Code: 5G353

III B.Tech. I Semester Supplementary Examinations February 2021

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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		Marks	CO	Blooms Level

UNIT–I

		Marks	CO	Blooms Level
1.	Draw the circuit of inverting and non-inverting amplifiers using Op-Amp and derive an expression for their gain.	14M	CO1	L3

OR

			Marks	CO	Blooms Level
2.	a)	An IC op-amp 741 used as an inverting amplifier with a gain of 100. The voltage gain Vs frequency characteristic is flat up to 12 kHz. Find the maximum peak to peak input signal that can be feed without causing any distortion to the output.	8M	CO1	L3
	b)	Draw and explain the output waveform of the ideal inverter circuit when the input is square wave	6M	CO1	L1

UNIT–II

			Marks	CO	Blooms Level
3.		Explain the Astable and Monostable Multivibrator using Op-Amp with a neat diagram.	14M	CO1	L2

OR

			Marks	CO	Blooms Level
				CO1	
4.	a)	Discuss in detail about successive approximation type DAC.	8M	CO1	L2
	b)	What are the applications of PLL.	6M	CO1	L2

UNIT–III

			Marks	CO	Blooms Level
5.	a)	Discuss the CMOS Dynamic Electrical Behavior.	8M	CO2	L3
	b)	Give some advantages and disadvantages of above.	6M	CO2	L2

OR

			Marks	CO	Blooms Level
6.		Show the Operation of Universal Gate with ECL technology.	14M	CO2	L3

UNIT–IV

			Marks	CO	Blooms Level
7.		Define decoder and explain with neat diagram the functionality of 3 to 8 decoder also write the VHDL program for standard 74X138.	14M	CO2	L2

OR

			Marks	CO	Blooms Level
8.		Discuss the Entities, Architectures and Configurations of VHDL design with an example.	14M	CO3	L3

UNIT–V

			Marks	CO	Blooms Level
9.		Write a VHDL entity and architecture for a 3-bit synchronous counter using flip flops.	14M	CO3	L2

OR

			Marks	CO	Blooms Level
10.		Explain the operation of SR-flip flop and T-flip-flop with VHDL code.	14M	CO3	L2

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III B.Tech. I Semester Supplementary Examinations February 2021

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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			Marks	CO	Blooms Level

UNIT–I

1. a) Define and explain the following

   i) Directivity   ii) Beam width   iii) Radiation resistance.   6M

   b) Develop the relation between the effective area and directivity D of an antenna operating at a wavelength of .   8M

OR

2. a) Derive the expression for radiation resistance of alternating current element.   10M

   b) An antenna has Rr =73 , RL=2 . Compute its efficiency   4M

UNIT–II

3. a) Define uniform linear array and derive the expression for array factor of n-element linear array.   8M

   b) Illustrate the need of Antenna Array?   6M

OR

4. a) Explain the operation of Binomial arrays.   7M

   b) A linear broadside array consists of 16 identical isotropic radiators with spacing /2. Derive an expression and plot the radiation pattern. Also find directivity and beam width.   7M

UNIT–III

5. a) List out the types of horn antenna and Explain what optimum horn is.   10M

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

   Mouth aperture = 10 X10 ; Frequency of operation = 5 GHz.   4M

OR

6. a) Sketch and explain the constructional features of a helical antenna.   7M

   b) Explain about flat sheet and corner reflector antennas.   7M

UNIT–IV

7. 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

OR

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

UNIT–V

9. a) Derive the refractive index expression in the ionosphere   7M

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

OR

10. a) Discuss about the super refraction with relative figures in different cases   7M

    b) Write a short note on skip distance and virtual height, and Critical frequency and Maximum usable frequency   7M

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III B.Tech. I Semester Supplementary Examinations February 2021
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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			Marks	CO	Blooms Level

UNIT–I

| 1. | a) | Define bus? Draw the figure to show how functional units are interconnected using a bus and explain it. | 8M | CO1 | L1,L2 |
| | b) | Differentiate between fixed point and floating-point representation | 6M | CO1 | L2 |

OR

| 2. | a) | Describe the different types of computers. | 7M | CO1 | L2 |
| | b) | Convert the following binary number into decimal & octal number:
   i) $(00010.110)_2$
   ii) $(000.10110)_2$ | 7M | CO1 | L1,L3 |

UNIT–II

| 3. | a) | Define register transfer language? Explain the basic symbols used in register transfer | 7M | CO1 | L1 |
| | b) | Draw the block diagram of arithmetic logic shift unit and explain its operations | 7M | CO1 | L2 |

OR

| 4. | a) | Explain about shift micro operations with examples. | 7M | CO1 | L2 |
| | b) | Describe the memory reference instructions with an example. | 7M | CO1 | L2 |

UNIT–III

| 5. | a) | Define addressing mode? Explain the following addressing modes with examples.
   i) Direct Addressing Mode
   ii) Immediate Addressing Mode | 8M | CO2 | L1 |
| | b) | Explain the three basic types of data manipulation instructions. | 6M | CO2 | L2 |

OR

| 6. | a) | Differentiate relative and absolute addressing modes for branch instructions. | 7M | CO2 | L2 |
| | b) | Explain the operation of a Micro programmed control unit using a diagram. | 7M | CO2 | L2 |

UNIT–IV

| 7. | a) | Explain the following mapping techniques used for cache mapping
   i) Associative mapping cache
   ii) Direct mapping cache
   iii) Set-associative mapping cache | 7M | CO2 | L2 |
| | b) | List the functionalities of I/O interface. Draw and explain a combined input/output interface circuit. | 7M | CO2 | L1,L2 |

OR

| 8. | a) | Describe memory hierarchies in detail. | 8M | CO2 | L2 |
| | b) | Briefly explain various peripheral devices used in computer system. | 6M | CO2 | L2 |

UNIT–V

| 9. | a) | Explain the instruction pipeline processing in RISC architecture. | 7M | CO3 | L2 |
| | b) | Explain the characteristics of multiprocessors. | 7M | CO3 | L2 |

OR

| 10. | a) | Discuss about Arithmetic pipeline. | 7M | CO3 | L2 |
| | b) | Define Parallel Processing? Explain it in detail. | 7M | CO3 | L1,L2 |

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R-15

III B.Tech. I Semester Supplementary Examinations February 2021

Control Systems

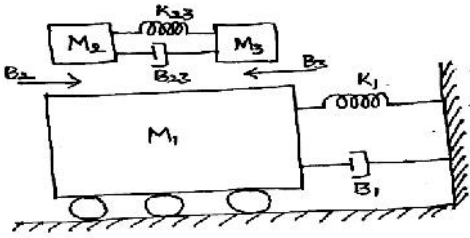(Electronics and Communication Engineering)

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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			Marks	CO	Blooms Level

UNIT–I

1. a) Explain in brief about classification of control systems.   6M   CO1   L2

    b) For the mechanical system given below, write differential equations and find the transfer function.

8M   CO1   L1

OR

2. a) Compare the Open loop and Closed loop control systems.   6M   CO1   L4

    b) Using mason gain formula find the transfer function for the signal flow graph shown in figure.
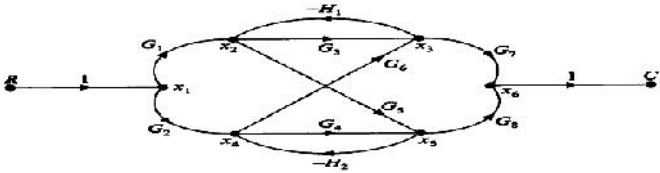
8M   CO1   L2

UNIT–II

3. a) Derive the expression of rise time for unit step response of second order system   7M   CO2   L5

    b) Explain about various test signals used in control system?   7M   CO2   L2

OR

4. a) What are the difficulties in RH stability criterion? Explain how you can overcome them?   6M   CO2   L2

    b) A unity feedback system has a plant

    $$G(S) = \frac{K(S+0.5)}{S(S+1)(S^2+2S+2)}$$ sketch the root locus and find the roots

    when $\zeta = 0.5$.   8M   CO2   L2

UNIT–III

5. a) Deduce the expressions for resonant peak & resonant frequency and hence establish the correlation between time response & frequency response.   7M   CO3   L5

    b) Given $\zeta = 0.7$ & $\omega n = 10$ r/s find resonant peak, resonant frequency & Bandwidth.   7M   CO3   L2

OR

6. a) What is "Nyquist Contour"?   6M CO3 L1

b) A system is given by $G(S) = \dfrac{K}{S^2(S+4)(S+1)}$ Sketch the Nyquist plot

hence determine the stability of the system   8M CO3 L5

UNIT–IV

7. a) What is compensation? What are the different types of compensators?   4M CO4 L1

b) What is a lead compensator, obtain the transfer function of lead compensator and draw pole-zero plot?   5M CO4 L1

c) Explain the different steps to be followed for the design of lead compensator using Bode plot?   5M CO4 L2

OR

8. A unity feedback system has an open loop transfer function

$G(S) = \dfrac{K}{(S(S+1)(0.2S+1)}$ Design a suitable phase lag compensator

to achieve following specifications Kv= 8 and Phase margin 40 deg with usual notation.   14M CO4 L6

UNIT–V

9. a) Explain properties of state transition matrix.   6M CO5 L2

b) Consider the transfer function

$\dfrac{Y(S)}{U(S)} = \dfrac{(2S^2 + S + 5)}{(S^3 + 6S^2 + 11S + 4)}$

Obtain the state equation by direct decomposition method and also find state transition matrix.   8M CO5 L1

OR

10. a) Discuss the significance of state Space Analysis?   6M CO5 L2

b) Obtain state space mode for given mechanical system as shown in the figure.

8M CO5 L1

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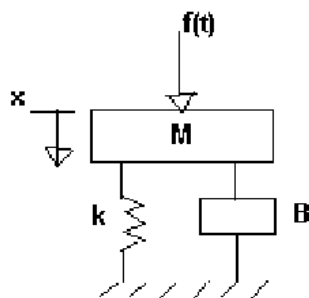
III B.Tech. I Semester Supplementary Examinations February 2021
Digital Communication
(Electronics and Communication Engineering)

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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			Marks	CO	Blooms Level

UNIT–I

			Marks	CO	Blooms Level
1.	a)	Explain the functional description of digital communication system in detail. with neat sketch	7M	1 & 3	L2
	b)	A television signal with a bandwidth of 4.2 MHz is transmitted using binary PCM. The number of quantization levels is 512. Calculate the transmission bandwidth and output SNR	7M	1 & 3	L3

OR

2.	a)	In a binary PCM system, the output signal to quantizing noise ratio is to be held to a minimum of 40dB. Determine the number of required levels and find the corresponding output signal to quantization noise ratio.	7M	1 & 3	L3
	b)	Explain the modulation and demodulation procedure in DPCM system.	7M	1 & 3	L2

UNIT–II

3.	a)	Describe the generation and coherent detection of Amplitude Shift Keying (ASK) signal.	7M	1 & 3	L2
	b)	Discuss about the Coherent Detection of Frequency Shift Keying.	7M	1 & 3	L2

OR

4.	a)	The bit stream 1011100011 is to be transmitted using DPSK. Determine the encoded sequence and transmitted phase sequence.	7M	1 & 3	L3
	b)	Explain about DPSK system. And also give the comparison between DPSK and PSK.	7M	1 & 3	L2

UNIT–III

5.	a)	Write short notes on joint entropy, condition entropy and mutual information.	7M	1 & 3	L1
	b)	A continuous time signal is band limited to 5 KHz. The signal is quantized in eight levels of a PCM system with probabilities 0.25, 0.2, 0.2, 0.1, 0.1, 0.05, 0.05 and 0.05. Calculate the entropy.	7M	1 & 3	L3

OR

6.	a)	Define the following i)Information ii) Entropy iii) Rate of Information iv) Channel Capacity	7M	1 & 3	L1
	b)	Prove that $I(X,Y) = H(X) - H(X/Y)$	7M	1 & 3	L3

UNIT–IV

7.	a)	With an example explain the error detection and correction capabilities of linear block codes.	7M	2 & 3	L3
	b)	Compare code efficiency of Shanon Fano coding and Huffman coding when five source messages have probabilities m1=0.4, m2=0.15, m3=0.15, m4=0.15, m5=0.15.	7M	2 & 3	L1

OR

8.		The parity check bits of a (8,4) block code are generated by $C_0=m_1+ m_0+ m_3$ $C_1=m_1+ m_0+ m_2$ $C_2=m_2+ m_0+ m_3$ $C_3=m_1+ m_2+ m_3$. Where m_1, m_2 and m_3 are the message digits. i) Find the generator matrix and the parity check matrix for this code. ii) Find the minimum weight of this code. iii) Find the error-detection and correction capabilities of this code.	14M	2 & 3	L3

UNIT–V

9.	a)	Describe the algebraic structure of cyclic codes.	7M	2 & 3	L1
	b)	Construct a (7, 4) binary systematic cyclic code using a generator polynomial g(x) = x^3+x^2+1 for the data: 1010	7M	2 & 3	L6

OR

10.	a)	Write the advantages and disadvantages of convolutional codes.	7M	2 & 3	L1
	b)	Discuss in brief about the analysis of convolutional encoders.	7M	2 & 3	L1

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III B.Tech. I Semester Supplementary Examinations February 2021
Managerial Economics and Financial Analysis
(Common to CE, ME & ECE)

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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Marks   CO   Blooms Level

UNIT–I

1. Define Managerial Economics and Discuss its nature and scope.

OR

2. Explain any two principles of Managerial Economics.
    (a) Opportunity Cost Principle
    (b) Risk and Uncertainty Principle
    (c) Equi-Marginal Principle

UNIT–II

3. Discuss the Cost-Output Relationship in short run and long run.

OR

4. Explain the following demand forecasting methods
    (a) Consumers survey method
    (b) Regression Method

UNIT–III

5. Discuss the problems and remedies of Public Sector Business Organisations.

OR

6. Explain the following pricing methods
    (a) Market Skimming Pricing
    (b) Peak Load Pricing

UNIT–IV

7. Discuss double entry book keeping and state the procedure for preparing balance sheet of the firm at the end of financial year.

OR

8. A company is considering two mutually exclusive projects. Both require an initial investment of ₹ 10,000 each and have a life of five years. The cost of capital of the company is 10%. The estimated cash inflow of the two projects are as follows :

Year	1	2	3	4	5
Project A	4000	4000	4000	4000	4000
Project B	5000	6000	5400	4000	5000

You are required to calculate Net Present Value and suggest which project should be accepted. The PV factors at 10% from first year to fifth year are 0.909, 0.826, 0.751, 0.683 and 0.621 respectively.

UNIT–V

9. Explain the meaning of financial ratio and discuss its significance in analysing the financial performance of a firm.

OR

10. From the following information, you are required to prepare a Balance Sheet.
    (i)   Current Ratio – 1.75
    (ii)   Liquid Ratio – 1.25
    (iii)   Stock Turnover Ratio (Cost of sales/closing stock) – 9
    (iv)   Gross Profit Ratio – 25 per cent
    (v)   Debt collection period – 1.5 months
    (vi)   Reserves and surplus to capital – 0.2
    (vii)   Turnover to fixed assets – 1.2
    (viii) Capital gearing ratio – 0.6
    (ix)   Fixed Assets to net worth – 1.25
    (x)   Sales for the year ₹ 12,00,000

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