Code No: **RT42022C** **R13** **Set No. 1**

**IV B.Tech II Semester Regular/Supplementary Examinations, April/May - 2019**

# SPECIAL ELECTRICAL MACHINES

**(Electrical and Electronics Engineering)**

**Time: 3 hours** **Max. Marks: 70**

***Question paper consists of Part-A and Part-B***

***Answer ALL sub questions from Part-A***

***Answer any THREE questions from Part-B***

*****

## PART–A *(22 Marks)*

1. a) What are the applications SRM? [3]
   b) Define pull in torque and pull out torque in stepper motor. [4]
   c) Discuss the B-H curves of common permanent magnetic materials. [3]
   d) Why is the PMBLDC motor called electronically commutated motor? [4]
   e) What are the various linear synchronous motor topologies? [4]
   f) Discuss the application of linear motors for traction drives. [4]

## PART–B *(3x16 = 48 Marks)*

2. Explain control of switched reluctance motor and draw the current and torque waveforms. [16]

3. a) Discuss about single stack VR stepper Motor. [8]
   b) Explain different configurations for switching the phase windings in stepper motor. [8]

4. a) Develop the equivalent circuit of Permanent magnet DC Motor. [8]
   b) Explain the working principle of Permanent Magnet DC Motors. [8]

5. Explain in detail the advantages and disadvantages of BLDC Motors over conventional DC or AC motors. [16]

6. a) Discuss the operation principle of with Active Reaction Rail-Construction. [8]
   b) Explain in detail the working principle of Linear Induction Motors. [8]

7. What are the different types of AC motors are suitable for electric traction? Explain in detail. [16]

Code No: **RT42022C** **R13** **Set No. 2**

**IV B.Tech II Semester Regular/Supplementary Examinations, April/May - 2019**

# SPECIAL ELECTRICAL MACHINES

**(Electrical and Electronics Engineering)**

**Time: 3 hours** **Max. Marks: 70**

***Question paper consists of Part-A and Part-B***

***Answer ALL sub questions from Part-A***

***Answer any THREE questions from Part-B***

*****

## PART–A *(22 Marks)*

1. a) What are essential difference between Switched reluctance motor and conventional reluctance motor? [3]
   b) What is meant by micro stepping in stepper motor? What are its advantages? [4]
   c) List the permanent magnet materials used in PMDC machines. [3]
   d) Discuss the basic configuration of BLDC Motor. [4]
   e) List the applications of Linear Induction Motor [4]
   f) What are main characteristics of traction drives? [4]

## PART–B *(3x16 = 48 Marks)*

2. a) Explain the principle of operation of Switched reluctance motor. [8]
   b) Discuss about the control of Switched reluctance motor for traction type loads. [8]

3. With neat sketches, explain the construction and principle of operation of Hybrid stepping motor. [16]

4. a) Write short notes on Moving coil Motors. [8]
   b) Explain the constructional details of Permanent Magnet DC Motors. [8]

5. a) Describe how the conventional DC motor is developed as Electronically Commutated DC Motor. [8]
   b) Explain the Methods for reducing Torque Pulsations. [8]

6. Explain in detail the construction and working principle of Linear Induction Motors. [16]

7. What are the different types of DC motors are suitable for electric traction? Explain in detail. [16]

Code No: **RT42022C** **R13** **Set No. 3**

**IV B.Tech II Semester Regular/Supplementary Examinations, April/May - 2019**

# SPECIAL ELECTRICAL MACHINES

**(Electrical and Electronics Engineering)**

**Time: 3 hours** **Max. Marks: 70**

***Question paper consists of Part-A and Part-B***

***Answer ALL sub questions from Part-A***

***Answer any THREE questions from Part-B***

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## PART–A *(22 Marks)*

1. a) Why rotor position sensor is essential for the operation of switched reluctance motor? [3]
   b) Mention some applications of stepper motor. [4]
   c) What are the advantages of PMDC motors? [3]
   d) List the drawbacks of surface mounted Permanent magnet DC Machines. [4]
   e) Write short notes on Linear synchronous motor. [4]
   f) What are the advantages of using AC motors over DC motors in traction control? [4]

## PART–B *(3x16 = 48 Marks)*

2. a) Write short notes on power converter principle for switched reluctance motor. [8]
   b) Discuss the various modes of operation of SRM. [8]

3. Explain in detail about closed-loop control of step motor. [16]

4. a) Sketch and discuss the torque-speed characteristics of a PMDC motor. [8]
   b) Derive the torque equation of PMDC motor. [8]

5. From the fundamentals, discuss how the d-q analysis of BLDC Motor is developed. [16]

6. Explain in detail the construction and working principle of Linear synchronous Motors. [16]

7. a) What is the selection criterion of motors for electric traction application? [8]
   b) Compare AC and DC traction systems. [8]

Code No: **RT42022C** **R13** **Set No. 4**

**IV B.Tech II Semester Regular/Supplementary Examinations, April/May - 2019**

# SPECIAL ELECTRICAL MACHINES

**(Electrical and Electronics Engineering)**

**Time: 3 hours** **Max. Marks: 70**

***Question paper consists of Part-A and Part-B***

***Answer ALL sub questions from Part-A***

***Answer any THREE questions from Part-B***

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## PART–A *(22 Marks)*

1. a) List out the advantages of switched reluctance motor. [4]
   b) Define holding torque and detent torque in stepper motor. [3]
   c) Mention some applications of PM DC motor. [4]
   d) What are the relative merits of the brushless dc motor drives? [4]
   e) Write short notes on Linear Induction motor. [4]
   f) What are the advantages of electric traction? [3]

## PART–B *(3x16 = 48 Marks)*

2. With a neat sketch, explain the Power Converter for SR Motor. Give the analysis for current and torque waveforms. [16]

3. a) Explain the construction and various modes of excitation of VR stepper motor. [12]
   b) What are the advantages of VR stepper motor? [4]

4. Explain in detail the construction and working principle of Permanent Magnet DC Motors. [16]

5. a) Explain the constructional details of BLDC motor with the help of neat sketches. [8]
   b) Write short notes on theory of brushless DC motor as variable speed synchronous motor. [8]

6. a) Explain in detail the working principle of Linear synchronous Motors. [8]
   b) Give the analysis of Linear Induction motor in terms of electromagnetic equations. [8]

7. Explain how the single sided linear induction motor is used for traction drive applications. [16]