PSNA COLLEGE OF ENGINEERING AND TECHNOLOGY, DINDIGUL
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
SERIAL TEST – I

Subject Name : Special electrical machines   **Year/ Semester** : II / III
Course/Branch : B.E / EEE(A &B)   **Subject Code** : EE

PART- A
Answer any nine of the following (9*2 = 18)
1. What do you understand by full step and half step operation?
2. Classify the different types of stepper motor?
3. What is the step angle of 4 phase stepper motor with 12 stator teeth and 3 rotor teeth?
4. Define holding torque and detent torque.
5. List any four applications of stepper motor.
6. List any four advantages of SRM.
7. What is SRM?
8. Write down the torque equation of the SRM and mention its parameters.
9. Mention the 5 types of converter circuits used for SRM.
10. Bring out the difference between the stepper motor and the SRM.

PART B
Answer all the questions (16*2 = 32)
11. a) Explain the full step operation of variable reluctance stepper motor with neat diagram (8)
    b) Derive the torque equation for Stepper motor which uses the variable reluctance principle (8)

OR
12. a) What is the step angle of 5 phase SRM having 10 stator poles and 4 rotor poles? What is the commutation frequency in each phase at a speed of 6000 rpm. (8)
    b) Explain the construction of SRM in detail with neat diagram. (8)

13. a) Explain the dynamic characteristics of stepper motor with all its curve areas and the characteristics parameters (8)
    b) Design the unipolar L/R drive for the following parameters.
          R_m = 1.23 Ohm   ; I_{ph} = 3.5 A   ; τ_{e2}= 0.5ms
          L_m = 7.94mH   ; τ_{e1} = 1 ms   ;   (8)

OR
14. a) A SRM with 6 stator poles and 4 rotor poles has a stator pole arc of 30 degree and a rotor pole arc of 32 degree. The aligned inductance is 10.7 mH and the unaligned inductance is 1.5 mH. Saturation can be neglected. Calculate the instantaneous torque when the rotor is 30 degree before the aligned position and the phase current is 7 A. Neglect fringing. (8)
    b) Derive the torque equation for SRM (8)

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