Hall Ticket Number :										

R-17

Code: 7G352

III B.Tech. I Semester Regular Examinations November 2019

Control Systems

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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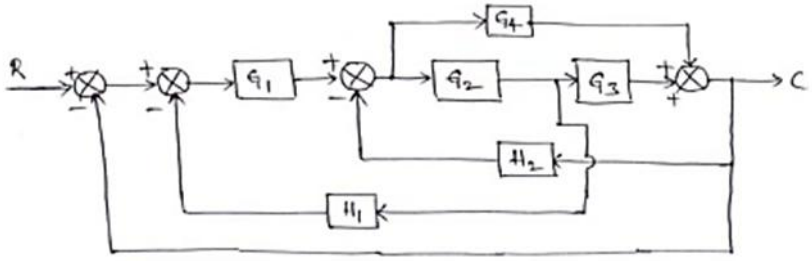
UNIT–I

1. a) What is meant by open loop and closed loop control systems? Differentiate them. 6M

   b) Find the closed loop transfer function of the following block diagram using reduction technique.

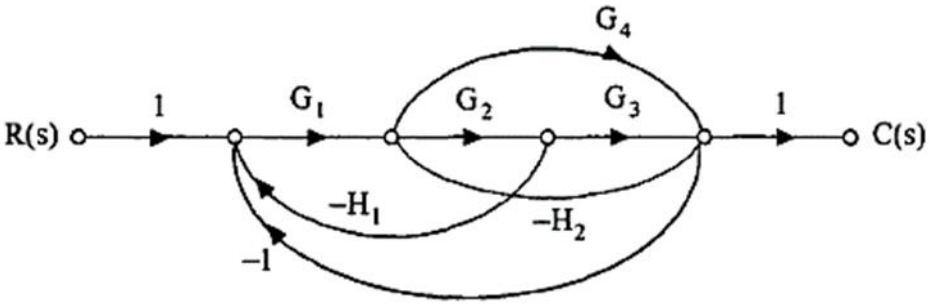


8M

OR

2. a) What are the effects of feedback on Sensitivity and external noise? 6M

   b) For the Signal flow graph shown below find C/R, using Mason's gain formula.



8M

UNIT–II

3. a) Derive the response of a standard under damped second order system for unit step input. 7M

   b) A unity feedback system has an open-loop transfer function $G(s)=\frac{K}{s(s+10)}$.

   Determine K so that the system will have a damping ratio 0.5. For this value of K, determine peak over shoot and time for peak over shoot for the unit step input. 7M

OR

4. a) Find the stability of the system whose characteristic equation is given by $P(s)=s^6+2s^5+8s^4+12s^3+20s^2+16s+16$ 7M

   b) Sketch the root locus of the system whose open loop transfer function is $G(s)H(s)=\frac{k}{s(s+2)(s+4)}$. find the value of k for damping ratio of 0.5 7M

UNIT–III

5. The open loop transfer function of a unity feedback system is given by $\frac{10(s+3)}{s(s+2)(s^2+4s+100)}$ draw the bode plot, find the gain margin and phase margin. 14M

OR

6. a) Explain frequency domain specifications. 6M

   b) A unity feedback control system has an open loop transfer function given by $G(s)H(s)=\frac{100}{s(s+5)(s+2)}$. Draw Nyquist diagram and determine stability. 8M

UNIT–IV

7. a) Derive the expression for the transfer function of a lead compensator. 8M

   b) What are the effects of phase – lead compensation? 6M

OR

8. a) Explain about the PID controller. 7M

   b) Discuss the advantages and disadvantages of proportional, proportional derivative, proportional integral control system. 7M

UNIT–V

9. a) Diagonalize the system matrix, $A=\begin{bmatrix} 0 & 1 & 0 \\ 3 & 0 & 2 \\ -12 & -7 & -6 \end{bmatrix}$ 7M

   b) Test the system represented by following equations is state controllable and observable.

$$[X]=\begin{bmatrix} -2 & 0 \\ 0 & -1 \end{bmatrix}[x]+\begin{bmatrix} 3 \\ 1 \end{bmatrix}u,\quad y=\begin{bmatrix} 1 & 0 \end{bmatrix}\begin{bmatrix} x_1 \\ x_2 \end{bmatrix}$$

7M

OR

10. a) Explain the concepts of state, state variables and state model 7M

    b) Determine the state model of the system characterized by the differential equation $(s^4+2s^2+8s^3+4s+3)Y(s)=10U(s)$ 7M

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Hall Ticket Number :										

R-17

Code: 7G159

III B.Tech. I Semester Regular Examinations November 2019

Computer System Architecture

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Explain the common bus system of computers with a neat sketch. 7M
   b) Explain about the basic components of computer. 7M

OR

2. a) Explain Basic operational concepts. 6M
   b) Find 2's complement of the following
      i) 10010 ii) 111000 iii) 0101010 iv) 111111 8M

UNIT–II

3. a) Explain the execution of micro instructions with a neat diagram. 7M
   b) What is instruction cycle? Explain each phase of instruction cycle with neat diagram? 7M

OR

4. a) Briefly explain the different instruction formats with suitable examples. 8M
   b) Discuss the control sequence for conditional and unconditional branch Instructions. 6M

UNIT–III

5. a) Explain the process of Booth'' s multiplication algorithm with a flow chart. 7M
   b) What are addressing modes? Give an overview of the addressing modes 7M

OR

6. a) Discuss Arithmetic addition and subtraction with signed-2's complement representation. 8M
   b) What is an overflow in arithmetic operation of signed magnitude data? How is it detected? 6M

UNIT–IV

7. a) Explain Main Memory and its types. 8M
   b) Discuss Direct Memory Access (DMA). 6M

OR

8. a) Explain the cache execution of a read operation with a neat diagram 7M
   b) How can you justify Daisy Chain priority is useful in priority interrupt? 7M

UNIT–V

9. a) What are the major difficulties that cause the instruction pipeline to deviate from its normal operations? Explain 7M
   b) Explain briefly about arithmetic pipeline with neat diagram. 7M

OR

10. a) Explain briefly about the characteristics of multiprocessors 6M
    b) Discuss in detail about the multiport memory interconnection structure used in multiprocessors. 8M

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Hall Ticket Number :										

R-17

Code: 7G351

III B.Tech. I Semester Regular Examinations November 2019

Digital Communication

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Explain the functional description of digital communication system in detail. with neat sketch 6M

   b) Explain about the following

      i) Bandwidth requirements of PCM

      ii) Noise in PCM systems 8M

OR

2. a) Explain with neat sketches A-law and μ-law Companding 7M

   b) Why do we need to go for adaptive delta modulation? Explain the adaptive delta modulation in detail 7M

UNIT–II

3. a) Define and draw the waveforms of ASK, FSK, PSK and DPSK for the data sequence 110100110111. 10M

   b) Compare the various digital modulation schemes 4M

OR

4. a) Discuss about the Non-Coherent Detection of Amplitude Shift Keying 7M

   b) Discuss about the Coherent Detection of Frequency Shift Keying 7M

UNIT–III

5. a) Derive an expression for Joint entropy in terms of conditional entropy 6M

   b) A transmitter has an alphabet of four letters [x_1 x_2 x_3 x_4] and 3receiver has an alphabet of three letters [y_1 y_2 y_3] the joint probability matrix

$$P(X,Y) = \begin{array}{c} \\ x_1 \\ x_2 \\ x_3 \\ x_4 \end{array} \begin{array}{c} \begin{array}{ccc} y_1 & y_2 & y_3 \end{array} \\ \begin{bmatrix} 0.3 & 0.05 & 0 \\ 0 & 0.25 & 0 \\ 0 & 0.15 & 0.05 \\ 0 & 0.05 & 0.15 \end{bmatrix} \end{array}$$

   Calculate all entropies. 8M

OR

6. a) Derive an expression for Shannon- Hartley theorem 8M

   b) Explain the following

      i) Bandwidth and S/N tradeoff ii) Channel Capacity 6M

UNIT–IV

7. a) Explain the following terms

   i) Fixed length coding ii) Variable length coding 4M

   b) Apply Shannon –Fano coding procedure for the message ensemble and find the efficiency of the channel

   P=[0.4 0.2 0.12 0.08 0.08 0.08 0.04] 10M

OR

8. The parity check bits of a (8,4) block code are generated by where m_0,m_1,m_2 and m_3 are the message digits.

   $c_0 = m_1 + m_0 + m_3$

   $c_1 = m_1 + m_0 + m_2$

   $c_2 = m_2 + m_0 + m_3$

   $c_3 = m_1 + m_2 + m_3$

   (a) Find the generator matrix and the parity check matrix for this code.

   (b) Find the minimum weight of this code.

   (c) Find the error-detecting capabilities of this code.

   (d) Show through an example that this code can detect three errors/codeword 14M

UNIT–V

9. a) Derive an expressions for code polynomial V(x)=D(x)g(x) and also the systematic polynomial $V(x)=r(x)+x^{n-k}D(x)$ for a binary cyclic codes 7M

   b) Generator polynomial of a (7,4) cyclic code is $g(x)=1+x+x^3$ find first 5 code vectors in the following ways

   a) Using V(x)=D(x)g(x) b) Using systematic form 7M

OR

10. Draw the State diagram, Tree diagram and Trellis diagram for k=3, rate=1/3 code generated by $g_1(x) =1+x^2$, g2(x) =1+x, and $g_3(x) =1+x+x^2$. 14M

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Hall Ticket Number :										

R-17

Code: 7G354

III B.Tech. I Semester Regular Examinations November 2019

Electronic Measurements and Instrumentation

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Explain the working principle of D'Arsonval galvanometer with the help of torque equation. 8M

   b) A basic D'Arsonval movement with with a full scale deflection current of I_{fsd}=100μA and an internal resistance of R_m = 200Ω is available. It is to be converted into a 0-5V,0-10V,0-25V and 0-50V multi range voltmeter using individual multipliers for each range. Calculate the values of individual resistors. 6M

OR

2. a) Explain the construction of multi-range voltmeter. 6M

   b) Define the following terms
   i) Error ii) Resolution iii) Sensitivity iv) Expected value. 8M

UNIT–II

3. a) Draw the circuit diagram and explain the working of a heterodyne type wave analyzer. 7M

   b) Describe the terms related to signal generator.
   i) Random Noise ii)Arbitrary Wave form iii) sweep generator 7M

OR

4. a) With a neat sketch explain the operation of logic analyzer. 8M

   b) What is distortion? What does a distortion analyzer measure. 6M

UNIT–III

5. a) Differentiate between Dual trace CRO and Dual beam CRO. 8M

   b) Explain how a two dimensional display is produced in a CRO. 6M

OR

6. a) How does the sampling oscilloscope increase the apparent frequency response of an oscilloscope? 7M

   b) What is the relationship between the period of a waveform and its frequency? How is an oscilloscope used to determine frequency? 7M

UNIT–IV

7. a) Explain how Wien bridge is used to measure unknown capacitance and frequency. 8M

   b) Explain the differences in balancing dc and ac bridges. 6M

OR

8. a) Explain the Basic principle of Wheat stone Bridge and derive the expression for unknown resistance. 8M

   b) In the Case of Maxwell's Bridge, one arm has a resistor of R_1= 470KΩ in parallel with a capacitor of C_1 = 0.01μF. Second arm has a resistance of R_2=5.1 KΩ, Third arm has resistance of R_3 = 100 KΩ. The bridge is excited at frequency 1KHz. Determine the values of unknown Inductance and unknown Resistance. 6M

UNIT–V

9. a) Derive the expression for gauge factor for a strain gauge. 7M

   b) Explain the Data Acquisition system with neat sketch. 7M

OR

10. a) Explain the working of a piezoelectric transducer with suitable equations and sketches. 8M

    b) Define a transducer. Explain the classification of transducers. 6M

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Hall Ticket Number :										

R-17

Code: 7G353

III B.Tech. I Semester Regular Examinations November 2019

Analog & Digital Integrated Circuits Applications

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) Explain the block diagram of an operational amplifier with the help of a diagram indicating the various building blocks. 7M

   b) Sketch and explain a typical gain versus frequency graph for an operational amplifier 7M

OR

2. Draw the circuit of an instrumentation amplifier. Discuss the characteristics of the circuit and show how the voltage gain can be varied. Also show the method of nulling common mode outputs and how the dc output voltage can be level shifted. 14M

UNIT–II

3. a) Explain the functional diagram of IC 555 with a neat sketch 7M

   b) A non – inverting amplifier is to amplify a 100 mV signal to a level of 3V. Using a 741 op-amp, design a suitable circuit. 7M

OR

4. a) Explain the following for a phase locked loop (PLL),
   i) Lock in range ii) Capture range 7M

   b) What is the main disadvantage of Flash ADC? With the help of a neat diagram explain the operation of a successive approximation type ADC. 7M

UNIT–III

5. Explain with neat diagram,
   i) CMOS inverter ii) TTL inverter 14M

OR

6. Explain the behavioral and data flow style description type of HDL programming, with examples and keywords used 14M

UNIT–IV

7. Explain the working principle of 4–bit parallel fast look ahead carry adder. 14M

OR

8. Explain static electrical behavior of CMOS inverter with necessary electrical circuits 14M

UNIT–V

9. a) Explain the operation of a simple SR Flip Flop using NAND gates. 7M

   b) Give the logic diagram
   i) J-K flip Flop.
   ii) S-R Flip Flop. 7M

OR

10. a) Design a synchronous counter using clocked JK flip-flop for counting sequence **:** 0-2-3-6-5-1-0 7M

    b) Implement up counter using VHDL 7M

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Hall Ticket Number :										

R-17

Code: 7G355

III B.Tech. I Semester Regular Examinations November 2019

Antennas and Wave Propagation

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

Answer *all five* units by choosing one question from each unit (5 x 14 = 70 Marks)

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UNIT–I

1. a) What is the polarization of the antenna? In what way it is significant in the selection of receiving antenna? 7M

   b) Explain the mechanism of field oscillations from a oscillating dipole with suitable diagrams 7M

OR

2. a) Generate the relation between the effective height and radiation resistance. Show that the directivity for unidirectional operation is 2(n+1) for an intensity variation of $U = U_m COS^n\theta$. 8M

   b) Explain the terms with expressions

   I. Radiation power density

   II. Radiation intensity 6M

UNIT–II

3. a) Find the radiation pattern and phase pattern of 10-element isotropic linear array with an element spacing d == λ/2 working at a frequency of 12 MHz when it is functioning in broadside mode and endfire mode? 7M

   b) Discuss the application of linear array. Explain the advantages and disadvantage of linear array. 7M

OR

4. a) Calculate the directions of the maxima and nulls of the array factor of an array of two infinitesimal dipoles oriented along the Z-direction, kept at $Z_1 = -0.125\lambda$ and $Z_2 = 0.125\ \lambda$ and carrying currents $I_1 = \exp(-j\pi/4)$ and $I_2 = \exp(+j\pi/4)$ respectively. 7M

   b) Explain the operation of Binomial arrays. 7M

UNIT–III

5. a) List out the types of horn antenna and Explain what optimum horn is. 7M

   b) Design the pyramidal horn antenna with the following details:

   Mouth aperture = 10λX10λ; Frequency of operation = 5 GHz. 7M

OR

6. Explain the design parameter of helical antenna with practical design considerations; also write the expression for the HPBW, BWFN and axial ratio. 14M

UNIT–IV

7. What are the conditions under which the wave travels in the ground wave mode? List out various applications of the ground wave propagation. 14M

OR

8. a) Discuss briefly the salient features of ground wave propagation. 7M

   b) Derive expression for field strength when space wave propagates between transmitting and receiving antennas of heights h_t and h_r respectively. 7M

UNIT–V

9. a) Illustrate the structure of Ionosphere 7M

   b) Explain reflection wave propagation mechanism in the absence of earth's magnetic field 7M

OR

10. a) Discuss about virtual ray path, critical frequency, MUF, LUF, OF, Virtual height and Skip distance. 7M

    b) Define critical frequency and obtain the relation between critical frequency and MUF 7M

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