, explain the microprocessor based control of SRM [K<sub>3</sub>]
28. Draw the phasor diagram of PMSM and derive the torque equation [K<sub>2</sub>]
29. With neat diagram and switching table explain a BLDC motor drive [K<sub>2</sub>]
30. Draw the structure of 6/4 pole VR stepper motor and explain the modes of operation [K<sub>2</sub>]

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