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**B.Tech. (Electrical Engineering) 8th Semester
(G-Scheme) Examination, July-2022
SPECIAL ELECTRICAL MACHINES
Paper- PEC-EE-402-G**

Time allowed : 3 hours]

[Maximum marks : 75

Note: Attempt five questions in all, selecting one question from each unit. Question no. 1 is compulsory. All questions carry equal marks.

1. (a) List out the difference between Squirrel cage IM and Slip ring IM. 2.5×6
- (b) What is the purpose of deep- bar cage rotors?
- (c) Why single phase Induction motor does not have starting torque?
- (d) Calculate step angle for 3-phase, 24- pole permanent magnet stepper motor.
- (e) State advantage of servomotors over large industrial motors
- (f) Write some important application of PMDC motors.

Unit-I

2. (a) Describe with neat sketch construction of 3-phase Induction motor 7.5

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- (b) A 746 KW, 3-phase Induction motor 50 Hz, 16 poles has rotor resistance of $.02\Omega$ and reactance of $.15\Omega$ at standstill. Full load torque is obtained at 360 rpm. Calculate a) Speed at which maximum torque occur b) Ratio of maximum to full load torque c) External resistance per phase to be inserted in rotor circuit to get maximum torque at starting
7.5

3. Discuss briefly the various methods of speed control of 3-phase Induction motor
15

Unit-II

4. Draw the circuit diagram of Split phase Single phase Induction Motor and explain its working. When this type of motor is commonly used? 15

5. What is two- phase servomotor? Describe its construction and working. Draw its torque-speed characteristics for various control voltages 15

Unit-III

6. Name the most popular types of stepper motor. Describe operation of variable reluctance type of stepper motor. 15

7. Draw and explain torque-speed characteristics of reluctance motor. Compare reluctance motor with induction motor. 15

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Unit-IV

8. What types of permanent-magnet materials are used for permanent-magnet d.c. motor? State their properties and applications. 15

9. Describe the construction and working operation of brushless dc motor. State its application also. 15

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