

F 6848

(Pages : 2)

Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2017

Seventh Semester

Branch : Electrical and Electronics Engineering

EE 010 706 L06—SPECIAL ELECTRICAL MACHINES (Elective II) [EE]

(New Scheme—2010 Admission onwards)

[Regular/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 3 marks.

1. Name the types of stepper motor.
2. Enumerate the different power controllers used for the control of switched reluctance motor.
3. Mention some application of switched reluctance motor.
4. Compare PMBLDC motor with conventional DC motor.
5. Draw the speed torque characteristics of permanent magnet synchronous motor.

(5 × 3 = 15 marks)

Part B

Answer all questions

Each question carries 5 marks.

6. What is stepping angle ? Calculate the stepping angle for a 3 phase 24 pole permanent magnet type stepper motor.
7. Enumerate the various operating modes of SR motors with neat diagrams.
8. Explain the principle of operation of synchronous reluctance motor.
9. Explain the speed torque characteristics of PMBLDC motor.
10. Derive the EMF equation of a permanent magnet synchronous motor.

(5 × 5 = 25 marks)

Turn over

Part C

Answer all questions.

Each full question carries 12 marks.

11. Explain the construction and principle of operation of VR stepping motor in detail.

Or

12. Explain the constructional features of hybrid stepper motor. With neat sketch, explain its operation.

13. Discuss the necessity of power electronic circuit in SR motor. Explain the different type converter circuits in detail.

Or

14. (a) Explain the torque-speed characteristics of switched reluctance motors.

(b) Discuss in detail, about the microprocessor based control of SR motors drives.

15. Draw and explain a typical torque speed characteristics of a synchronous reluctance motor. Compare a synchronous reluctance motor with an equivalent induction motor.

Or

16. Derive the voltage and torque equations of synchronous reluctance motor.

17. Draw the IGBT based inverter circuit for the delta connected, PMBLDC motor and sketch the firing sequence and phase current waveform for 120° mode.

Or

18. Illustrate the working of different type of power controllers used for the control of PMBLDC motor.

19. (a) Draw and explain the phasor diagram of surface-magnet sine wave motor.

(b) Explain the torque/speed characteristics of sine wave motor.

Or

20. Explain the working of power controller circuit for a permanent magnet synchronous motor.

(5 × 12 = 60 marks)

F 6848

(Pages : 2)

Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2017

Seventh Semester

Branch : Electrical and Electronics Engineering

EE 010 706 L06—SPECIAL ELECTRICAL MACHINES (Elective II) [EE]

(New Scheme—2010 Admission onwards)

[Regular/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 3 marks.

1. Name the types of stepper motor.
2. Enumerate the different power controllers used for the control of switched reluctance motor.
3. Mention some application of switched reluctance motor.
4. Compare PMBLDC motor with conventional DC motor.
5. Draw the speed torque characteristics of permanent magnet synchronous motor.

(5 × 3 = 15 marks)

Part B

Answer all questions

Each question carries 5 marks.

6. What is stepping angle ? Calculate the stepping angle for a 3 phase 24 pole permanent magnet type stepper motor.
7. Enumerate the various operating modes of SR motors with neat diagrams.
8. Explain the principle of operation of synchronous reluctance motor.
9. Explain the speed torque characteristics of PMBLDC motor.
10. Derive the EMF equation of a permanent magnet synchronous motor.

(5 × 5 = 25 marks)

Turn over

Part C

Answer all questions.

Each full question carries 12 marks.

11. Explain the construction and principle of operation of VR stepping motor in detail.

Or

12. Explain the constructional features of hybrid stepper motor. With neat sketch, explain its operation.

13. Discuss the necessity of power electronic circuit in SR motor. Explain the different type converter circuits in detail.

Or

14. (a) Explain the torque-speed characteristics of switched reluctance motors.

(b) Discuss in detail, about the microprocessor based control of SR motors drives.

15. Draw and explain a typical torque speed characteristics of a synchronous reluctance motor. Compare a synchronous reluctance motor with an equivalent induction motor.

Or

16. Derive the voltage and torque equations of synchronous reluctance motor.

17. Draw the IGBT based inverter circuit for the delta connected, PMBLDC motor and sketch the firing sequence and phase current waveform for 120° mode.

Or

18. Illustrate the working of different type of power controllers used for the control of PMBLDC motor.

19. (a) Draw and explain the phasor diagram of surface-magnet sine wave motor.

(b) Explain the torque/speed characteristics of sine wave motor.

Or

20. Explain the working of power controller circuit for a permanent magnet synchronous motor.

(5 × 12 = 60 marks)

F 6844

(Pages : 2)

Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2017

Seventh Semester

Branch : Electrical and Electronics Engineering

EE 010 706 L02—INDUSTRIAL INSTRUMENTATION (Elective II) [EE]

(New Scheme—2010 Admission onwards)

[Regular/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

*Answer all questions.
Each question carries 3 marks.*

1. What are different methods of force measurement ?
2. What is resistance strain gauges ?
3. Explain industrial applications of viscometers.
4. What are different types of filled system thermometer ?
5. What is meant by two color radiation pyrometers ?

(5 × 3 = 15 marks)

Part B

*Answer all questions.
Each question carries 5 marks.*

6. Briefly explain 3 lead RTD.
7. Describe measurement of force using Hydraulic force meter.
8. List the different types of torque measuring devices and explain any two of them.
9. Describe the working principle, construction and method of using an optical pyrometer.
10. Describe the calibration of thermometer.

(5 × 5 = 25 marks)

Part C

*Answer all questions.
Each full question carries 12 marks.*

11. (a) Explain proximity torque sensors. (6 marks)
- (b) With the help of neat sketch explain method of speed measurement using eddy current tachometer. (6 marks)

Or

Turn over

12. Explain with need sketches the construction and working of an inline stationary torque sensor and inline rotating torque sensor.
13. Explain the following :
- (a) Radiation densitometer.
 - (b) Refractometric densitometer.

(6 + 6 = 12 marks)

Or

14. (a) Explain briefly, different types of density measurement methods.
(b) Explain briefly different methods for viscosity measurements.

(6 + 6 = 12 marks)

15. (a) Explain indirect methods of level measurement.
(b) Explain electrical methods for level measurement.

(6 + 6 = 12 marks)

Or

16. Write short note on :
- (a) Eddy current level measurement sensor.
 - (b) Servicing of level measurement instruments.

(6 + 6 = 12 marks)

17. Write short note on :
- (a) Elastic pressure transducer.
 - (b) Errors in manometers for pressure measurement.

(6 + 6 = 12 marks)

Or

18. (a) Explain different types of manometers.
(b) Write notes on pressure switches.

(6 + 6 = 12 marks)

19. (a) Explain total radiation pyrometer and optical pyrometer.
(b) Explain calibration of temperature transducers.

(8 + 4 = 12 marks)

Or

20. Explain filled system thermometers and source of errors associated with them.

[5 × 12 = 60 marks]

F 6843

(Pages : 2)

Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2017

Seventh Semester

Branch : Electrical and Electronics Engineering

EE 010 706 L 01—HVDC TRANSMISSION (Elective II) (EE)

(New Scheme—2010 Admission onwards)

[Regular/Supplementary]

Time : Three Hours

Maximum Marks : 100

Part A

Answer all questions.

Each question carries 3 marks.

1. Compare AC and DC transmission.
2. What do you mean by HVDC system control ?
3. What is misfire ?
4. What is the need for controlling reactive power ?
5. Enumerate the applications of MTDC system.

(5 × 3 = 15)

Part B

Answer all questions.

Each question carries 5 marks.

6. Discuss the choice of converter configuration.
7. How to start and stop a d.c. link ?
8. Discuss the types of converter faults.
9. How reactive power can be controlled during transients ?
10. Discuss the protection of MTDC system.

(5 × 5 = 25)

Turn over

Part C

Answer all questions.

Each question carries 12 marks.

11. With the help of a schematic diagram, explain the major components of a typical HVDC converter station and converter bridge characteristics.

Or

12. Discuss Graetz circuit with overlap.

13. Explain in detail about the converter control characteristics in HVDC systems.

Or

14. Discuss the principles of D.C. link control and firing angle control.

15. Discuss in detail the transient over voltage in D.C. link and protection of D.C. lines.

Or

16. Explain about commutation failure of converters.

17. Briefly explain about the different types of D.C. filters.

Or

18. Discuss the static VAR systems.

19. Discuss the parallel MTDC system and its types.

Or

20. Explain the modelling of D.C. networks.

(5 × 12 = 60 marks)

F 6758

(Pages : 2)

Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2017

Seventh Semester

Branch : Electrical and Electronics Engineering

EE 010 701—ELECTRICAL POWER TRANSMISSION (EE)

(New Scheme—2010 Admission onwards)

[Regular/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

*Answer all questions.
Each question carries 3 marks.*

1. Discuss proximity effect.
2. What do you mean by reactive power in a line ?
3. Define string efficiency.
4. What is the necessity of earthing ?
5. Discuss HVDC transmission.

(5 × 3 = 15 marks)

Part B

*Answer all questions.
Each question carries 5 marks.*

6. Discuss the effect of bundling.
7. A 3-phase, 50 Hz overhead transmission line has the following distributed constants $-R = 28 \Omega$, $X = 63 \Omega$, Capacitive Susceptance = 4×10^{-4} mho. If the load at the receiving end is 75 MVA at 0.8 p.f. lagging with 132 KV between lines, calculate (a) voltage ; (b) current ; (c) power factor at the sending end ; (d) Regulation ; (e) Efficiency of transmission for this load. Use nominal T method.
8. A single core lead sheathed cable is graded by using two dielectrics of relative permittivity 3.6 (inner) and 2.5 (outer) the thickness of each being 1 cm. The core diameter is 1 cm. System voltage is 66 KV, 3-phase. Determine the maximum stress in the two dielectrics.
9. Discuss the conditions affecting corona.
10. Explain in detail about the static VAR compensator.

(5 × 5 = 25 marks)

Turn over

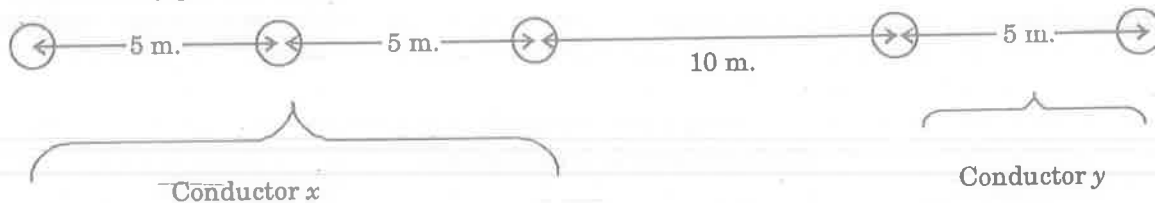
Part C

Answer all questions.
Each full question carries 12 marks.

11. Derive an expression for inductance of composite conductors.

Or

12. One circuit of a single phase transmission line is composed of three solid 0.5 cm radius wires. The return circuit is composed of two solid 2.5 cm radius wires. The arrangement of conductors is as shown in figure. Applying the concept of GMD and GMR, find the inductance of the complete line in millihenry per kilometer :



13. Discuss in detail about the evaluation of ABCD constants using convergent series method.

Or

14. Two transmission lines having generalized circuit constants $A_1B_1C_1D_1$ and $A_2B_2C_2D_2$ are connected (i) in series ; (ii) in parallel. Develop expressions for overall constants ABCD of the combination in terms of $A_1B_1C_1D_1$ and $A_2B_2C_2D_2$.
15. Show how the effects of wind and ice loading are taken into account while determining the sag and stress of an overhead line conductor.

Or

16. Discuss in detail about pin type insulator and suspension type.
17. A certain 3-phase equilateral transmission line has a total corona loss of 53 kW at 106 kV and a loss of 98 kW at 110.9 kV. What is the disruptive critical voltage ? What is the corona loss at 113 kV ?

Or

18. Discuss in detail the resistance grounding. Enumerate merits and demerits of resistance grounded system.
19. Describe the process of interconnection of HVDC into AC system.

Or

20. With the help of a neat sketch, discuss the operation of unified flow controller.

(5 × 12 = 60 marks)

F 6773

(Pages : 2)

Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2017

Seventh Semester

Branch : Electrical and Electronic Engineering

EE 010 702—SYNCHRONOUS MACHINES (EE)

(New Scheme—2010 Admission onwards)

[Regular/Supplementary]

Time : Three Hours

Maximum : 100 Marks

Part A

Answer all questions.

Each question carries 3 marks.

1. What are the causes of harmonics in the e.m.f. waveforms of synchronous generators ?
2. Why should the slip be kept as small as possible during the slip test ?
3. Define synchronizing power.
4. Derive an expression for power developed in a cylindrical rotor alternator in terms of power angle and syn Impedance.
5. Discuss the methods of increasing the response of an excitor.

(5 × 3 = 15 marks)

Part B

Answer all questions.

Each question carries 5 marks.

6. Give the constructional details of rotor of both salient pole and cylindrical rotor synchronous machine.
7. What is the necessity of computing the voltage regulation of alternators ?
8. Explain the starting methods of a synchronous motor.
9. Explain how the excitation and power circles can be super-imposed to obtain V curves of a cylindrical rotor synchronous motor.
10. What is meant by excitor ceiling voltage ?

(5 × 5 = 25 marks)

Turn over

Part C

*Answer all questions.
Each question carries 12 marks.*

11. The field form of a 3-phase 50 Hz, 10-pole, star-connected alternator has a spatial flux density distribution given by the expression $B = \sin \theta + 0.3 \sin 3\theta + 0.2 \sin 5\theta + 0.1 \sin 7\theta$. The machine has 180 slots and has two layer winding with 3 turn coil. Each coil span 15 slots. The coil being connected in 60° groups. The armature diameter is 125 cm and core length 45 cm. Determine :
- 1 Expression for the instantaneous e.m.f. per conductor.
 - 2 r.m.s. phase and line voltages.

Or

12. What are the causes of harmonics in the e.m.f. waveform of synchronous generator and what means are adopted to minimize them ? Explain. Also derive an e.m.f. expression and find the ratio of induced e.m.f. of n^{th} harmonic to fundamentals.
13. A 3-phase star-connected alternator is rated 1800 kVA, 13500 V. The armature effective resistance and synchronous reactance are 4.5Ω and 30Ω respectively per phase. Calculate the percentage regulation for a load of 1280 kW at power factors of :
- (a) 0.8 lagging.
 - (b) Unity pf.

Or

14. Explain the two reaction theory as applied to salient pole synchronous machine and draw the phasor diagram for lagging power factor load.
15. Explain hunting in a synchronous machine what is the purpose of damper winding in a synchronous machine.

Or

16. Two 3-phase 50 Hz alternator operate in parallel. One is rated at 1000 kW and the other is rated 1500 kW. The first machine has a frequency load characteristics that varies from 51 Hz at no load to 49.6 Hz at full load. For the other machine the frequency load characteristics varies from 51.4 Hz to 49.2 Hz. How will the machines share a common load of 2000 kW ?
17. Discuss the power angle characteristics of cylindrical rotor and salient pole machines.

Or

18. Explain with the help of phasor diagram the operation of a synchronous condenser. Also mention its application.
19. Explain the construction, principle of operation of Brushless alternator.

Or

20. Explain the different excitation methods of alternator.

(5 × 12 = 60 marks)