

## II B. Tech II Semester Regular Examinations, June/July - 2022

## ANALOG COMMUNICATIONS

(Common to ECE &amp;ECT)

Time: 3 hours

Max. Marks:

70

Answer any **FIVE** Questions each Question from each unitAll Questions carry **Equal** Marks

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**UNIT-I**

- 1 a) With neat sketch explain Frequency Division Multiplexing. [7M]  
 b) Calculate the percentage power saving when the carrier and one of the sidebands are suppressed in an AM wave modulated to a depth of 100% and 50%. [7M]  
 Or
- 2 a) Develop the equation of a single tone modulation of AM system and explain the power relations. [7M]  
 b) With the help of waveforms and spectrum, describe the concept of Amplitude modulation both in time domain and frequency domain. [7M]

**UNIT-II**

- 3 a) List out the methods for generation of SSB-SC signal and explain any one of the method in detail. [7M]  
 b) Find the various frequency components and their amplitudes in the voltage given by  $v(t) = 50 (1 + 0.7 \cos 5000t - 0.3 \cos 1000t) \sin 5 \times 10^6 t$ . Draw the single sided spectrum. Also evaluate the modulated and sideband power. [7M]  
 Or
- 4 a) Explain the generation of DSB-SC signal using balanced modulator. Derive the expression for DSB-SC signal. [7M]  
 b) A carrier signal  $c(t) = 10 \cos (2\pi \cdot 10^6 t)$  is modulated by a message signal  $m(t) = 2 \cos (8\pi \cdot 10^3 t)$  to generate a DSB-SC signal. Sketch the spectrum, calculate the B.W and power. [7M]

**UNIT-III**

- 5 a) Explain Armstrong method of generation of FM signal. [7M]  
 b) Distinguish between FM and PM by giving its mathematical analysis. [7M]  
 Or
- 6 a) Describe the frequency analysis of Angle modulated waves. Explain their Bandwidth requirements. [7M]  
 b) Compare AM and FM Systems noise performances. [7M]

**UNIT-IV**

- 7 Explain the following (i) AGC (ii) RF sections. [14M]  
 Or
- 8 a) Discuss about frequency stability in FM Transmitter. [7M]  
 b) List out the advantages and disadvantages of TRF receiver. [7M]

**UNIT-V**

- 9 a) Explain, how a PPM signal can be generated from PWM signal. [7M]  
 b) Explain demodulation of PPM. [7M]  
 Or
- 10 Write short notes on i) Single polarity and Double polarity PAM ii) Generation and Demodulation of PWM [14M]

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## UNIT-I

- 1 a) How AM is generated using square law modulator? Derive relevant expressions. [7M]  
 b) Discuss (i) Single tone modulation (ii) Switching modulator [7M]

Or

- 2 a) With neat sketch, explain communication system. [7M]  
 b) Comparison and contrast different AM Techniques. [7M]

## UNIT-II

- 3 a) What is vestigial side band? Explain the process of generation and detection of VSB modulated wave using a carrier  $A_c \cos 2\pi f_c t$  [10M]  
 b) Give the applications of AM-FC and VSB modulation schemes. [4M]

Or

- 4 Describe the SSB in frequency domain and then explain how to generate SSB modulated wave using frequency discrimination method. Also, list the advantages of SSB [14M]

## UNIT-III

- 5 a) With neat diagram, explain the FM demodulator using PLL. [7M]  
 b) Discuss about the power and bandwidth requirements of FM? [7M]

Or

- 6 a) For an FM modulator with a modulating signal  $m(t) = V_m \sin 300 \omega t$ , the carrier Signal  $c(t) = 8 \sin(6.5 \times 10^6 t)$  and the modulation index  $\beta = 2$ . Find out the significant side frequencies and their amplitudes. [7M]  
 b) Explain the difference between Narrow band FM and Wide band FM. [7M]

## UNIT-IV

- 7 a) Draw the block diagram of superhetrodyne receiver and the function of each block. [7M]  
 b) Discuss the factors influencing the choice of intermediate frequency (IF) for a radio receiver. [7M]

Or

- 8 a) Explain the Foster Seeley Discriminator method for FM demodulation with the help of neat circuit diagram. [7M]  
 b) Explain working of FM transmitter using Armstrong method with a neat block diagram [7M]

## UNIT-V

- 9 a) Write short notes on Modeling of Noise Sources. [7M]  
 b) Explain about noise in AM systems. [7M]

Or

- 10 a) Explain the process of generation of PWM with neat diagrams. [7M]  
 b) Write short notes on transmission bandwidth of PAM, PWM, and PPM. [7M]

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**UNIT-I**

- 1 a) With suitable diagram explain the square-law diode modulation method for AM generation. [7M]  
 b) An amplitude modulated voltage is given by  $V = 50 (1 + 0.2 \cos 100 t + 0.001 \cos 3500t) \cos 10^6 t$ . State all frequency components present in the voltage, and find modulation index for each modulating voltage term. What is the effective modulation index of V? [7M]

**Or**

- 2 a) Describe an expression for AM wave and sketch its frequency spectrum. [7M]  
 b) Explain the square law detection of AM signals. [7M]

**UNIT-II**

- 3 a) Explain the Frequency discrimination method for generating SSB signal. [7M]  
 b) With neat sketch explain COSTAS Loop? [7M]

**Or**

- 4 a) Explain the phase discrimination method for generating SSB. [7M]  
 b) Explain the principle of coherent detection of DSB-SC with neat block diagram. [7M]

**UNIT-III**

- 5 a) With the help of waveforms and spectrum, describe the concept of FM. [7M]  
 b) With neat circuit diagram explain the working of a Balanced Frequency discriminator. [7M]

**Or**

- 6 a) Draw the block diagram of FM transmitter using indirect method and explain its working. [7M]  
 b) Describe the working of a varactor diode modulator of FM [7M]

**UNIT-IV**

- 7 a) Mention the advantages of superhetrodyne receiver over TRF receiver [4M]  
 b) Distinguish between simple AGC and delayed AGC [5M]  
 c) Draw the block Schematic for FM broad cast receiver and explain the function of each unit [5M]

**Or**

- 8 a) Explain the effect of feedback on performance of AM transmitter. [7M]  
 b) Write a short notes on amplitude limiting. [7M]

**UNIT-V**

- 9 Write short notes on i) Single polarity PAM ii) Generation of PWM [14M]

**Or**

- 10 a) What is Noise figure? Find the Average Noise Figure of cascaded networks [7M]  
 b) Discuss threshold effect in angle modulation systems [7M]



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## UNIT-I

- 1 a) Derive the equation for power relation of a single tone modulation of AM system. [7M]
- b) The antenna current of an AM transmitter is 9A when only carrier is transmitted but it increases to 10.6A when the carrier is modulated by a single sine wave. Find the percentage of modulation. Determine the antenna current when the percentage of modulation changes to 0.8? [7M]

Or

- 2 a) Draw the Envelope detector and illustrate the process of detection of AM wave. [7M]
- b) An amplitude modulated signal represented in time domain as  $4\cos(1800\pi t) + 10\cos(2000\pi t) + 4\cos(2200\pi t)$ . Sketch the spectrum and calculate the band width and total power. [7M]

## UNIT-II

- 3 a) What is DSB-SC modulator? Explain the ring modulator for generation of DSB-SC. [7M]
- b) A DSB signal is to be generated with a carrier frequency of 1MHz using a nonlinear device with input and output characteristics  $v_0 = a v_i + b v_i^3$ . The output of the non-linear device can be filtered by an appropriate BPF and  $v_i = m(t) + \cos(2\pi f_1 t)$ . Find the value of  $f_1$ . [7M]

Or

- 4 a) Discuss about the power and bandwidth requirement of DSB-SC. [7M]
- b) With neat sketch explain the Envelope detection of a VSB wave pulse carrier. [7M]

Or

- 5 a) With neat diagram explain generation of FM using reactance modulator. [7M]
- b) With neat diagram explain the detection of FM using Zero crossing detector. [7M]

- 6 a) Explain the working of Varactor diode modulator in FM. [10M]
- b) Make a comparison of AM with FM. [4M]

## UNIT-IV

- 7 a) Describe the operation of variable reactance type and phase modulated FM transmitter. [7M]
- b) What is the significance of AGC circuit? Differentiate between simple, delayed and amplify AGC. [7M]

Or

- 8 a) Draw the block diagram of a superheterodyne receiver and explain its operation What are the advantages of this receiver? [7M]
- b) List out the advantages and disadvantages of TRF receiver. [7M]

## UNIT-V

- 9 a) Explain the effect of Noise in SSB system [7M]
- b) With neat sketch explain the significance of Pre-emphasis and De-emphasis. [7M]

Or

- 10 a) Mention and explain different methods for generation of PWM [7M]
- b) Define the following (i) thermal noise (ii) shot noise (iii) noise figure [7M]

Equivalent noise temperature

**II B. Tech II Semester Supplementary Examinations, June/July - 2022**  
**ELECTROMAGNETIC WAVES AND TRANSMISSION LINES**  
 (Com to ECE, EIE)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)  
 2. Answer **ALL** the question in **Part-A**  
 3. Answer any **FOUR** Questions from **Part-B**

**PART -A**

1. a) A plane  $z = 1$  m has a uniform charge density of  $\rho_s = 2 \text{ pC/m}^2$ . Find the electric field **E** above the plane. (3M)
- b) Define magnetic flux density. (2M)
- c) Write the relationship between **E** and **H** in a lossy medium. (2M)
- d) Write short notes on complex poynting vector. (3M)
- e) Draw the L-type equivalent circuit of a transmission line. (2M)
- f) Define VSWR and write the significance of it. (2M)

**PART -B**

2. a) Derive the expression for capacitance of a parallel plate capacitor. (7M)
- b) Derive the relationship between electric field intensity and electric potential. (7M)
3. a) Explain about force on charged particle and current element due to magnetic field. (7M)
- b) In free space,  $\mathbf{E} = 10 \sin(\omega t - \beta z) \mathbf{a}_y$  V/m. Determine **D**, **B** and **H**. (7M)
4. a) Define Polarization. Explain the various types of polarization. (7M)
- b) Find the depth of penetration of an EM wave in copper at  $f = 60 \text{ Hz}$  and  $f = 100 \text{ MHz}$ . For copper,  $\sigma = 5.8 \times 10^7 \text{ mho/m}$ ,  $\mu_r = 1$ ,  $\epsilon_r = 1$ . (7M)
5. a) Derive the expression for reflection coefficient when an EM wave normally incident on dielectric-dielectric interface. (7M)
- b) In a non-magnetic medium,  $\mathbf{E} = 4 \sin(2\pi \times 10^7 t - 0.8x) \mathbf{a}_z$  V/m, determine (i)  $\epsilon_r$ ,  $\eta$  (ii) the time average power carried by the wave. (7M)
6. a) Explain about various transmission line parameters. (7M)
- b) A transmission line has  $R = 30 \Omega/\text{m}$ ,  $G = 0$ ,  $L = 100 \text{ mH/m}$ ,  $C = 200 \text{ nF/m}$  and operating at  $f = 1 \text{ MHz}$ . Determine its characteristic impedance and phase constant. (7M)
7. a) Derive the expression for input impedance of open circuited and short circuited transmission lines. (7M)
- b) Explain about single stub matching. (7M)



**II B. Tech II Semester Supplementary Examinations, June/July- 2022**  
**SWITCHING THEORY AND LOGIC DESIGN**  
 (Com. to EEE, ECE, ECC)

Time: 3 hours

Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)  
 2. Answer **ALL** the question in **Part-A**  
 3. Answer any **THREE** Questions from **Part-B**

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**PART -A**

1. a) Why is hexadecimal code widely used in digital systems? List out the digits used to represent the hexadecimal codes. (3M)
- b) Why is minimization of switching functions required? (3M)
- c) Define encoder? List out the applications of it. (4M)
- d) What are the advantages and disadvantages of using a PROM as a PLD? (4M)
- e) What are the various methods used for triggering flip-flops? Explain with examples. (4M)
- f) What is state assignment? Give example. (4M)

**PART -B**

2. a) How to generate a Gray code and Excess-3 for a binary number. Explain with an example? (8M)
- b) Subtract the following decimal numbers by the 9's and 10's complement methods. (8M)
  - i) 274 - 86    ii) 93 - 615    iii) 574.6 - 297.7
3. a) Simplify the following functions with suitable Boolean theorems. (8M)
  - (i)  $\overline{AB} + AC + \overline{BC} + \overline{BC} + AB$
  - (ii)  $(A + B)(A + C)(B + C)(\overline{A} + D)(B + D)$
- b) Reduce the following expression to the simplest possible POS and SOP forms. (8M)
 
$$F = \sum m(6, 8, 13) + d(2, 3, 11, 15)$$
4. a) Design and draw the logic circuit diagram for full adder /subtractor. Let us consider a control variable w and the designed circuit that functions as a full adder when w=0, as a full subtractor when w= 1. (8M)
- b) Implement the following multiple output combinational logic circuit using a 4 line to 16 line decoder: (8M)
 
$$F_1 = \sum m(0, 1, 4, 7, 12, 14, 15) \quad F_3 = \sum m(2, 3, 7, 8, 10)$$

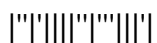
$$F_2 = \sum m(1, 3, 6, 9, 12) \quad F_4 = \sum m(1, 3, 5)$$
5. a) Tabulate the PLA programmable table for the four Boolean functions listed below. (8M)
 
$$A(x, y, z) = \sum m(0, 1, 2, 4, 6) \quad B(x, y, z) = \sum m(0, 2, 6, 7)$$

$$C(x, y, z) = \sum m(3, 6) \quad D(x, y, z) = \sum m(1, 3, 5, 7)$$
- b) Give the comparison between fixed function IC approach, ASIC approach and PLD approach. (8M)

6. a) Distinguish between latch and flip-flop. Show the logic diagram for both. Explain the operation with the help of function table. (8M)
- b) Design a conversion circuit to convert SR Flip-flop to JK Flip-flop? (8M)
7. a) Reduce the number of states in the state table, and tabulate the reduced state table and give proper assignment. (8M)

| PS | NS,Z |      |
|----|------|------|
|    | X=0  | X=1  |
| A  | F, 0 | B, 0 |
| B  | D, 0 | C, 0 |
| C  | F, 0 | E, 0 |
| D  | G, 1 | A, 0 |
| E  | D, 0 | C, 0 |
| F  | F, 1 | B, 1 |
| G  | G, 0 | H, 0 |
| H  | G, 1 | A, 0 |

- b) With suitable example explain the mealy and moore models? (8M)



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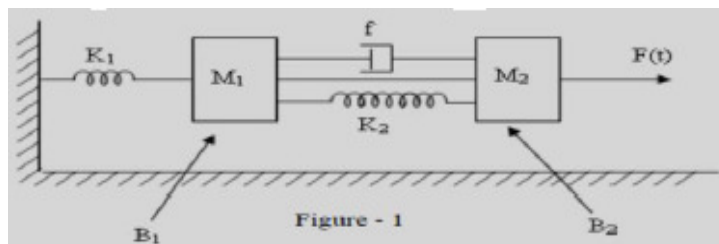
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## UNIT-I

- 1 a) Define control system, open loop and closed loop control systems. Compare their merits and demerits. [7M]
- b) Derive the transfer function of Translational Mechanical System. [7M]

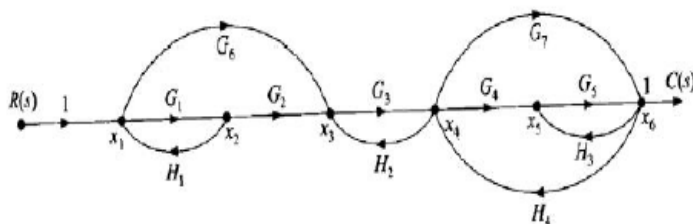
Or

- 2 a) Define transfer function. Explain its advantages and limitations. [7M]
- b) Design the force voltage analogy & force- current analogy circuit and develop the transfer function of the mechanical system shown in figure 1? [7M]



## UNIT-II

- 3 a) Derive the transfer function and develop the block diagram of Armature controlled DC servo motor. [7M]
- b) Apply Mason's gain formula to find the transfer function of the system shown below? [7M]



Or

- 4 a) Obtain the time response of a first order system for a unit step input and plot its response. [7M]
- b) Damping factor and natural frequency of the system are 0.12 and 84.2 rad/sec respectively. Determine the rise time ( $t_r$ ), peak time ( $t_p$ ), maximum peak overshoot ( $m_p$ ) and settling time ( $t_s$ ). [7M]



**UNIT-III**

- 5 a) Differentiate Qualitative Stability & Conditional Stability. [7M]  
 b) Explain the construction rules for root locus technique. [7M]

**Or**

- 6 a) Test the stability of the system with the following characteristic equation by Routh's test [7M]  
 $s^6 + 2s^5 + 8s^4 + 20s^2 + 16s + 16 = 0$   
 b) Define and derive the breakaway point on the root locus. [7M]

**UNIT-IV**

- 7 a) Explain the design rules of Bode Plot. [7M]  
 b) Explain about correlation between time & frequency response. [7M]

**Or**

- 8 a) Sketch the Bodeplot and determine the following. [7M]  
 (i) Gain cross over frequency      ii) Phase cross over frequency  
 (iii) Gain Margin                      (iv) Phase margin  
 For the transfer function is given by

$$G(s) = \frac{10}{s(1 + 0.4s)(1 + 0.1s)}$$

- b) State and explain the Nyquist stability criterion. [7M]

**UNIT-V**

- 9 a) Define the controllability and observability. [7M]  
 b) Determine the state controllability and observability of the system described by [7M]

$$\begin{bmatrix} \dot{X} \end{bmatrix} = \begin{bmatrix} -3 & 1 & 1 \\ -1 & 0 & 1 \\ 0 & 0 & 1 \end{bmatrix} x + \begin{bmatrix} 0 & 1 \\ 0 & 0 \\ 2 & 1 \end{bmatrix} u; \quad y = \begin{bmatrix} 0 & 0 & 1 \\ 1 & 1 & 0 \end{bmatrix} x$$

**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 [7M]  
 $(s^4 + 2s^2 + 8s^3 + 4s + 3) Y(s) = 10 U(s)$

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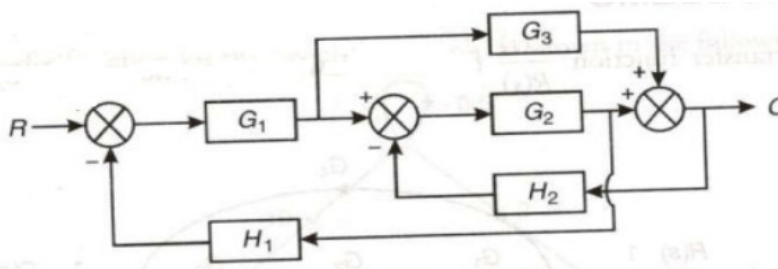
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## UNIT-I

- 1 a) Analyze in detail the effects of feedback on overall gain, sensitivity of the system. [7M]
- b) Define control system, Explain traffic control system with suitable diagram. [7M]

Or

- 2 Determine the transfer function of the following block diagram. [14M]



## UNIT-II

- 3 a) Discuss the response of a standard under damped second order system for unit step input. [7M]
- b) Determine the step, ramp and parabolic error constants of the following unity feedback control system whose open loop transfer function is given by [7M]

$$G(s) = \frac{1000}{(1 + 2s)(1 + 0.5s)}$$

Or

- 4 a) Explain the field controlled DC servomotor and develop its transfer function. [7M]
- b) Discuss the response of a standard first order system for unit step input. [7M]

## UNIT-III

- 5 a) Define the following terms [7M]
  - i) absolute stability ii) marginal stability iii) conditional stability
  - iv) relative stability v) instability
- b) Summarize the advantages and limitations of Routh-Hurwitz criterion? [7M]

Or

- 6 a) Determine the stability of the closed loop system that has the following characteristic equation and also determine the number of roots that are in the right half s-plane and on the imaginary axis using Routh-Hurwitz criterion [7M]  

$$s^4 + 4s^3 + 7s^2 + 16s + 12 = 0$$
- b) The characteristics equation of feedback control system is  $s^3 + 3Ks^2 + (K + 2)s + 4 = 0$ . Examine the range of K for which system is stable? [7M]

**UNIT-IV**

- 7 a) List out steps involved in the design of phase –lag controller. [7M]
- b) Obtain a frequency response plot for this system when  $K > 0$  and  $K < \infty$ . By using the Nyquist criterion, find the range of values for K over which the Unity feedback closed-loop systems will be stable? [7M]

**Or**

- 8 a) Explain about Polar Plot- how it is used for stability analysis. [7M]
- b) Construct the polar plot of  $G(s)H(s) = \frac{K}{s(s+3)(s+5)}$  and there from determine range of K for stability using Nyquist Criterion? [7M]

**UNIT-V**

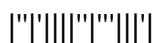
- 9 a) What are the advantages and limitations of state space analysis over conventional methods? [7M]
- b) Consider the following system with differential equation is given by [7M]  
 $\ddot{y} + 4\dot{y} + 9y + 4y + u = 0$ .  
 Find the state space model in diagonal canonical form.

**Or**

- 10 A system is characterized by the following state space equations. [14M]

$$\begin{bmatrix} \dot{X}_1 \\ \dot{X}_2 \end{bmatrix} = \begin{bmatrix} -3 & 1 \\ -2 & 0 \end{bmatrix} \begin{bmatrix} X_1 \\ X_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t); y = \begin{bmatrix} 1 & 0 \end{bmatrix} \begin{bmatrix} X_1 \\ X_2 \end{bmatrix}$$

- (i) Find the transfer function of the system.  
 (ii) Determine the state transition matrix.  
 (iii) Solve the state equation for the unit step input under zero initial conditions.



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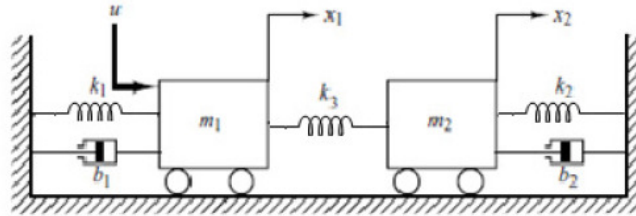
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## UNIT-I

- 1 a) Draw the free body diagram and write the differential equations describing the dynamics of the system shown in below figure and obtain the transfer function  $X_1(s)/U(s)$ ? [7M]



- b) Discuss about the Open Loop and closed loop control systems and their differences. [7M]

Or

- 2 a) Write and explain feedback characteristics with an example. [7M]  
b) What is the classification of control systems? Discuss the importance of mathematical modeling of a control system. [7M]

## UNIT-II

- 3 a) Explain the operation and Derive the transfer function of field controlled DC Servo motor. [7M]  
b) Explain about the signal flow-graph with an example. [7M]

Or

- 4 a) 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]  
b) Calculate the steady state errors due to a unit step input, a unit ramp input and a unit parabolic input for a unity feedback control system whose open loop transfer function is [7M]

(i)  $G(s) = \frac{1}{s^2(s+6)}$       (ii)  $G(s) = \frac{1}{s^2+3s+1}$

## UNIT-III

- 5 Sketch the root locus of the system whose open loop transfer function is [14M]

$$G(s)H(s) = \frac{K}{s(s+2)(s+4)}. \text{ Find the value of } k \text{ for damping ratio of } 0.5$$

Or

- 6 a) For a unity feedback system with open loop transfer function  $G(s)H(s) = \frac{K}{s(s+4)(s+6)}$ . Find the range of K for which the system will be stable using RH – Criterion? [7M]

- b) Using Routh-Hurwitz criterion, determine the stability of the closed loop system that has the following characteristic equation and also determine the number of roots that are in the right half s-plane and on the imaginary axis  $P(s) = s^6 + 2s^5 + 8s^4 + 12s^3 + 20s^2 + 16s + 16$ . [7M]

## UNIT-IV

- 7 Consider a unity feedback system having an open loop transfer function  $G(s) = \frac{K}{s(1+0.5s)(1+2s)}$  sketch the Bode plot and determine the value of 'k' so that gain margin is 20 dB and phase margin is  $20^\circ$ ? [14M]

Or

- 8 a) Find resonant peak, resonant frequency and bandwidth of the unity feedback system whose open loop transfer function is as follows:  $G(s) = \frac{0.5}{s^2+3s+2}$  [7M]
- b) The forward path transfer function of a unity feedback system is given by  $G(s) = \frac{K}{(s+3)^2}$ . Using Nyquist Stability Criterion; determine the range of K for the closed loop system to be stable? [7M]

## UNIT-V

- 9 a) A system is characterized by the following state space equations. [7M]

$$\begin{bmatrix} \dot{X}_1 \\ \dot{X}_2 \end{bmatrix} = \begin{bmatrix} -3 & -1 \\ -2 & 0 \end{bmatrix} \begin{bmatrix} X_1 \\ X_2 \end{bmatrix} + \begin{bmatrix} 0 \\ 1 \end{bmatrix} u(t); y = \begin{bmatrix} 1 & 0 \end{bmatrix} \begin{bmatrix} X_1 \\ X_2 \end{bmatrix}$$

(i) Find the transfer function of the system.

(ii) Compute the state transition matrix and the Eigen values of A.

(iii) Solve the state equation for the unit step input under zero initial conditions.

- b) The transfer function of a control system is given by  $\frac{Y(s)}{U(s)} = \frac{s+2}{s^3+9s^2+24s+24}$  check for controllability and observability. [7M]

Or

- 10 a) Draw the electrical circuit diagram that represents the Lead Compensator and explain in detail. [7M]
- b) Draw the electrical circuit diagram that represents the Lag Compensator and explain in detail. [7M]

## II B. Tech II Semester Regular Examinations, June/July - 2022

## LINEAR CONTROL SYSTEMS

(Common to ECE &amp; EIE)

Time: 3 hours

Max. Marks: 70

Answer any **FIVE** Questions each Question from each unitAll Questions carry **Equal** Marks

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## UNIT-I

- 1 a) Explain the reduction of parameter variation by feedback. [7M]
- b) Derive transfer function of Rotational Mechanical Systems. [7M]

Or

- 2 a) With a neat diagram, explain temperature control systems? [7M]
- b) Define differential equation and derive differential equations of electrical circuits. [7M]

## UNIT-II

- 3 a) Describe the AC servo motor and draw its torque Vs speed characteristics. [7M]
- b) Derive steady state errors & error constants. [7M]

Or

- 4 a) Explain the construction and principle of operation synchro transmitter. [7M]
- b) Explain the working of DC servo motor and find its transfer function. [7M]

## UNIT-III

- 5 a) Explain the special cases in Routh's stability criterion. [7M]
- b) Sketch the root locus for the characteristic equation is  $s(s+1)(s+2) + k(s+1.5) = 0$  [7M]

Or

- 6 a) Write and explain limitations of Routh's stability. [7M]
- b) Define the following terms: (i) Stability (ii) Absolute Stability (iii) Marginal Stability (vi) Conditional Stability [7M]

## UNIT-IV

- 7 a) Sketch the Bode plot and determine the Gain margin and phase margin for the transfer function is given,  $G(s) = 10/s(1+0.4s)(1+0.1s)$  [7M]
- b) Derive the relation between phase margin and damping ratio. [7M]

Or

- 8 a) Discuss the calculation of gain crossover frequency and phase crossover frequency with respective to the polar plots. [7M]
- b) Derive the correlation between time domain and frequency domain specifications. [7M]

## UNIT-V

- 9 a) State and prove the properties of State Transition Matrix. [7M]
- b) Explain the concepts of state, state model, state variable, state space. [7M]

Or

- 10 a) State and explain the concepts of Controllability and Observability. [7M]
- b) Given,  $G(s) = \frac{K}{s^2+5s+6}$  obtain the state space model of the system in the diagonal canonical form. [7M]

|||||

## II B. Tech II Semester Regular Examinations, June/July - 2022

## JAVA PROGRAMMING

(Common to CSE,IT,CSE(CSBS),&amp;CS)

Time: 3 hours

Max. Marks: 70

Answer any **FIVE** Questions each Question from each unitAll Questions carry **Equal** Marks

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**UNIT-I**

- 1 a) List and explain the Tokens in the Java language. [7M]
- b) Demonstrate Bitwise operators using a Java program. [7M]

**Or**

- 2 a) List and explain the control statements with examples. [7M]
- b) Demonstrate the operator precedence using a Java program. [7M]

**UNIT-II**

- 3 a) Compare the working of constructor overloading with method overloading. [7M]
- b) Demonstrate method overriding with an example java program. [7M]

**Or**

- 4 a) Compare the pass-by-value with the pass-by-reference method using an example. [7M]
- b) Demonstrate Nested class concept with an example. [7M]

**UNIT-III**

- 5 a) Is it possible to implement multiple inheritances in Java? Justify your answer. [7M]
- b) Develop a Java program to perform Binary search. [7M]

**Or**

- 6 a) Demonstrate the Nested Interfaces using an example program. [7M]
- b) Develop a program to perform matrices multiplication. [7M]

**UNIT-IV**

- 7 a) Discuss the advantages of Wrapper classes. [7M]
- b) Demonstrate the class Throwable with the help of a Java program. [7M]

**Or**

- 8 a) Is it possible to Rethrow exceptions? Justify your answer. [7M]
- b) List and explain any four packages in Java language. [7M]

**UNIT-V**

- 9 a) Discuss the issues of Race condition and Deadlock. [7M]
- b) Demonstrate Inter-thread communication with a Java program. [7M]

**Or**

- 10 a) Develop a JDBC application to establish a link between MySQL and Java to save and access a table. [7M]
- b) List and explain any three methods of a String class. [7M]

**II B. Tech II Semester Supplementary Examinations, June/July - 2022****ANALOG COMMUNICATIONS**

(Electronics Communication Engineering)

Time: 3 hours

Max. Marks: 75

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Answer any **FIVE** Questions each Question from each unitAll Questions carry **Equal** Marks

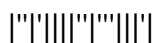
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- 1 a) What is the principle of Amplitude modulation? Derive expression for the AM wave and draw its spectrum. [8M]  
b) An AM modulation has the following:  $s(t)=10(1+5\cos 2000t)$  volts. Considering  $1\ \Omega$  load, find Side-band power and Modulation Index. [7M]
- Or
- 2 a) Obtain a relationship between carrier and side band powers in an AM DSBFC wave and explain how power distribution takes place in AM DSB FC system. [8M]  
b) A transmitter radiates 9 kW with the carrier unmodulated and 10.123 kW when the carrier is sinusoidally modulated. Then (i) Calculate the modulation index. (ii) If another sine wave corresponding to 40% modulation is transmitted simultaneously, determine the total radiated power. [7M]
- 3 a) Explain briefly the effects of frequency and phase errors in synchronous detection of AMDSB – SC. [8M]  
b) With the help of block diagram, explain Frequency Division Multiplexing (FDM). [7M]
- Or
- 4 a) Explain the concepts of Carrier Acquisition in DSB. [8M]  
b) Draw the block diagram for the generation of a VSB signal and explain the principle of operation. [7M]
- 5 a) A 20 MHz carrier is frequency modulated by a sinusoidal signal such that the peak frequency deviation is 100 kHz. Determine the modulation index and the approximate bandwidth of the FM signal if the frequency of the modulating signal is: (i) 1 kHz (ii) 15 kHz. [8M]  
b) Explain the reactance modulator method using FET for the generation of FM. Why is it necessary to use AFC in this method of generation? [7M]

Or



- 6 a) What do you mean by narrowband FM? Explain the generation of narrowband frequency modulation. [8M]  
b) Write the comparisons between FM and AM. [7M]
- 7 a) Explain the similarities and differences between FM and AM receivers. [8M]  
b) Describe the functional block diagram of FM receiver. [7M]
- Or
- 8 a) Explain the important parameters in Radio receiver measurements. [8M]  
b) Explain about frequency changing and tracking. [7M]
- 9 Briefly explain about: (i) Threshold effect in FM, (ii) Noise equivalent Bandwidth and (iii) Bandpass noise representation. [14M]
- Or
- 10 a) Explain the noise performance of SSB-SC scheme with the help of neat block diagram. [8M]  
b) Explain the generation of PWM with relevant diagrams. [7M]



**II B. Tech II Semester Supplementary Examinations, June/July - 2022**  
**ELECTRONIC CIRCUIT ANALYSIS**

(Com to ECE, EIE)

Time: 3 hours

Max. Marks: 70

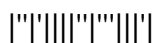
- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)  
 2. Answer **ALL** the question in **Part-A**  
 3. Answer any **FOUR** Questions from **Part-B**
- ~~~~~

**PART -A**

- |       |                                                                                            |    |
|-------|--------------------------------------------------------------------------------------------|----|
| 1. a) | Define frequency response of an amplifier.                                                 | 2M |
| b)    | What are the merits of Cascode amplifier?                                                  | 2M |
| c)    | Write the expression for input and output resistance of voltage series feedback amplifier. | 3M |
| d)    | Draw the equivalent circuit of crystal oscillator.                                         | 2M |
| e)    | What are the different kinds of power amplifiers?                                          | 3M |
| f)    | What are the disadvantages of tuned amplifiers?                                            | 2M |

**PART -B**

- |       |                                                                                                                                                                                                   |    |
|-------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----|
| 2. a) | Derive the expression for the CE current gain with resistive load at high frequencies.                                                                                                            | 7M |
| b)    | Give the analysis of common drain Amplifier circuit at high frequencies.                                                                                                                          | 7M |
| 3. a) | With neat sketch explain cascaded transistor amplifier and its analysis.                                                                                                                          | 7M |
| b)    | Discuss about differential amplifier using BJT.                                                                                                                                                   | 7M |
| 4. a) | Explain the classification of amplifiers.                                                                                                                                                         | 7M |
| b)    | Explain current series feedback amplifiers.                                                                                                                                                       | 7M |
| 5. a) | Explain Barkhausen criterion with necessary equations and an example.                                                                                                                             | 7M |
| b)    | In an Hartley oscillator, if $L_1=0.2\text{mH}$ , $L_2=0.3\text{mH}$ and $C=0.003\text{ }\mu\text{F}$ , calculate the frequency of oscillation. Draw the circuit diagram of Colpitt's oscillator. | 7M |
| 6. a) | Derive the expression for conversion efficiency of Class B push pull power amplifier.                                                                                                             | 7M |
| b)    | Discuss about Thermal stability and Heat sinks.                                                                                                                                                   | 7M |
| 7. a) | Explain the classification of tuned amplifier.                                                                                                                                                    | 7M |
| b)    | Draw the circuit of single tuned capacitance coupled amplifier and explain its operation.                                                                                                         | 7M |



**II B. Tech II Semester Regular Examinations, June/July - 2022**  
**MANAGEMENT AND ORGANIZATIONAL BEHAVIOR**  
 (Common to ECE&PE)

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

Answer any **FIVE** Questions each Question from each unit  
 All Questions carry **Equal** Marks  
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**UNIT-I**

- 1 a) What are the principles of scientific management theory and explain them? [7M]
- b) Discuss the Pros & Cons of social responsibilities of management. [7M]

**Or**

- 2 What is Departmentation and Decentralization and write about its importance for the management of business enterprise? [14M]

**UNIT-II**

- 3 a) Explain about Job Evaluation, Performance Appraisal, Manpower Planning and Grievance Handling. [7M]
- b) Explain the elements of Market Mix with suitable example. [7M]

**Or**

- 4 a) Explain the concepts of HRM. [7M]
- b) Explain the concepts of Marketing. [7M]

**UNIT-III**

- 5 a) Explain the importance of Goals and Objectives for a business with example. [14M]

**Or**

- 6 Explain about SWOT analysis for newly entered business in Indian Telecom Industry. [14M]

**UNIT-IV**

- 7 What is Perception and write about its nature and process of Perception? [14M]

**Or**

- 8 What is motivation? Explain about theories of Motivation. [14M]

**UNIT-V**

- 9 a) Explain about Group and its types. [7M]
- b) What is Stress? What are the strategies to handle stress in business? [7M]

**Or**

- 10 Explain about organizational conflicts, types of conflicts and strategies for managing conflicts. [14M]

**II B. Tech II Semester Regular Examinations, June/July - 2022**  
**MANAGEMENT AND ORGANIZATIONAL BEHAVIOR**

(Common to ECE & PE)

Time: 3 hours

Max. Marks: 70

Answer any **FIVE** Questions each Question from each unit  
 All Questions carry **Equal** Marks

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**UNIT-I**

- 1 a) What is management? Explain about the functions of Management. [10M]
- b) What is systems approach to Management? [4M]

**Or**

- 2 a) What are elements and tools of Scientific Management? [7M]
- b) What is MBO and write about the process of MBO? [7M]

**UNIT-II**

- 3 What is Human Resource Management? Explain its significance in providing competitive advantage for an organization with an example. [14M]

**Or**

- 4 a) Write about the 7P's of Marketing with suitable examples. [7M]
- b) Explain the concepts of wages, salary administration job evaluation and merit rating. Discuss its significance.

**UNIT-III**

- 5 a) What is environment scanning of a business? [7M]
- b) Explain the concepts of bench marking and balanced score card. [7M]

**Or**

- 6 What are different steps in strategy formulation and implementation? Explain with suitable example. [14M]

**UNIT-IV**

- 7 What is learning and write about the nature and characteristics of learning and mention learning theories? [14M]

**Or**

- 8 a) Explain about Douglas McGregor's theory X and theory Y? [7M]
- b) Explain the concepts of change management and attitude formation process. [7M]

**UNIT-V**

- 9 Explain how interpersonal conflict occurs and give two examples of substantive conflict and two examples of emotional, interpersonal conflict. [14M]

**Or**

- 10 "A supermarket is functioning well because it has the right mix of cashiers, stockers, baggers, and shift managers on every shift. Their success is because of group composition". Make a comment stating the group dynamic concepts. [14M]

**II B. Tech II Semester Regular Examinations, June/July - 2022**  
**MANAGEMENT AND ORGANIZATIONAL BEHAVIOR**

(Common to ECE & PE)

Time: 3 hours

Max. Marks: 70

Answer any **FIVE** Questions each Question from each unit  
 All Questions carry **Equal** Marks

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**UNIT-I**

1 Explain about Fayol's principles of Management. [14M]

**Or**

2 a) What are modern trends in organization structure design? [7M]

b) Explain the features of scientific management in detail. [7M]

**UNIT-II**

3 Explain about the functions of Human Resource Managers in the organization. [14M]

**Or**

4 a) Explain about different methods of recruitment. [7M]

b) Write 4 P's of Marketing with suitable examples. [7M]

**UNIT-III**

5 a) What is organization policy and write its importance? [7M]

b) Explain about Porter's Generic Strategies. [7M]

**Or**

6 The strategic management process encompasses three phases-strategy formulation, implementation, and evaluation and control. —Discuss. [14M]

**UNIT-IV**

7 What is Personality and write about the determinants of personality? [14M]

**Or**

8 a) Explain Herzberg's Two-Factor Theory of Motivation. [7M]

b) Explain the process of reinforcement motivation with example. [7M]

**UNIT-V**

9 a) What are the steps involved in measuring organizational culture? Explain. [7M]

b) What are the stages of group development? [7M]

**Or**

10 What is Organizational Conflict? Explain the Factors Influencing Organizational Conflict and explain the Types of Organizational Conflict. [14M]

**II B. Tech II Semester Regular Examinations, June/July - 2022**  
**MANAGEMENT AND ORGANIZATIONAL BEHAVIOR**  
 (Common to ECE & PE)

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

Answer any **FIVE** Questions each Question from each unit  
 All Questions carry **Equal** Marks

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**UNIT-I**

- 1 a) Explain about the nature of Management. [7M]  
 b) Write about different types of leadership styles? [7M]

**Or**

- 2 a) Discuss the advantages and disadvantages of decentralization of authority. [7M]  
 b) What is MBO? Explain the concepts of MBO. [7M]

**UNIT-II**

- 3 a) Explain the types of performance appraisal methods. [7M]  
 b) Explain about STP in marketing with suitable examples. [7M]

**Or**

- 4 a) Explain the various components of wages. [7M]  
 b) Define Market and Marketing. Explain the features of Marketing. [7M]

**UNIT-III**

- 5 Explain value chain analysis concept with example of McDonald. [14M]

**Or**

- 6 Explain how Bench Marking and Balanced Score Card will in designing contemporary business strategies. [14M]

**UNIT-IV**

- 7 a) What is personality? Discuss how personality development can happen. [7M]  
 b) Explain the importance of learning organization in today's dynamic environment. [7M]

**Or**

- 8 a) Explain Maslow's theory of Human Needs. [7M]  
 b) Define Attitude. Explain the Attitude formation process. [7M]

**UNIT-V**

- 9 a) Explain about the various types of organization culture. [7M]  
 b) What are the causes and effects of stress? [7M]

**Or**

- 10 a) Explain about the organization conflicts and strategies for managing conflicts. [7M]  
 b) What is organization climate and organization culture? [7M]

**II B. Tech II Semester Supplementary Examinations, June/July - 2022****COMPUTER ARCHITECTURE AND ORGANIZATION**

(Electronics Communication Engineering)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions each Question from each unitAll Questions carry **Equal** Marks

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- 1 a) With a neat diagram, explain basic operational concepts between processor and memory. 8M  
 b) Explain about program sequencing and control instructions in computer architecture. 7M

Or

- 2 a) Does increasing RAM increase computer performance? Give justification to your answer. 8M  
 b) Describe the four basic types of instructions in a general purpose computer. 7M
- 3 a) Explain about Logic, Rotate and Shift instructions with examples. 8M  
 b) Differentiate between direct and indirect addressing mode with an example. 7M

Or

- 4 a) Explain about the role of Stacks and Queues in computer programming equation. 8M  
 b) Draw and Explain basic computer instruction formats. 7M
- 5 a) Discuss various ways of enabling and disabling interrupts. 8M  
 b) Justify “synchronous buyer are faster than asynchronous buyer” this statement. 7M

Or

- 6 a) Write short notes on 15M  
 i) DMA controller  
 ii) Synchronous and Asynchronous bus  
 iii) PCI bus
- 7 a) Explain the following 15M  
 i) Random Access Memory ii) Read Only Memory iii) Flash Memory

Or

- 8 a) What is a Cache memory? What are the characteristics of Cache memory? 8M  
 How many types of cache levels are there? Explain.  
 b) Discuss the merits and demerits of Magnetic and Optical storage devices. 7M
- 9 a) Depict the control steps involved in fetching a word from memory. 8M  
 b) Write the control sequence for executing the instruction MUL R3 R2 R1 7M

Or

- 10 a) Explain in detail about various approaches for generating control signals to execute an instruction. 15M



**II B. Tech II Semester Supplementary Examinations, June/July - 2022**  
**CONTROL SYSTEMS**  
 (Com to ECE, EIE, ECC)

Time: 3 hours

Max. Marks: 70

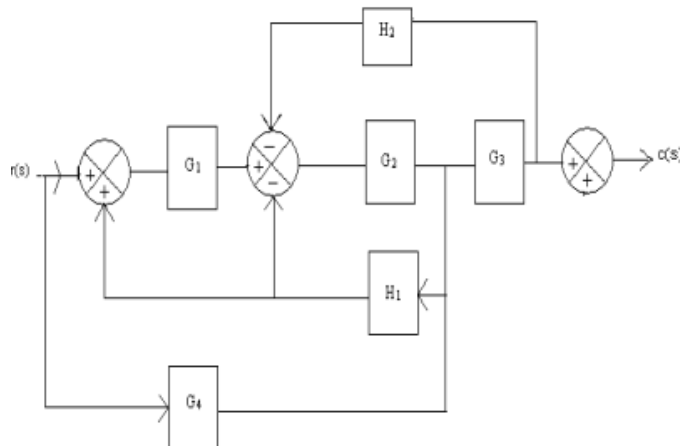
- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)  
 2. Answer **ALL** the question in **Part-A**  
 3. Answer any **FOUR** Questions from **Part-B**

**PART -A**

1. a) What is the basis for framing the rules of block diagram reduction technique? 3M
- b) Name the test signals used in control system. 2M
- c) How will you find root locus on real axis? 2M
- d) What is frequency response? 2M
- e) When lag lead compensator is required? Explain. 3M
- f) What are phase variables? 2M

**PART -B**

2. a) Obtain the closed loop transfer function  $C(S)/R(S)$  of the system whose block diagram is shown in fig. 7M



- b) Discuss about Linearizing effect of feedback. 7M
3. a) Derive the transfer function for Armature controlled DC servo motor. 7M
- b) Explain the Effect of adding a zero to a system. 7M
4. a) Sketch the root locus for the open loop transfer function of unity feedback control system given below:  
 $G(S)H(S)=K/S(S+2)(S+4)$ . 7M
- b) What will be the nature of impulse response when the roots of characteristic equation are lying on imaginary axis? Explain with neat sketch. 7M



5. a) Write short notes on correlation between the time and frequency response. 7M
- b) Construct the polar plot for the function  $GH(S) = 2(S+1)/S^2$ . Find Gain cross over frequency, Phase cross over frequency. 7M
6. a) Explain the procedure for lead compensator. 7M
- b) Design a suitable lead compensators for a system with unity feedback and having open loop transfer function  $G(S) = K/S(S+1)(S+4)$  to meet the specifications.  
(i) Damping ratio=0.5 (ii) Undamped natural frequency  $\omega_n = 2$  rad/sec. 7M
7. a) Explain state space representation for continuous time system. 7M
- b) Given the transfer function of a system, determine a state variable representation for the system  $Y(S)/U(S) = 1/(S+2)(S+3)(S+4)$  7M



**II B. Tech II Semester Supplementary Examinations, June/July - 2022****MANAGEMENT AND ORGANIZATIONAL BEHAVIOR**

(Electronics Communication Engineering)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions each Question from each unitAll Questions carry **Equal** Marks

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- |    |                                                                                                   |      |
|----|---------------------------------------------------------------------------------------------------|------|
| 1  | a) Define management and explain the system approach to management.                               | [8M] |
|    | b) What do you mean by MBO? Explain its process.                                                  | [7M] |
| Or |                                                                                                   |      |
| 2  | a) Explain the nature and importance of management.                                               | [7M] |
|    | b) What do you mean by departmentation? Explain its role in organization structure.               | [8M] |
| 3  | a) Discuss about the recruitment and selection in HRM.                                            | [8M] |
|    | b) What are the statutory welfare administrative facilities?                                      | [7M] |
| Or |                                                                                                   |      |
| 4  | a) Write about different types of performance appraisal system in an organization.                | [8M] |
|    | b) What do you mean by marketing? Explain in detail.                                              | [7M] |
| 5  | a) What is the Strategic Management? What is the importance of Strategic Management?              | [7M] |
|    | b) What do you mean by environmental scanning? Discuss the role it plays in strategy formulation. | [8M] |
| Or |                                                                                                   |      |
| 6  | a) What is bench marking? Explain in detail.                                                      | [8M] |
|    | b) Discuss about the generic strategic alternatives.                                              | [7M] |
| 7  | a) Explain the meaning of personality. What are the determinants of personality.                  | [8M] |
|    | b) Contrast Classical Conditioning and Operant conditioning Theories of Learning.                 | [7M] |
| Or |                                                                                                   |      |
| 8  | a) Explain Social Learning Theory with reference to your Role Model.                              | [8M] |
|    | b) Discuss the various reasons for individual resistance to change.                               | [7M] |
| 9  | a) What is group cohesiveness? How its helps in group development?                                | [8M] |
|    | b) Define organizational culture and how its influences the group.                                | [7M] |
| Or |                                                                                                   |      |
| 10 | a) What are the different types of conflicts?                                                     | [8M] |
|    | b) Define group behavior and how does it influence in group performance?                          | [7M] |

**II B. Tech II Semester Supplementary Examinations, June/July - 2022****ANALOG COMMUNICATION**

(Electronics &amp; Communication Engineering)

Time: 3 hours

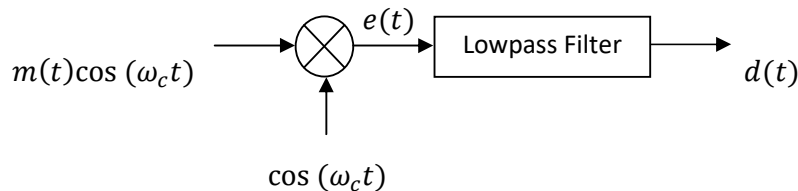
Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)2. Answer **ALL** the question in **Part-A**3. Answer any **FOUR** Questions from **Part-B****PART -A**

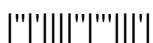
1. a) Define amplitude modulation. (2M)
- b) Plot the spectrum of USSB-SC signal. (3M)
- c) Give the time-domain representation of FM wave. (2M)
- d) Define sensitivity of a radio receiver. (2M)
- e) Draw the power spectral density of thermal noise current. (3M)
- f) Plot double polarity PAM wave. (2M)

**PART -B**

2. a) Determine  $\eta$  and the percentage of the total power carried by the sidebands of the AM wave for tone modulation when (i)  $\mu = 0.5$  and (ii)  $\mu = 0.3$ . (7M)
- b) Describe the operation of envelope detector for AM. (7M)
3. a) Find  $s_{SSB}(t)$  when the modulating signal is a sinusoid  $m(t) = \cos(\omega_m t)$ . (7M)
- b) Find  $e(t)$  and  $d(t)$  of the following system. What is the name of this system? (7M)



4. a) An angle-modulated signal with carrier frequency  $\omega_c = 2\pi \times 10^5$  is described by the equations  $s(t) = 10\cos(\omega_c t + 5\sin 3000t + 10\sin 2000\pi t)$ . Find the power of modulated signal. (7M)
- b) Explain the method of generation of NBFM signals. (7M)
5. a) Draw the block diagram of FM receiver and explain its operation. (7M)
- b) What are the different types of AM transmitters? Explain briefly. (7M)
6. a) What is the effect of noise in SSB-SC system? Explain. (7M)
- b) Write brief notes on the need for pre-emphasis in FM system. (7M)
7. a) What is TDM? Explain neat sketches. (7M)
- b) Write notes on flat-top sampling. (7M)



**II B. Tech II Semester Supplementary Examinations, June/July - 2022****EM WAVES AND TRANSMISSION LINES**

(Com to ECE, EIE)

Time: 3 hours

Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)2. Answer **ALL** the question in **Part-A**3. Answer any **THREE** Questions from **Part-B**

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**PART -A**

1. a) Define Electric field intensity and Electric flux density. What is the relation between them in free space? 4M
- b) List the Maxwell's equations for time varying electromagnetic fields and compare with the static fields. 4M
- c) Compare the wave propagation in conductors and dielectrics. 3M
- d) Define Brewster angle and Critical angle. 3M
- e) Write about different types of Loading methods in transmission lines. 4M
- f) A transmission line of  $200\Omega$  characteristic impedance is connected to a load of  $800\Omega$ . Calculate the reflection coefficient and VSWR. 4M

**PART -B**

2. a) Derive the expression for electric flux density ( $D$ ) due to an infinite sheet of charge placed on the  $z=0$  plane using Gauss's law. 10M
- b) Describe the Ampere's force law. 6M
3. a) Derive the Boundary conditions for the tangential and normal components of Electrostatic fields at the boundary between two perfect dielectrics. 8M
- b) Find the displacement current density within a parallel plate capacitor having a dielectric with  $\epsilon_r=5$ , area of each plate  $A=0.02 \text{ m}^2$ , spacing between the plates  $d=0.05 \text{ mm}$ , applied voltage is  $V=10\sin 300t$ . 8M
4. a) What is characteristic impedance? Derive the relation between  $E$  and  $H$  in terms of characteristic impedance of the medium. 8M
- b) Derive the expression for Skin depth of a good conductor. 8M
5. a) State and prove the Poynting Theorem. 9M
- b) What is Surface impedance? Show that for a good conductor, the surface impedance is equal to the characteristic impedance. 7M
6. a) Prove that a line of finite length terminated by its characteristic impedance  $Z_0$  is equivalent to an infinite transmission line. 8M
- b) A transmission line has  $R=20.8\Omega/\text{km}$ ,  $L=6.622\text{mH}/\text{km}$ ,  $C=0.00835 \mu\text{F}/\text{km}$  and  $G=0.08\mu\text{S}/\text{km}$  operates at  $f=100\text{MHz}$ . Find the attenuation and phase constant of the line. 8M
7. a) Discuss about single stub matching. 8M
- b) Write about the applications of Smith chart. 8M



## II B. Tech II Semester Regular Examinations, June/July - 2022

## ELECTRONIC CIRCUIT ANALYSIS

(Common to ECE, EIE, &amp; ECT)

Time: 3 hours

Max. Marks: 70

Answer any FIVE Questions each Question from each unit

All Questions carry Equal Marks

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## UNIT-I

- 1 a) Derive the voltage gain equation for common source amplifier at high frequencies. [7M]  
 b) Explain various high frequency parameters of a BJT and derive the relations between them. [7M]

Or

- 2 Determine the all hybrid  $- \pi$  parameters of a Transistor operating at Collector Current  $I_C(Q)=2\text{mA}$ ,  $V_{CE}(Q)=20\text{V}$  and  $I_B(Q)=20\mu\text{A}$ . Transistor specifications are  $\beta_0=100$ , unity gain frequency  $f_T = 50\text{MHz}$ ,  $C_{OB}=3\text{pF}$ ,  $h_{iE}=1.4\text{K}\Omega$ ,  $h_{re}=2.5 \times 10^{-4}$ ,  $h_{oe}=25\mu\text{mhos}$ . Assume that the Operating temperature is  $300^\circ\text{K}$ . [14M]

## UNIT-II

- 3 a) Draw the circuit of Boot-strap follower and explain its operation. [7M]  
 b) How Differential amplifier using BJT works?- Discuss. [7M]

Or

- 4 A CE-RC coupled amplifier uses transistor with the following h-parameters: [14M]  
 $h_{fe}=50$ ,  $h_{oe}=30 \times 10^{-6} \text{ mhos}$ ,  $h_{re}=2.5 \times 10^{-4}$ . The value of  $g_m$  at the operating point is  $50\text{m mhos}$ . The biasing resistor  $R_1$  between  $V_{cc}$  and base is  $100\text{K}\Omega$  and  $R_2$  between base and ground is  $10\text{K}\Omega$ . The load resistor  $R_C = 5\text{K}\Omega$ . let  $C = 160\text{pF}$  be the total shunt capacitance in the input circuit and the coupling capacitor  $C_c=6\mu\text{F}$ . Calculate for one stage of the amplifier:  
 (i) mid-band current gain  
 (ii) mid-band voltage gain

## UNIT-III

- 5 a) With neat block diagram, show that input resistance increases with series mixing. [7M]  
 b) Draw the circuit diagram of a current series feedback amplifier, Derive expressions of input & output impedances, Gain, and feedback factor. [7M]

Or

- 6 a) An amplifier has a gain of 50 with negative feedback. For a specified output voltage, if the input required is  $0.1\text{V}$  without feedback and  $0.8\text{V}$  with feedback, Compute  $\beta$  and open loop gain. [7M]  
 b) Explain the concept of feedback with block diagram. What are the merits and demerits of positive feedback? [7M]

## UNIT-IV

- 7 a) Derive the expression frequency of oscillation and condition for sustained oscillations of a Colpitts oscillator. [7M]  
 b) Derive the basic conditions for oscillations and classify oscillators based on their applications. [7M]

Or

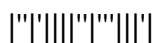
- 8 a) With the help of suitable schematic, explain the operation of a Wien Bridge oscillator and derive an expression for its frequency of operation. [7M]  
b) In the Wien-bridge oscillator, if the RC network consists of resistors of  $200\text{K}\Omega$  and the capacitors of  $300\text{pF}$ , find its frequency of oscillation. [7M]

**UNIT-V**

- 9 a) Distinguish Single and Double tuned amplifiers. [7M]  
b) Derive Q factor of a single tuned amplifier. [7M]

**Or**

- 10 a) Explain the operation of class A push-pull power amplifier. [7M]  
b) Show that the conversion efficiency of a transformer coupled power amplifier is 50%. [7M]



## II B. Tech II Semester Regular Examinations, June/July - 2022

## ELECTRONIC CIRCUIT ANALYSIS

(Common to ECE, EIE, &amp; ECT)

Time: 3 hours

Max. Marks: 70

Answer any **FIVE** Questions each Question from each unitAll Questions carry **Equal** Marks

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## UNIT-I

- 1 a) Define  $f_T$  and derive an expression for it. [7M]  
 b) Explain various hybrid-pi capacitances and conductance of a BJT. [7M]

Or

- 2 a) What are the typical values of various components in hybrid –  $\pi$  model? Show that at low frequencies the hybrid –  $\pi$  model with  $r_{be}$  taken as infinite reduces to the approximate CE- h – parameter model. [7M]  
 b) A FET has Drain saturation current  $I_{DSS}$  of 10mA and Quiescent point Drain current  $I_D$  is 5mA, with pinch –off voltage  $V_p = -4V$ , calculate the value of  $V_{GS}$  and the value of Trans conductance  $g_m$ . [7M]

## UNIT-II

- 3 a) Derive an expression for the overall higher cut-off frequency of a two stage amplifier with identical stages of individual higher cut-off frequency,  $f_H$ . [7M]  
 b) Discuss about the effect of cascading on bandwidth of multistage amplifiers. [7M]

Or

- 4 a) Discuss the effect of coupling capacitors of a CE amplifier on the over all frequency response of the amplifier. [7M]  
 b) Draw the circuit diagram, equivalent circuit of a Darlington pair and derive expressions for overall voltage gain and input impedance. [7M]

## UNIT-III

- 5 a) Explain the concept of feedback with block diagrams? What are the advantages and disadvantages of negative feedback? [7M]  
 b) An amplifier has a gain of 50 with negative feedback. For a specified output voltage, if the input required is 0.1V without feedback and 0.8V with feedback, Compute  $\beta$  and open loop gain. [7M]

Or

- 6 Through the block schematics, [14M]  
 i. Explain four types of negative feedback amplifiers.  
 ii. Derive and compare their parameters.

## UNIT-IV

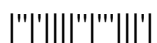
- 7 a) Derive the expression frequency of oscillation and condition for sustained oscillations of a Colpitt's oscillator. [7M]  
 b) Explain the concept of frequency and amplitude stability of oscillators. [7M]

Or

- 8 a) Derive the expression frequency of oscillation and condition for sustained oscillations of a FET based RC Phase shift oscillator. [7M]  
 b) State and explain Barkhausen criterion with different conditions of Loop gain. [7M]

**UNIT-V**

- 9 a) Draw the equivalent circuit of capacitance coupled single tuned amplifier and derive the equation for voltage gain. [7M]  
b) What is a Q-factor, Derive the expression for Q-factor of a capacitor? [7M]
- Or
- 10 a) Explain the operation of class B Push-Pull power amplifier. [7M]  
b) What is a cross over distortion and explain a remedy for it. [7M]





## II B. Tech II Semester Regular Examinations, June/July - 2022

## ELECTRONIC CIRCUIT ANALYSIS

(Common to ECE, EIE, &amp; ECT)

Time: 3 hours

Max. Marks: 70

Answer any **FIVE** Questions each Question from each unitAll Questions carry **Equal** Marks

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## UNIT-I

- 1 a) Perform the high frequency analysis of a common drain amplifier. [7M]  
 b) Derive the expression for the high frequency parameters in terms of low Frequency parameters of a BJT. [7M]

Or

- 2 Define Hybrid- $\pi$  model. Draw and derive the expressions for different elements of the Hybrid  $\pi$  model [14M]  
 (i) Determination of Trans Conductance  
 (ii) Determination of input conductance  
 (iii) Determination of feedback conductance  
 (iv) Determination of output conductance

## UNIT-II

- 3 a) With the help of a neat circuit diagram, describe the working of a cascade amplifier. [7M]  
 b) Differentiate between direct and capacitive coupling of multiple stages of amplifiers. [7M]  
 With the help of a neat circuit diagram, describe the working of a cascade amplifier.

Or

- 4 Draw the equivalent circuits of RC coupled amplifier for Mid-band, Low frequency range, high frequency range and derive the expressions for current gain and voltage gain. [14M]

## UNIT-III

- 5 a) Derive the expression for output resistance of a voltage sampled circuit. [7M]  
 b) Explain the method of identifying feedback Topology. [7M]

Or

- 6 a) With a neat sketch explain a negative feedback amplifier and obtain expression for its closed loop gain. [7M]  
 b) A voltage-series negative feedback amplifier has a voltage gain without feedback of  $A=500$ , input resistance  $R_i=3K\Omega$ , output resistance of  $R_o=20K\Omega$  and feedback ratio  $\beta=0.01$ , calculate the voltage gain  $A_f$ , input resistance  $R_{if}$  and output resistance  $R_{of}$  of the amplifier with feedback. [7M]

## UNIT-IV

- 7 a) Derive the expression frequency of oscillation and condition for sustained oscillations of a Hartley oscillator. [7M]  
 b) In an Hartley oscillator, if  $L_1=0.2mH$ ,  $L_2=0.3mH$  and  $C=0.003 \mu F$ , calculate the frequency of its oscillation. [7M]

Or

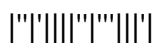
- 8 Discuss and explain the basic circuit of an LC oscillator and derive the condition for the oscillations. [14M]

**UNIT-V**

- 9 a) With the help of a suitable circuit diagram, show that the maximum conversion efficiency of a class B power amplifier is 78.5%. [7M]  
b) Write short notes on Thermal stability and Heat sinks. [7M]

Or [7M]

- 10 a) Draw the diagram of a capacitance coupled tuned amplifier and derive an expression for its quality factor. [7M]  
b) Define efficiency for a power amplifier. Classify power amplifiers based on their class of operation and compare them. [7M]



## II B. Tech II Semester Regular Examinations, June/July - 2022

## ELECTRONIC CIRCUIT ANALYSIS

(Common to ECE, EIE, &amp; ECT)

Time: 3 hours

Max. Marks: 70

Answer any **FIVE** Questions each Question from each unitAll Questions carry **Equal** Marks

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**UNIT-I**

- 1 a) Derive the expression for CE short-circuit current gain with resistive load. [7M]  
 b) Derive the expressions for  $f_T$  and  $f_\beta$ . [7M]

Or

- 2 Draw the Hybrid-  $\pi$  model for a common emitter transistor. At room temperature (300K) at  $I_C=10\text{mA}$  and  $V_{CE}=8\text{V}$ .  $h_{ie}=500$ ,  $h_{oe}=2 \times 10^{-4} \mu\text{s}$ ,  $h_{fe}=100$  and  $h_{re}=10^{-4}$ . At the same operating point  $f_T=50\text{MHz}$  and  $C_{ob}=3\text{PF}$ . Calculate the values of hybrid- $\pi$  parameters. [14M]

**UNIT-II**

- 3 a) Derive the expression for input resistance of a Darlington pair circuit. [7M]  
 b) With the help of a neat circuit diagram, describe the working of a bootstrapping. [7M]

Or

- 4 a) Derive expressions for  $R_i$ ,  $R_o$ ,  $A_v$  &  $A_i$  using h-parameter model of a CC- CE amplifier? [7M]  
 b) Draw the circuit diagram of Direct Coupled Amplifier and explain its operation in detail. [7M]

**UNIT-III**

- 5 a) Draw the block diagram of Current Shunt feedback system and derive the expression for  $R_{if}$  and  $R_{of}$  [7M]  
 b) What is meant by negative feedback in amplifier, enumerate the effects of negative feedback on the various characteristics of the amplifier. [7M]

Or

- 6 a) Draw the circuit of a voltage series feedback amplifier and derive the expressions for  $R_{if}$  and  $R_{of}$  [7M]  
 b) With neat block diagram Derive the expression for overall gain of a negative feedback circuit. [7M]

**UNIT-IV**

- 7 a) Derive the expression for frequency of oscillation of BJT- RC phase-shift oscillator with necessary explanation. [7M]  
 b) Discuss about Frequency and amplitude stability of oscillators. [7M]

Or

- 8 a) Write down the expression for frequency of oscillation in Hartley and Colpitts Oscillators. [7M]  
b) A Colpitts Oscillator is designed with  $C_2=100\text{pF}$  and  $C_1=7500\text{pF}$ . The inductance is variable, determine the range of inductance values, if the frequency of oscillation is to vary between 950 and 2050 KHz. [7M]

**UNIT-V**

- 9 a) Draw the Class-A Power Amplifier and explain operation in detail with necessary equations. Also derive the expression for maximum conversion efficiency. [7M]  
b) What is meant by distortion in power amplifiers, explain the given different types of distortions? [7M]

Or

- 10 a) Explain the reasons for oscillations in a tuned amplifier. Briefly explain the methods used to stabilize the tuned amplifiers against oscillations. [7M]  
b) Explain the operation of a double tuned amplifier. Explain the advantages of double tuned circuit over single tuned circuit. [7M]



**II B. Tech II Semester Supplementary Examinations, June/July - 2022****ELECTRONIC CIRCUIT ANALYSIS**

(Electronics Communication Engineering)

Time: 3 hours

Max. Marks: 75

Answer any **FIVE** Questions each Question from each unitAll Questions carry **Equal** Marks

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- 1 a) Explain the significance of all resistive components of hybrid- $\pi$  model and give their typical values. [8M]  
 b) Short circuit CE current gain of transistor is 25 at a frequency of 2MHz if  $f_{\beta}=200\text{kHz}$ . Calculate i)  $f_T$  ii)  $h_{fe}$  iii) Find  $|A_{il}|$  at frequency of 10MHz and 100MHz. [7M]

Or

- 2 a) Derive the expression of gain bandwidth product for voltage and current? [8M]  
 b) A high frequency amplifier uses a transistor which is driven from a source with  $R_s=0$ . Calculate value of  $f_H$ , if  $R_L=0$  and  $R_L=1\text{k}\Omega$ . Assume typical value of hybrid- $\pi$  parameters. [7M]
- 3 a) What are the effects of coupling capacitors in CE amplifier on the frequency response of the amplifier? Explain? [8M]  
 b) Compute the overall lower and upper cut-off frequency of an identical three stage cascade of amplifiers with individual lower and upper cut-off frequency given as 20Hz and 20KHz. [7M]

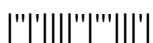
Or

- 4 a) List out the features of differential amplifier? Explain about differential gain, common mode gain and CMRR. [8M]  
 b) Let us consider the two stage amplifier circuit, the first stage in the circuit is a common emitter amplifier and second stage is common collector amplifier. Calculate input impedance, output impedance, and individual as well as overall current and voltage gains with the help of following transistor parameters at the corresponding quiescent point  $R_s=1\text{k}\Omega$ ,  $R_{c1}=3.3\text{k}\Omega$ ,  $R_{e2}=4.7\text{k}\Omega$ ,  $h_{ie}=2\text{k}\Omega$ ,  $h_{fe}=50$ ,  $h_{re}$  and  $h_{oe}=0$ . [7M]
- 5 a) With suitable diagrams explain current shunt and voltage shunt feedback amplifiers? [8M]  
 b) An amplifier requires an input signal of 60mV to produce a certain output with a negative feedback to get the same output the required signal is 0.5V. The voltage gain with feedback is 90. Find the open loop gain and feedback factor. [7M]

Or

- 6 a) Draw the block diagrams of four types of negative feedback amplifier circuits and explain the advantages and disadvantages with necessary derivations. [8M]  
 b) An amplifier has an input resistance of  $200\text{K}\Omega$ , with a certain negative feedback introduced in the above amplifier the input resistance is found to be  $20\text{M}\Omega$  and overall gain is found to be 1000. Calculate the loop gain and feedback factor. [7M]

- 7 a) Draw the circuit diagram of RC-Phase shift oscillator using BJT and derive the expressions for frequency of oscillations and condition on gain. [8M]  
b) Starting from the description of a generalized Oscillator, derive the expression for frequency of Oscillation in a Colpitt's Oscillator. [7M]  
Or
- 8 a) Derive an expression for frequency of oscillation of a RC phase-shift oscillator using a FET. [8M]  
b) Design a RC phase-shift oscillator to operate at a frequency of 5KHz. Use a MOSFET with  $\mu = 51$  and  $r_d = 5.5\text{Kohm}$ . The phase - shift network not load the amplifier, Find the minimum value of the drain - circuit resistance for which the circuit will oscillate? [7M]
- 9 a) Derive the expression for the harmonic distortion in a power amplifier if the relation between input and output currents is  $n^{\text{th}}$  order. [8M]  
b) Explain the operation of class B push-Pull power amplifier with neat sketch. [7M]  
Or
- 10 a) What is stagger tuning? Explain the frequency response of stagger tuned pair. [8M]  
b) Derive an expression for bandwidth of a capacitive coupled tuned amplifier. [7M]



**II B. Tech II Semester Supplementary Examinations, June/July – 2022****MANAGEMENT SCIENCE**

(Com to EEE, ECE, ECC)

Time: 3 hours

Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)2. Answer **ALL** the question in **Part-A**3. Answer any **FOUR** Questions from **Part-B**

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**PART -A**

1. Write short notes for the following:

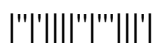
- a) Scientific Management (3M)
- b) Line Organization (2M)
- c) Economic order quantity (2M)
- d) Objectives of Merit rating (2M)
- e) CPM and PERT (3M)
- f) Strategy (2M)

**PART -B**

- 2. a) Explain the Nature and Scope of Management. (7M)
- b) Enumerate and explain the Principles of management contributed by Henry Fayol. (7M)
- 3. a) What are the important steps in the process of Organizing? (7M)
- b) Describe the charts used for recording information for Method study. (7M)
- 4. a) What are the Operative functions of Human Resource Manager? (7M)
- b) Discuss the Marketing Strategies that may be adopted during different stages of Product life cycle. (7M)
- 5. a) Write a note on “Total Float”, “Free Float” and “Independent Float” (7M)
- b) Construct a Network diagram with the following data (7M)

Event	Immediate Predecessor
B	A
C, D, E	B
F	C
F	D
F	E
G	F

- 6. a) What do you understand by SWOT analysis? (7M)
- b) Identify the factors to be diagnosed in an organisation’s External environment. (7M)
- 7. a) State the benefits and limitations of Just-in-Time (JIT) system. (7M)
- b) Discuss the activities involved in Supply Chain Management. (7M)



## II B. Tech II Semester Regular Examinations, June/July - 2022

## DIGITAL IC DESIGN

(Electronics &amp; Communication Engineering)

Time: 3 hours

Max. Marks: 70

Answer any **FIVE** Questions each Question from each unitAll Questions carry **Equal** Marks

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**UNIT-I**

- 1 a) Explain the various Data Objects supported by VHDL. Give the necessary examples? [7M]
- b) Define the following terms relevant to Verilog HDL [7M]
  - i) Parameters      iii) Constants
  - ii) Keywords      iv) identifiers

**Or**

- 2 a) Explain the difference in program structure of VHDL and any other procedural language. Give an example. [7M]
- b) What is the use of library clause and use clause? Give example. [7M]

**UNIT-II**

- 3 a) Design a 4-bit carry look ahead adder using gates and write data flow VHDL program. [7M]
- b) Design a 3-bit comparator using three one bit comparators and logic gates. [7M]

**Or**

- 4 a) What is multiplexer? Draw the logic diagram of 8 to 1 line multiplexer? [7M]
- b) Design a 32 to 1 MUX using 74x151 and 74x139 decoders. [7M]

**UNIT-III**

- 5 a) Design and Explain the operation of 4-bit ring counter with the help of an IC? [7M]
- b) Implement the verilog HDL module of N-bit Synchronous Up/Down counter? [7M]

**Or**

- 6 a) Design and Explain a 4-bit Ripple counter with the help of an IC? [7M]
- b) With suitable logic diagram explain a 4-bit bidirectional shift register? Also write the VHDL source code for the same? [7M]

**UNIT-IV**

- 7 a) Design a 3-input CMOS OR-AND-INVERTER gate. Draw the logic diagram and function table. [7M]
- b) Discuss a Pseudo-NMOS logic and design XNOR gate using it? [7M]

**Or**



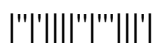
- 8 a) Draw a circuit diagram, functional table, and logic symbol for a CMOS gate with two inputs A and B and an output Z where  $Z=1$  if  $A=0$  and  $B=1$ , and  $Z=0$  otherwise. [7M]  
b) What is a Complementary Pass-Transistor Logic (CPL)? Draw the Circuit diagram of CPL NAND2 gate and CPL NOR2 gate. [7M]

**UNIT-V**

- 9 a) Construct a Gate-level schematic of the clocked NAND-based JK latch circuit and explain its operation with detailed truth table? [7M]  
b) Design Schmitt trigger using CMOS and explain its operation? [7M]

**Or**

- 10 a) Design CMOS SR latch circuit based on NOR2 gates and explain its operation with the help of truth table? [7M]  
b) Draw different styles of D-FlipFlops using CMOS and transmission gates and explain any one? [7M]



## II B. Tech II Semester Regular Examinations, June/July - 2022

## DIGITAL IC DESIGN

(Electronics &amp; Communication Engineering)

Time: 3 hours

Max. Marks: 70

Answer any **FIVE** Questions each Question from each unitAll Questions carry **Equal** Marks

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**UNIT-I**

- 1 a) Explain various architectural bodies/modeling styles in VHDL with examples. [7M]  
 b) Explain the various data types supported by VHDL. Give the necessary examples. [7M]

**Or**

- 2 a) Write the differences between Verilog and VHDL? Write the Syntax of CASE INVERTOR? [7M]  
 b) Write a Verilog code for a 4X1 MUX using CASE statement? [7M]

**UNIT-II**

- 3 a) Design a 2 input 4-bit multiplexer. Write the truth table and draw the logic diagram. [7M]  
 b) Using a process statement write a VHDL source code for 4 to 1 multiplexer. [7M]

**Or**

- 4 a) Draw the logic diagram of 74x283 IC and design a 24-bit ripple adder using the same IC. [7M]  
 b) Write a VHDL code for four bit parallel adder/subtractor. [7M]

**UNIT-III**

- 5 a) Draw the circuit diagram of a 4-bit binary counter and explain its working with its function table and write its Verilog code? [12M]  
 b) Tabulate the comparisons between synchronous sequential and asynchronous sequential circuits. [2M]

**Or**

- 6 a) List the basic types of shift registers in terms of data movement with diagrams? [2M]  
 b) Write a verilog description of the 8-bit parallel in/parallel out shift register for multiplication and division operations and write its test bench? [12M]

**UNIT-IV**

- 7 a) Draw a circuit diagram, functional table, and logic symbol for a two input depletion-load NOR gate and explain its functional behavior. [7M]  
 b) Define threshold voltage of a MOS device and explain its significance. [7M]

**Or**

- 8 a) What is a CMOS transmission gate? Implement Ex-OR and Ex-NOR Boolean functions using transmission gate. [7M]  
 b) Design an area efficient layout diagram for the CMOS logic shown below [7M]

$$Y = (A + B + C)^1$$

**UNIT-V**

- 9 a) Draw the Gate-level schematic and block diagram of the NAND-based SR latch and explain the operation with the help of function table. [7M]  
 b) List out the comparisons between latch and flip flop. [7M]

**Or**

- 10 a) Design and Explain the operation of CMOS clocked JK flip-flop [12M]  
 b) List out the differences between regenerative logic circuits and non-regenerative logic circuits. [2M]

## II B. Tech II Semester Regular Examinations, June/July - 2022

# DIGITAL IC DESIGN

(Electronics & Communication Engineering)

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

Answer any **FIVE** Questions each Question from each unit

All Questions carry **Equal** Marks

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## UNIT-I

- 1 a) Explain the program structure of VHDL with the help of block diagram. [7M]
- b) With suitable examples explain the various data types supported by VHDL. [7M]

**Or**

- 2 a) List out the different Operators available in Verilog HDL. Explain with example. [7M]
- b) What are the various data types supported by Verilog HDL? Explain about the predefined data values used for net or variable data type? [7M]

## UNIT-II

- |   |                                                                                                                                                                                                                                                               |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3 | <p>a) Design the logic circuit for even parity checker and write the behavioral VHDL program? [7M]</p> <p>b) What is a comparator? Explain the operation of a 2-bit comparator with a relevant diagram. Draw its logic symbol and write a VHDL code. [7M]</p> |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Or**

- 4    a) Design the following code converters: [7M]  
        i)      5211 to 2421                                  ii) 4-bit binary to excess-3  
      b) Design a first and second highest priority encoder circuit using 74LS148 and 74LS138? [7M]

### UNIT-III

- 5 a) Draw the logic diagram for n-bit left to right shift register? Write down the VHDL code for an n-bit left to right shift register? [9M]
- b) List out the applications of shift register? [5M]

**Or**

- 6 a) Discuss the logic circuit of 74 x 377 register. Write a VHDL program for the same in structural style. [9M]
- b) Give brief note on hazards in sequential circuits? [5M]

## UNIT-IV

- |   |                                                                                                                                                                                                                                                                 |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 7 | <p>a) Design a CMOS transistor circuit for 2-input NAND gate. With the help of function table explain the circuit. [7M]</p> <p>b) With suitable example, discuss about the requirement and operation of pass transistors and design AND gate using it? [7M]</p> |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

**Or**

- 8 a) Draw the circuit diagram of two-input depletion-load NOR gate and calculate the output low and output high voltages for the same? [7M]
- b) Design and Explain CMOS full-adder circuit? [7M]

## UNIT-V

- 9 a) Draw the logic diagram and truth table of a CMOS clocked SR flip-flop and explain its operation? [7M]
- b) With neat schematic explain D latch using CMOS Inverter and Transmission gate? [7M]

**Or**

- 10 a) Draw the schematic circuit of a D flip flop with negative edge triggering using NAND gates. Give its truth table and explain its operation? [7M]
- b) Design Schmitt trigger using CMOS and explain? [7M]

## II B. Tech II Semester Regular Examinations, June/July - 2022

## DIGITAL IC DESIGN

(Electronics &amp; Communication Engineering)

Time: 3 hours

Max. Marks: 70

Answer any **FIVE** Questions each Question from each unitAll Questions carry **Equal** Marks

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## UNIT-I

- 1 a) Explain the different concurrent statements and sequential statements in VHDL? [7M]  
 b) Discuss about the comparison between CASE and IF statements in VHDL with examples? [7M]

Or

- 2 a) Give the syntax for a net declaration? Explain the different kind of nets that belong to the net data type? [7M]  
 b) How the package declaration is different from entity declaration? Give the syntax for each? [7M]

## UNIT-II

- 3 a) Draw the logic symbol and logic diagram of 74 X 148 priority encoder. Give its truth table and write VHDL code in any one of the model. [7M]  
 b) Explain the design procedure for multiplexers and de-multiplexers and draw the logic diagram of a 4-to-1 line multiplexer with logic gates. [7M]

Or

- 4 a) Give circuit implementation of 4 Bit Ripple adder and Ripple Adder/Subtractor using ones and twos complement method. [7M]  
 b) Design a Binary to Gray Code converter and write its VHDL code using data flow modeling ? [7M]

## UNIT-III

- 5 a) List the basic types of shift registers in terms of data movement with diagrams? [2M]  
 b) Design & explain 4-bit serial-In Parallel-out register and write its VHDL code? [12M]

Or

- 6 a) Explain the operation of a 4 bit synchronous binary counter with the required diagram and waveforms. [7M]  
 b) Design a 4-bit binary synchronous counter using 74x74 IC. Write the VHDL source code for the same. [7M]

## UNIT-IV

- 7 a) Draw the generalized NOR structure with multiple inputs using Pseudo nMOS and explain the operation with the help of functional table? [7M]  
 b) Develop complementary Pass-transistor logic? Design OR operation using Pass-transistor logic? [7M]

Or

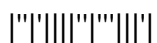
- 8 a) Draw and explain the CMOS Half adder? [7M]  
b) How does a transmission gate work? Explain four different representations of the CMOS transmission gate (TG). Design 2X1 MUX using it? [7M]

**UNIT-V**

- 9 a) Explain the operation of a D-latch using CMOS through suitable timing diagram for various possibilities of input. [7M]  
b) Design CMOS JK Flip flop and explain? [7M]

**Or**

- 10 a) With the help of neat circuit diagram explain the operation of a CMOS bistable element? [7M]  
b) Design D-Flip flop using CMOS Inverter and transmission gates as switches? [7M]



**II B. Tech II Semester Regular Examinations, June/July - 2022****DATABASE MANAGEMENT SYSTEMS**

(Common to CSE,CST,CSE(CS),CSE(IOTCSIBCT),CSE(CSBS),CSE(IOT),&amp;CS)

**Time: 3 hours****Max. Marks: 70**Answer any **FIVE** Questions each Question from each unitAll Questions carry **Equal Marks**

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**UNIT-I**

- 1 a) Why would you choose a database system instead of simply storing data in operating system files? When would it make sense not to use a database system? [7M]
- b) Draw the generic architecture of database systems and briefly explain different components in it. [7M]

**OR**

- 2 a) How database users are classified according to their roles? Write at least 5 functions of database administrators. [7M]
- b) Explain about different levels of abstractions. [7M]

**UNIT-II**

- 3 a) Define the following terms: relation schema, relational database schema, domain, attribute, attribute domain, relation instance, and relation cardinality. [7M]
- b) When are integrity constraints enforced by a DBMS? What is referential integrity? Explain with examples. [7M]

**OR**

- 4 Consider the following relational schema. An employee can work in more than one department; the pct time field of the Works relation shows the percentage of time that a given employee works in a given department. [14M]

Emp(eid: integer, ename: string, age: integer, salary: real)

Works(eid: integer, did: integer, pct time: integer)

Dept(did: integer, dname: string, budget: real, managerid: integer)

Write the following queries in SQL:

- a) Print the names and ages of each employee who works in both the Hardware department and the Software department.
- b) For each department with more than 20 full-time-equivalent employees (i.e., where the part-time and full-time employees add up to at least that many full-time employees), print the did together with the number of employees that work in that department.
- c) Print the name of each employee whose salary exceeds the budget of all of the departments that he or she works in.
- d) Find the managerids of managers who manage only departments with budgets greater than \$1 million.
- e) Find the enames of managers who manage the departments with the largest budgets.
- f) If a manager manages more than one department, he or she controls the sum of all the budgets for those departments. Find the managerids of managers who control more than \$5 million.

**II B. Tech II Semester Supplementary Examinations, June/July - 2022**  
**PULSE AND DIGITAL CIRCUITS**  
 (Com to ECE, EIE, ECC)

Time: 3 hours

Max. Marks: 70

- Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)  
 2. Answer **ALL** the question in **Part-A**  
 3. Answer any **FOUR** Questions from **Part-B**
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**PART -A**

1. a) What are the reasons for existence of rise time and fall time in RC Circuits? 2M
- b) Write the differences between clipping and clamping Circuits? 2M
- c) Define breakdown voltage in transistors? 2M
- d) Define Bistable, Monostable and astable multivibrator? 3M
- e) Write the relation between slope, transmission and displacement error equations? 2M
- f) Listout the merits and demerits of TTL? 3M

**PART -B**

2. a) Estimate the response of RC high pass circuit for sine wave as input. 7M
- b) Define Attenuator? Design and explain Attenuator circuit with RC components? 7M
3. a) With the help of a neat circuit diagram explain the working of a two-level diode clipper. 7M
- b) Explain the response of the negative biase clamping circuit ? 7M
4. a) Explain the switching times of a transistor with suitable diagram? 7M
- b) Explain the basic working principle of a bistable multivibrator with neat diagrams? 7M
5. a) Derive Pulse width equation of a monostable multivibrator? 7M
- b) Design an astable multivibrator to generate an output pulse width is 100 mSec. The ON/ OFF time period is 50 msec. Assume required Data. 7M
6. a) Explain why an operational integrator is used in transistorized miller sweep circuit. 7M
- b) Explain the working of a transistor Bootstrap sweep circuit and derive expression for the slope sweep error. 7M
7. a) Explain the response of AOI Logic gates with help of truth table? 7M
- b) Listout the differences between Sampling gate and Logic gate? Explain Basic Operating Principles of Sampling Gate? 7M

