Hall Ticket Number :										

R-17

Code: 7G355

III B.Tech. I Semester Regular & 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)

****

			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 λ.	8M		
		OR			
2.	a)	Derive the expression for radiation resistance of alternating current element.	10M		
	b)	An antenna has Rr =73Ω, RL=2Ω. 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 λ/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 = 10λX10λ; 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		

*****

Hall Ticket Number :										

R-17

Code: 7G159

III B.Tech. I Semester Regular & 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)

****

			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

*****

Hall Ticket Number :										

R-17

Code: 7G352

III B.Tech. I Semester Regular & Supplementary Examinations February 2021

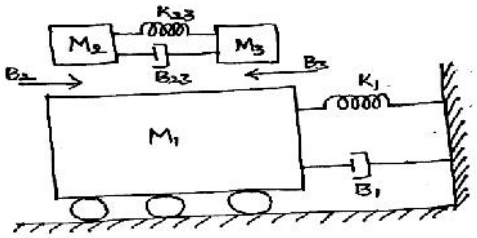
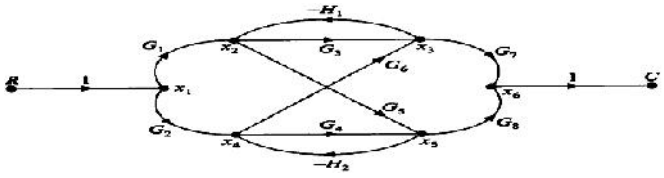
Control Systems

(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)

****

			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 ζ = 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 ζ = 0.7 & ωn = 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 $G(S)=\frac{K}{S^2(S+4)(S+1)}$ 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

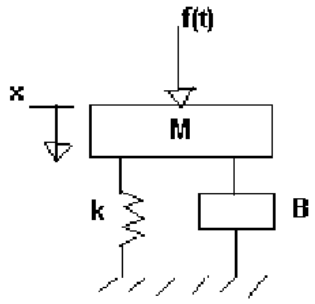
OR

8.		A unity feedback system has an open loop transfer function $G(S)=\frac{K}{(S(S+1)(0.2S+1)}$ 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 $\frac{Y(S)}{U(S)}=\frac{(2S^2+S+5)}{(S^3+6S^2+11S+4)}$ 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

*****

Hall Ticket Number :										

R-17

Code: 7G351

III B.Tech. I Semester Regular & 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)

****

			Marks	CO	Blooms Level
		UNIT–I			
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) = $x3+x^2+1$ 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

*****

Hall Ticket Number :										

R-17

Code: 7G354

III B.Tech. I Semester Regular & Supplementary Examinations February 2021

Electronic Measurements and Instrumentation

(Electronics and Communication Engineering)

Max. Marks: 70 Time: 3 Hours

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

****

			Marks	CO	Blooms Level
		UNIT–I			
1.	a)	Discuss and explain various types of DVMs in measurement and instrumentation.	6M	CO1	L2
	b)	A basic D'Arsonval movement with a full scale deflection current of Ifsd=100μA and an internal resistance of Rm = 200Ω is available. It is to be converted into a 0- 5V,0-10V,0-25V and 0-50V multi range voltmeter using individual multipliers for each range. Calculate the values of individual resistors.	8M	CO1	L6
		OR			
2.	a)	Explain the working principle of PMMC with the help of torque equation	6M	CO1	L2
	b)	Explain about the Ramp type Integrating type Digital Voltmeter.	8M	CO1	L2
		UNIT–II			
3.	a)	Explain how a Frequency Signal Generator works?	6M	CO2	L2
	b)	Demonstrate the functioning of wave generator with the help of required diagrams.	8M	CO2	L2
		OR			
4.	a)	Discuss the basic principle of Sweep frequency generator with neat sketch.	6M	CO2	L2
	b)	Explain the working of spectrum analyzer with neat diagram.	8M	CO2	L2
		UNIT–III			
5.	a)	Explain the working of CRT with neat diagram.	6M	CO3	L2
	b)	Describe the block diagram of Sampling oscilloscope and explain its working.	8M	CO3	L2
		OR			
6.		Explain the Digital Storage oscilloscope and its applications.	14M	CO3	L6
		UNIT–IV			
7.	a)	Explain the Basic principle of kelvin Bridge and derive the expression for unknown resistance.	6M	CO4	L2
	b)	Explain Wein bridge with neat diagram and derive the expression for unknown parameters'.	8M	CO4	L2
		OR			
8.	a)	Explain the principle of operation and construction of Maxwell's bridge.	6M	CO4	L2
	b)	In the Case of Maxwell's Bridge, one arm has a resistor of R1= 470KΩ in parallel with a capacitor of C1 = 0.01μF. Second arm has a resistance of R2 = 5.1 KΩ, Third arm has resistance of R3 = 100 KΩ. The bridge is excited at frequency of s 1KHz. Determine the values of unknown Inductance and unknown Resistance.	8M	CO4	L6
		UNIT–V			
9.	a)	Define a transducer. Explain the classification of transducers.	6M	CO5	L2
	b)	Explain the strip chart recorders with neat sketch.	8M	CO5	L2
		OR			
10.	a)	Explain working of strain gauge with neat sketch.	6M	CO5	L2
	b)	Describe the X-Y recorders with neat diagram.	8M	CO5	L2

*****

Hall Ticket Number :										

R-17

Code: 7G353

III B.Tech. I Semester Regular & 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)

****

			Marks	CO	Blooms Level
		UNIT–I			
1.		Draw the circuit of inverting and non-inverting amplifiers using Op-Amp and derive an expression for their gain.	14M	CO1	L3
		OR			
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			
3.		Explain the Astable and Monostable Multivibrator using Op-Amp with a neat diagram.	14M	CO1	L2
		OR		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			
5.	a)	Discuss the CMOS Dynamic Electrical Behavior.	8M	CO2	L3
	b)	Give some advantages and disadvantages of above.	6M	CO2	L2
		OR			
6.		Show the Operation of Universal Gate with ECL technology.	14M	CO2	L3
		UNIT–IV			
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			
8.		Discuss the Entities, Architectures and Configurations of VHDL design with an example.	14M	CO3	L3
		UNIT–V			
9.		Write a VHDL entity and architecture for a 3-bit synchronous counter using flip flops.	14M	CO3	L2
		OR			
10.		Explain the operation of SR-flip flop and T-flip-flop with VHDL code.	14M	CO3	L2

*****