Code No: **R42024** **R10** **Set No. 1**

IV B.Tech II Semester Regular/Supplementary Examinations, April - 2015

SPECIAL ELECTRICAL MACHINES

(Electrical and Electronics Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
*****

1 a) List the main advantages of switched reluctance motors. [8]

b) Draw and explain the speed torque characteristics of a switched reluctance motor. [7]

2 a) Define and explain holding torque and detent torque of a stepper motor. [6]

b) What are permanent magnet stepper motors? Explain its construction and operation. [9]

3 What is a BLDC motor? What are its advantages? Give the mathematical modeling of a BLDC motor. [15]

4 a) List and discuss different types of linear motors. [8]

b) Explain the operation of a linear induction motor. [7]

5 a) Discuss the advantages and disadvantages of permanent magnet motors. [7]

b) Draw and explain the equivalent circuit of a permanent magnet DC motor. [8]

6 What is a closed-loop control? What are its advantages? Compare open-loop and closed-loop systems. [15]

7 a) What is the need for position sensor in the control of switched reluctance motor? Explain. [7]

b) Explain the switching pattern of asymmetric bridge converter used for the control of a four-phase 8/6 switched reluctance motor. [8]

8 a) List and compare different types of motors employed in traction. [8]

b) Explain the application of linear motors for traction drives. [7]

Code No: **R42024** **R10** **Set No. 2**

IV B.Tech II Semester Regular/Supplementary Examinations, April - 2015

SPECIAL ELECTRICAL MACHINES

(Electrical and Electronics Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks

*****

1 a) Discuss the physical principle of a switched reluctance motor. [7]

b) Derive the general expression for torque of a switched reluctance motor. [8]

2 a) With a neat diagram, explain the constructional details of an eight stator pole, six rotor pole stepper motor. Also discuss its operation. [10]

b) List different applications of stepper motors. [5]

3 a) Compare between PMBLDC motors and PMSM motors. [7]

b) List the advantages and applications of BLDC motors. [8]

4 What are linear motors? What are its applications? Explain the constructional details of a linear induction motor. [15]

5 a) Draw and explain the hysteresis loop. [8]

b) Discuss different applications of Permanent Magnet DC Motors. [7]

6 With a neat block diagram, explain the closed loop-control of stepper motors. [15]

7 With a neat block diagram, explain the closed loop speed control of a switched reluctance motor. Also explain different controllers used in it. [15]

8 What are linear induction motors? Explain the use of single sided linear induction motor for traction drives. [15]

Code No: **R42024** **R10** **Set No. 3**

IV B.Tech II Semester Regular/Supplementary Examinations, April - 2015

SPECIAL ELECTRICAL MACHINES

(Electrical and Electronics Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
*****

1	a)	What is the need for position feedback in the operation of switched reluctance motor? Explain.	[8]
	b)	List and discuss different applications of switched reluctance motors.	[7]
2	a)	Explain the construction and operation of a variable reluctance stepper motors.	[9]
	b)	What is a step angle? Explain.	[3]
	c)	Define stepping rate of a stepper motor.	[3]
3	a)	Draw and explain the back emf waveforms of a three-phase BLDC motor.	[7]
	b)	Explain the commutation process in BLDC machines.	[8]
4	a)	Explain the principle of operation of a linear induction motor.	[8]
	b)	Explain different applications of linear motors.	[7]
5	a)	Why energy is lost during magnetization and demagnetization of materials? Explain with the help of hysteresis loop.	[9]
	b)	List the advantages and disadvantages of permanent magnet machines.	[6]
6	a)	Explain the open-loop control of stepper motors.	[10]
	b)	List different applications of stepper motors.	[5]
7		With a neat schematic diagram, explain the speed control of a BLDC motor drive.	[15]
8	a)	Discuss different AC motors suitable for traction systems.	[8]
	b)	Compare between AC and DC traction systems.	[7]

Code No: **R42024** **R10** **Set No. 4**

IV B.Tech II Semester Regular/Supplementary Examinations, April - 2015

SPECIAL ELECTRICAL MACHINES

(Electrical and Electronics Engineering)

Time: 3 hours **Max. Marks: 75**

Answer any FIVE Questions
All Questions carry equal marks
*****

1 a) Discuss the operating principle of switched reluctance motor. [7]

b) With a neat circuit diagram, explain the asymmetric bridge converter for a four-phase 8/6 switched reluctance motor. [8]

2 a) What are hybrid stepper motors? Explain its construction and operation. [9]

b) Discuss different applications of a stepper motor. [6]

3 a) Explain the constructional details of a PMBLDC motor. [9]

b) Prove that the PM BLDC machines have 15% more power density than the PMSM. [6]

4 a) Compare between linear induction motors and rotary induction motors. [7]

b) Discuss the application of linear induction motors for electric traction. [8]

5 a) What is electrically commutated DC Motor? Explain its operation. [8]

b) Explain the advantages and applications of Permanent Magnet DC Motors. [7]

6 What is the need for closed loop control of electrical machines? With a neat diagram, explain the closed loop control of a stepper motor. [15]

7 Draw the back emf waveforms and explain the switching logic for a three phase BLDC motors. [15]

8 a) Discuss the main characteristics of traction drives. [7]

b) Discuss the suitability of linear induction motors for traction drives. [8]