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BTECH
(SEM VI) THEORY EXAMINATION 2021-22
SPECIAL ELECTRICAL MACHINES

Time: 3 Hours**Total Marks: 100****Note:** Attempt all Sections. If you require any missing data, then choose suitably.**SECTION A****1. Attempt all questions in brief.****2*10 = 20**

Qno	Questions	CO
(a)	How stepper motors are different from conventional motors.	1
(b)	Give the advantage of having low rotor inertia of two phase ac servomotor.	1
(c)	What is stepper motor? State its type.	2
(d)	Define step angle.	2
(e)	Give the classification of switched reluctance motors.	3
(f)	State any four applications of switched reluctance motors	3
(g)	What are the types of permanent magnet DC motor	4
(h)	Write any four applications of PCB motors.	4
(i)	Write any four applications of hysteresis motors.	5
(j)	Write any four applications of reluctance motors.	5

SECTION B**2. Attempt any three of the following:****10*3 = 30**

Qno	Questions	CO
(a)	Explain with the help of suitable example and sketches for the followings (i) Constant torque control of Induction Machine (ii) Constant power control of Induction Machine	1
(b)	Explain the construction and principle of operation of hybrid stepper motor.	2
(c)	Explain the principal of operation and operating modes of switched reluctance motor. Also writes its advantage and disadvantage.	3
(d)	Explain the principal of operation and torque production of three-phase three-pulse brushless dc motor. Also mention its advantage over conventional dc motor.	4
(e)	Write short note on (i) Hysteresis motor (ii) Single phase reluctance motor	5

SECTION C**3. Attempt any one part of the following:****10*1 = 10**

Qno	Questions	CO
(a)	Write short note on two phase servomotor discussing the construction, torque-speed characteristics and applications.	1
(b)	Write short note on the followings- (i) Characteristics of SEIG in detail. (ii) Characteristics of DFIG in detail	1



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4. **Attempt any one part of the following:** **10 *1 = 10**

Qno	Questions	CO
(a)	Write short note on permanent magnet stepper motor discussing its construction, operation and application.	2
(b)	Discuss in details the principle of operation and characteristics of hybrid stepper motor with applications.	2

5. **Attempt any one part of the following:** **10*1 = 10**

Qno	Questions	CO
(a)	Discuss various drive circuits of switched reluctance motors	3
(b)	Explain in details the constructional features of Linear SRM. Also discuss the principle of operation, Torque production and performance characteristics.	3

6. **Attempt any one part of the following:** **10*1 = 10**

Qno	Questions	CO
(a)	Write short note on permanent magnet synchronous generators and their applications.	4
(b)	Write short note on the followings- (a) Sinusoidal PM ac motors. (b) Brushless DC motors.	4

7. **Attempt any one part of the following:** **10*1 = 10**

Qno	Questions	CO
(a)	A universal series motor when operating on 220 V dc, draws 10 Amp and runs at 1440 r.p.m. Find the new speed and p.f. when connected to 220 V 25 Hz ac supply, the motor current remaining the same. The motor has total resistance of 1 Ω and total inductance of 0.1H.	5
(b)	An ac operated universal motor has a 2-pole armature with 960 conductors. At a certain load the motor speed is 5000 rpm and the armature current is 4.6 Amp; the armature terminal voltage and input are respectively 100 V and 300 W. Calculate the following quantities assuming an armature resistance of 3.5 Ohm. (i) Effective armature reactance (ii) Maximum value of useful flux/pole.	5