

Code No: **R42024**

R10

Set No. 1

IV B.Tech II Semester Regular Examinations, April/May - 2014

SPECIAL ELECTRICAL MACHINES

(Electrical and Electronics Engineering)

Time : 3 hours

Max. Marks: 75

Answer any Five Questions

All Questions carry equal marks

- 1 a) Explain the principle of operation of Switched Reluctance Motors. [8]
b) Discuss the torque production mechanism in Switched Reluctance Motors. [7]
- 2 a) List out areas of applications & suitability of stepping motors. [8]
b) Explain different types of variable reluctance stepping motors. [7]
- 3 a) Give the advantages and application of BLDC motors. [8]
b) Explain the construction details of radial flux BLDC motor [7]
- 4 a) What are linear motors? Give their applications. [8]
b) Explain principle of operation of linear induction motor. [7]
- 5 a) What is hysteresis loop? How permanent magnets can be selected for dc motors? Explain clearly. [8]
b) Why Permanent magnet machines have high torque /weight ratio? Explain clearly [7]
- 6 a) Describe characteristics of stepper motor for open loop control. [8]
b) Explain closed loop control of stepper motor with the help of schematic block diagram/ [7]
- 7 a) Explain control principle of switched reluctance motor for fraction type loads [8]
b) Describe clearly rotor position sensing schemes of brushless dc motor. [7]
- 8 a) Compare AC and DC traction systems and what are merits and demerits [8]
b) Explain clearly single sided linear induction motor for the application of traction drive [7]

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Set No. 2

IV B.Tech II Semester Regular Examinations, April/May - 2014

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 features of Switched Reluctance Motors. [8]
b) Explain the procedure in designing stator and rotor pole arc for switched reluctance motor. [7]
- 2 a) Explain constructional details of stepper motors [8]
b) Explain multi- stack VR stepper motors. [7]
- 3 a) What are the advantages and disadvantages of Brushless DC machines compare to conventional DC motors. [8]
b) Explain operating principle of Brushless DC motor with the help of diagrams. [7]
- 4 a) Explain the construction & working Principle of Linear Induction Motor [8]
b) What are advantages & disadvantages of Linear Induction Motor compare to conventional induction motor and also list out the application of Linear Induction Motor [7]
- 5 a) List out the reasons why Permanent materials used in DC Machines [8]
b) Explain the significance of B-H characteristics of a permanent magnets [7]
- 6 a) Describe the closed loop control of stepper motors [8]
b) Describe the characteristics of stepper motors for open loop control [7]
- 7 a) Discuss how HALL sensors can be used for position sensing of PM BLDC motor. [8]
b) Describe the switching logic of a 3- phase 4-pole PM BLDC motor [7]
- 8 a) What is the selection criterion of motors for electric traction application? explain [8]
b) What are the merits and demerits of ac traction motors compare to dc traction motors [7]

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Set No. 3

IV B.Tech II Semester Regular Examinations, April/May - 2014

SPECIAL ELECTRICAL MACHINES

(Electrical and Electronics Engineering)

Time : 3 hours

Max. Marks: 75

Answer any Five Questions

All Questions carry equal marks

- 1 a) Explain different power converter configurations for Switched reluctance motor [8]
b) Explain briefly design aspects of Switched reluctance motor [7]
- 2 a) Describe constructional aspects of stepper motor [8]
b) What are hybrid stepping motors? Explain. [7]
- 3 a) Explain operation of brushless dc motor as variable speed synchronous motor [8]
b) Explain clearly the constructional details of brushless dc motor [7]
- 4 a) What are different types of LIM? Explain the operation of a short stator Linear Induction Motor [8]
b) What are the application of Linear Induction Motor and list out advantages & disadvantages of Linear Induction Motor [7]
- 5 a) What is B-H curve? Explain equivalent circuit of a Permanent magnet. [8]
b) Why Permanent magnet machines have high torque /weight ratio? Explain [7]
- 6 a) Explain closed loop control of stepper motors [8]
b) Compare open loop and closed loop control of stepper motor [7]
- 7 a) Describe control of switched reluctance motor for fraction type loads. [8]
b) Explain briefly different types of rotor position sensing schemes of brushless dc motors [7]
- 8 a) What are the different types AC motors suitable for electric traction? Explain the reason for selection of the motor [8]
b) Explain clearly single sided linear induction motor for traction drive application. [7]

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Set No. 4

IV B.Tech II Semester Regular Examinations, April/May - 2014

SPECIAL ELECTRICAL MACHINES

(Electrical and Electronics Engineering)

Time : 3 hours

Max. Marks: 75

Answer any Five Questions

All Questions carry equal marks

- 1 a) Describe working principle of Switched reluctance motor with the help of diagram. [8]
- b) What are the advantages and disadvantages of Switched reluctance motors and mention the applications of Switched reluctance motors [7]
- 2 a) Explain single stack VR stepper motors [8]
- b) What is Bifilar winding? Explain its significance. [7]
- 3 a) Explain the construction details of radial flux BLDC motor [8]
- b) What are the advantages of Brushless DC machines over AC motors and explain the principle of operation of Brushless DC motor [7]
- 4 a) Explain the application of Linear Induction motors for electric traction. [8]
- b) What are different types of Linear Induction motor? Mention advantages & disadvantages of Linear Induction motors [7]
- 5 a) What is the equivalent circuit of a Permanent Magnet? Explain B-H loops of different Permanent Magnets [8]
- b) Why Permanent magnet machines have high torque /weight ratio? explain it clearly [7]
- 6 a) Explain different types of controls of stepper motors [8]
- b) Describe the characteristics of stepper motor open loop drive [7]
- 7 a) Explain different control techniques of brushless dc motors [8]
- b) List out different rotor position sensing schemes of brushless dc motor and explain any one of the schemes clearly [7]
- 8 a) What are the different types of dc motors suitable for electric traction application? explain the reason clearly [8]
- b) What kind of ac motors is more suitable for traction application? Explain it clearly [7]