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PSNA College of Engineering and Technology

Department of Electrical and Electronics Engineering

Serial Test-II

Special Electrical Machines

Year/Sem : IV/VII

Max.Marks:50

Staff In-charge: **M.Kaliamoorthy**

Time: 90 Mins

Part A (9 * 2 = 18)

Answer any **NINE** questions

1. Write two distinguished points between Switched Reluctance and stepper motor.
2. List the applications of SRM.
3. Write the advantages of SRM
4. Mention the types of current regulators
5. Draw the ideal current wave form for motoring and generating
6. Draw the inductance variation graph
7. What is field and co energy?
8. Define aligned and unaligned inductance
9. Calculate the step angle and commutation frequency of a 3 phase SRM which has 12 stator poles and 8 rotor poles.
10. Draw the speed torque characteristics of SRM with torque speed capability.

Part B (2 *16 = 32)

Answer **ALL** questions

11. (i) Explain with neat diagram, the constructional details and working principle of switched reluctance motors (6)
- (ii) Explain the speed torque characteristics of SRM in detail (6)
- (iii) Explain with neat diagrams how Inductance varies with Rotor Position in SRM (4)

OR

12. (i) Explain with neat block diagram, the micro processor based control in switched reluctance motors (10)

(ii) A switched reluctance motor has six stator poles and four rotor poles. It has a stator pole arc of 30° and rotor pole arc of 32° . The aligned inductance is 10.7mH and unaligned inductance is 1.5mH. Saturation can be neglected. Calculate the instantaneous torque when the rotor is 22° before the aligned position and phase current is 7A. (6).

13.(i) Derive the expression for average torque in terms of mechanical energy transferred per stroke using B-H curve of switched reluctance motor. (6)

(ii) Discuss briefly the control techniques used in SRM (10)

OR

14.(i) Draw and explain with neat waveforms the operation of c-dump and Split-DC link converter used in SRM (5+5)

(ii) A switched reluctance motor has six stator poles and four rotor poles. The aligned inductance is 12.7mH and unaligned inductance is 3.5mH. Saturation can be neglected. What is the flux linkage in the aligned position when the phase current is 7.0 A. If the flux linkage is maintained constant while the rotor rotates from unaligned position to aligned position at low speed, determine the energy conversion per stroke and average torque. (6)

Staff in charge

HOD/EEE