

F 6815

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Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2017

Seventh Semester

Branch : Electrical and Electronics Engineering

EE 010 705—COMMUNICATION ENGINEERING (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. State the drawbacks of a Superheterodyne receiver.
2. What are the advantages of Interlaced Scanning ?
3. List any three methods of navigation.
4. Explain the power subsystem used in Satellites.
5. Compare PSK and M-ary PSK systems.

(5 × 3 = 15 marks)

Part B

Answer all questions.

Each question carries 5 marks.

6. Draw and explain the circuit of a FET reactance modulator.
7. What is compatibility in TV ? Explain the essential requirements that must be met to make a colour system fully compatible.
8. Derive the Radar range equation and bring out the various factors affecting the range.
9. With a block diagram, explain the working of a transponder and its role in Satellite Communication.
10. Draw and explain the modulator for PPM.

(5 × 5 = 25 marks)

Turn over

Part C

Answer all questions.

Each full question carries 12 marks.

11. With a neat block diagram, explain how signals are reproduced in an AM Superheterodyne receiver? Explain the action of AGC in the above.

Or

12. (a) With a neat circuit diagram, explain how message signal is reproduced using Ratio Detector?

(6 marks)

- (b) What is Pre-emphasis and De-emphasis? Explain their role in FM, with related circuit diagrams?

(6 marks)

13. (a) With a sketch explain the various parts in the $12 \mu\text{s}$ retrace duration of a line. Explain the function of each slot.

(6 marks)

- (b) Sketch the 7 MHz channel bandwidth of 625 tone system and explain the VSB used. What are the drawbacks of using this VSB?

(6 marks)

Or

14. With a neat block diagram, explain the functioning of each block in a PAL colour TV receiver. How the defects of NTSC are rectified?

15. Draw the block diagram of CW Radar. Explain how the speed can be determined? Why is isolation between the transmitter and receiver important in CW Radar?

Or

16. (a) Explain the three segments of GPS system.

(6 marks)

- (b) Describe the principle and applications of ILS.

(6 marks)

17. (a) Discuss the various features of Telemetry, Tracking and Commands.

(6 marks)

- (b) With a block diagram, explain the configuration of earth station.

(6 marks)

Or

18. (a) Explain the points to be considered while selecting orbital slot.

(6 marks)

- (b) Explain the Link Design and Various Design issues.

(6 marks)

19. (a) Compare DM, PCM and DPCM in terms of complexity and bit rate.

(6 marks)

- (b) Explain the working of BPSK modulator, with necessary diagrams.

(6 marks)

Or

20. Draw the block diagram of Differential Pulse Code Modulation system and explain each block clearly.

[5 × 12 = 60 marks]

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B.TECH. DEGREE EXAMINATION, NOVEMBER 2017

Seventh Semester

Branch : Electrical and Electronics Engineering

EE 010 704—MODERN CONTROL THEORY (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 is conveyed through controllability and observability of a system ? Determine whether the system given is controllable or not :

$$\dot{x} = \begin{bmatrix} -3 & 1 & 1 \\ -1 & 0 & 1 \\ 0 & 0 & 1 \end{bmatrix} x + \begin{bmatrix} 0 & 1 \\ 0 & 0 \\ 2 & 1 \end{bmatrix} u.$$

2. Define non-linear system. What is meant by local linearization of a non-linear model ?
3. Name any *five* inherent non-linearities. What is intentional non-linearities ? How inherent non-linearities is affecting static accuracy of any system ?
4. Define a discrete time system. When the need for discrete-time system arises ? Name different types of sampling operation with example.
5. What is a PLC ? Draw a block diagram to explain the components inside a PLC. Which is the programming language used in PLC's ?

(5 × 3 = 15 marks)

Part B

Answer all questions.

Each question carries 12 marks.

6. What is meant by pole-placement through state feedback ? What is the condition for assigning stability of a system through pole-placement ?
7. Define trajectory of a system and phase plane portrait. Why it is limited to second order systems alone ?

Turn over

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B.TECH. DEGREE EXAMINATION, NOVEMBER 2017

Seventh Semester

Branch—Electrical and Electronics Engineering

EE 010 703—DRIVES AND CONTROL [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 reasons for using load equalization in an electrical drive ?
2. "A dual converter fed DC motor drive can decelerate faster than a half controlled fed DC motor drive."- Reason out.
3. Draw the circuit diagram of a voltage source inverter fed induction motor and list any *two* advantage of VSI.
4. Why the slip power recovery scheme is suitable mainly for drives with a low speed range ?
5. Why a self-controlled synchronous motor is free from hunting oscillations ?

(5 × 3 = 15 marks)

Part B

Answer all questions.

Each question carries 5 marks.

6. With neat block diagram explain the concept of electrical drive.
7. Explain the motoring operation of separately excited motor using chopper control.
8. With neat diagram, explain a voltage source inverter feeding a 3-phase induction motor.
9. Explain the basic principle of vector control.
10. Discuss the principles of synchronous motor control.

(5 × 5 = 25 marks)

Turn over

Part C

Answer all questions.
Each full question carries 12 marks.

11. What are the advantages of electrical drives ? Explain four quadrant operation of electric drives.
(2 + 10 = 12 marks)

Or

12. Explain in detail about the single-phase half controlled rectifier control of dc separately excited motor (both continuous and discontinuous conduction).
13. Write short notes on the following :
(i) 3-phase half controlled converter fed separately excited dc motor drive.
(ii) Regenerative braking operation of separately excited motor using chopper control.
(6 + 6 = 12 marks)

Or

14. (i) Write short notes on SCR chopper fed separately excited DC motor drive on "current limit control".
(ii) List out the differences between motoring and inverter mode operation of 3-phase fully controlled bridge rectifier.
(8 + 4 = 12 marks)

15. What is Stator voltage control of a three-phase induction motor ? how is it implemented ? Also, obtain the torque speed characteristics of such a drive.

Or

16. (i) Explain how constant torque and constant hp mode of operation is achieved using v/f control with s-T characteristics. (8 marks)
(ii) What type of converters are used for v/f control of induction motor drives. (4 marks)
17. A star connected squirrel cage induction motor has following ratings and parameters : 400 V, 50 Hz, 4-pole, 1370 r.p.m., $R_s = 2 \text{ ohm}$, $R'_r = 3 \Omega$, $X_s = X'_r = 3.5 \Omega$. For regenerative braking operation when fed from the inverter, determine the values of :
(i) Speed for the frequency of 30 Hz and 80 % of full load torque.
(ii) Frequency for a speed of 1000 r.p.m. and full load torque.
(iii) Torque for a frequency of 40 Hz and speed of 1300 rpm.

(8 marks)

Or

18. Explain in detail about the static scherbius' drive and static kramer's drive.
(8 + 4 = 12 marks)

19. Along with detailed block diagram, discuss the operation of a self-controlled synchronous motor drive using load commutated thyristor inverter.

Or

20. Discuss the operation of dc traction drive employing PWM voltage source inverter fed induction motor drive. What are its main features ?

[5 × 12 = 60 marks]