

Hall Ticket Number :

R-17

Code: 7G364

III B.Tech. II Semester Regular & Supplementary Examinations July/Aug 2021

Digital Signal Processing

(Electronics and Communication Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

	Marks	CO	Blooms Level
UNIT-I			
1. a) Check whether the following system is linear and time invariant. $y(n) = n[x(n)]^2$	6M		
b) State and prove Time shift and Convolution properties of DFT.	8M		
OR			
2. a) Compute the response of the system $y(n) = 0.7y(n-1) - 0.12y(n-2) + x(n-1) + x(n-2)$ to the input $x(n) = nu(n)$.	7M		
b) Find the inverse DFT of $X(K) = \{1, 2, 3, 4\}$	7M		
UNIT-II			
3. a) Compute the FFT for the sequence $x(n) = n^2 + 1$ where $N=8$ using DIT algorithm.	7M		
b) Discuss the computation efficiency of radix-2 FFT algorithm over direct DFT.	7M		
OR			
4. a) Construct a signal flow graph for DIF algorithm if $N=6$.	7M		
b) Compute the IDFT of $X(k) = \{1, 2, 3, 4\}$ using DIF-FFT.	7M		
UNIT-III			
5. a) For the given specifications design an analog Butterworth filter $H(j\omega) = \begin{cases} 0.9 & \text{for } 0 \leq \omega \leq 0.2 \\ 0.2 & \text{for } 0.4 \leq \omega \leq \infty \end{cases}$	8M		
b) Compare Butterworth and Chebyshev approximations.	6M		
OR			
6. a) Explain the principle of designing FIR filters using frequency sampling technique.	7M		
b) Compute $20 \log w(e^{j\omega}) $ at $\omega=0$ for the following windows: i. Bartlett window for add N ii. Rectangular window iii. Hamming window	7M		
UNIT-IV			
7. a) What is the need for Multirate Digital Signal Processing?	7M		
b) Explain about the sampling rate conversion by a rational factor I/D.	7M		
OR			
8. a) Explain the applications of Multirate signal processing.	7M		
b) Consider a ramp sequence and sketch its interpolated and decimated versions with a factor '3'.	7M		
UNIT-V			
9. a) Discuss the applications of DSP in musical sound processing.	7M		
b) Discuss about spectral analysis of non-stationary signals.	7M		
OR			
10. a) Explain about various signal compression techniques.	7M		
b) What are the effects of oversampling A/D converter?	7M		

END

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III B.Tech. II Semester Regular & Supplementary Examinations July/August 2021

Microprocessors & Interfacing

(Electronics and Communication Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

	Marks	CO	Blooms Level
UNIT-I			
1. a) Explain about EU-Execution Unit of 8086 μ P.	7M	1	2
b) Discuss all the general purpose registers available in 8086 μ P.	7M	2	6
OR			
2. a) Analyze the addressing modes of 8086 μ P with examples.	7M	2	2
b) Create an assembly language program to perform ascending order of given 100 numbers.	7M	1	6
UNIT-II			
3. Illustrate the pin configuration of 8086 μ P.	14M	1	2
OR			
4. a) Describe SRAM memory Cell.	7M	1	1
b) Distinguish SRAM and DRAM Memory Cells.	7M	1	4
UNIT-III			
5. a) Discuss 8255 mode-0 operations and determine the control word with an example.	8M	2	6
b) Explain about BSR Control word.	6M	2	2
OR			
6. a) Illustrate the D/A converter interfacing with 8086 μ P.	7M	3	2
b) Show one sample program with the D/A Converter and 8086 μ P.	7M	3	2
UNIT-IV			
7. a) Compare synchronous and asynchronous data communications.	6M	4	6
b) Explain 8251 UART Architecture and it's functionality.	8M	4	2
OR			
8. a) Describe TTL to RS232C conversion.	7M	3	1
b) Construct one sample program for serial data transmission.	7M	4	6
UNIT-V			
9. a) Elaborate the features of 80286 over 8086 μ P.	7M	3	6
b) Compare Pentium and Pentium pro processors.	7M	3	5
OR			
10. a) Analyze the Protected mode in the advanced processors.	7M	4	4
b) Describe Segmentation concept in 80286 μ P.	7M	2	1

END

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III B.Tech. II Semester Regular & Supplementary Examinations July/August 2021

Microwave Engineering

(Electronics and Communication Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

	Marks	CO	Blooms Level
UNIT-I			
1. a) Starting from Maxwell's equations, derive the field equations of rectangular waveguides in TM mode.	7M	1	2
b) Starting from Maxwell's equations, derive the field equations of rectangular waveguides in TE mode.	7M	1	
OR			
2. a) Why TEM wave propagation is not possible in rectangular wave guide	7M	1	1
b) A rectangular waveguide with dimension of 3 x 2 cms operates in TM ₁₁ mode at 10 GHz. Determine the characteristic wave impedance.	7M	1	2
UNIT-II			
3. a) What are TE _{m,n} and TM _{n,m} modes w.r.t a circular waveguide. Sketch the dominant modes.	7M	2	2
b) A cylindrical wave guide has an inner radius of 2 cm. find the cutoff frequency for the guide operating in TE ₁₁ mode. Calculate λ_g and Z_{TE} at 10 GHz ($\lambda_0 = 3\text{cm}$)	7M	2	3
OR			
4. a) Derive the Q for TM ₁₁₁ mode of rectangular cavity assuming lossy conducting walls and lossless dielectric.	7M	2	2
b) For the dominant mode of operation in an air filled circular waveguide of inner diameter 4 cms. Find: (i) Cut off wavelength. (ii) Guided wave length. (iii) Cut off frequency	7M	2	2
UNIT-III			
5. a) Draw the structure of Magic Tee and write its characteristics.	7M	2	1
b) Draw the structure of Ferrite isolator and explain its working.	7M	2	1
OR			
6. a) Explain how Gyrator gives phase shift and explain it with neat diagram	7M	2	2
b) Derive the S matrix of directional coupler and define all the parameters.	7M	2	3
UNIT-IV			
7. a) How the oscillations are generated in reflex klystron and explain bunching process with apple gate diagram.	7M	2	3
b) Derive the equation of efficiency for a reflex klystron oscillator	7M	2	2
OR			
8. a) What are the different modes of operation of TWT and explain them?	7M	2	1
b) How cross-field is used to generate oscillations in Magnetron and derive the necessary equations?	7M	2	2
UNIT-V			
9. a) What is mean by transferred electron devices? Explain its principle of operation and draw its characteristics.	7M	3	2
b) How are the microwave measurements being different from low frequency measurements?	7M	3	2
OR			
10. a) Explain with block diagram of power measurement with bolometer technique.	7M	3	2
b) Explain the TRAPATT diode with principle of operation with characteristics and power output and efficiency	7M	3	3

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III B.Tech. II Semester Regular & Supplementary Examinations July/August 2021

Nano Electronics

(Electronics and Communication Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

	Marks	CO	Blooms Level
UNIT-I			
1. a) List out the types of scanning probe microscopies?	4M		
b) Explain scanning Tunneling microscopies in detail?	10M		
OR			
2. a) Explain Synthesis and Purification of Nanotubes?	7M		
b) Discuss the properties and applications of Nanotubes?	7M		
UNIT-II			
3. Explain briefly about Fabrication Techniques for Nanostructures	14M		
OR			
4. a) Describe nanoimprint lithography. What is split gate technology?	7M		
b) Interpret the different types of quantum dots investigated?	7M		
UNIT-III			
5. Write short notes on:			
a. Short channel MOS Transistor?			
b. Split gate transistor?			
c. Electron wave transistor?			
d. Quantum cell Automata (QCA)?	14M		
OR			
6. a) Explain the principle operation of Electron Spin Transistor.	7M		
b) Outline the device applications of quantum dot arrays	7M		
UNIT-IV			
7. a) Describe the digital circuit design based on RTDs technology and list out its applications?	7M		
b) Explain three terminal RTDs technology?	7M		
OR			
8. a) Explain the formation and working of Single electron Transistor (SET)?	9M		
b) Explain briefly the working principle of SET Adder with neat sketch?	5M		
UNIT-V			
9. a) Explain the limits due to Thermal particle Motion?	10M		
b) List the replacement of Technologies in integrated electronics?	4M		
OR			
10. a) Explain briefly about the "Nano systems as information processing machines?"	10M		
b) What are the Hardware requirements of Nano systems?	4M		

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Code: 7G16D

III B.Tech. II Semester Regular & Supplementary Examinations July/August 2021

Object Oriented Programming Concepts

(Common to EEE & ECE)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

Marks CO Blooms Level

UNIT-I

- | | | | |
|--|----|-----|----|
| 1. a) How does object oriented approach differ from object based approach? Give the applications of OOP. | 7M | CO1 | L1 |
| b) What are recursive constructors? Explain with an example | 7M | CO1 | L1 |

OR

- | | | | |
|--|----|-----|----|
| 2. a) What are merits and demerits of OO Methodology? | 7M | CO1 | L1 |
| b) How data and functions are organized in Object Oriented Program? Explain with an example. | 7M | CO1 | L1 |

UNIT-II

- | | | | |
|--|----|-----|----|
| 3. a) What is function overloading? What are the principles of function overloading? | 7M | CO2 | L1 |
| b) What is inheritance? Present the advantages and disadvantages of inheritance | 7M | CO2 | L1 |

OR

- | | | | |
|--|----|-----|----|
| 4. a) Explain operator overloading with the implementation of complex numbers. | 7M | CO2 | L2 |
| b) Illustrate runtime polymorphism using virtual functions. | 7M | CO2 | L2 |

UNIT-III

- | | | | |
|---|----|-----|----|
| 5. a) What are the primitive data types in Java? Write about type conversions. | 7M | CO3 | L1 |
| b) Write a java program to illustrate the usage of conditional statements and looping statements. | 7M | CO3 | L3 |

OR

- | | | | |
|--|----|-----|----|
| 6. a) Write a java program to illustrate the increment & decrement operators, shift operators and ternary operator. | 7M | CO3 | L3 |
| b) How to assign the values to the variables in the class during the time of creation of an object to that class? Explain with an example. | 7M | CO3 | L1 |

UNIT-IV

- | | | | |
|---|----|-----|----|
| 7. a) With a suitable Java program explain user-defined exception handling. | 7M | CO4 | L3 |
| b) How to define a package? How to access, import a package? Explain with examples. | 7M | CO4 | L1 |

OR

- | | | | |
|---|----|-----|----|
| 8. a) Explain the various access specifiers are used in java. | 7M | CO4 | L2 |
| b) Explain multilevel inheritance with the help of abstract class in your program | 7M | CO4 | L2 |

UNIT-V

- | | | | |
|--|----|-----|----|
| 9. a) What is the difference between a thread and a process? | 7M | CO4 | L1 |
| b) Explain the life cycle of an applet. | 7M | CO4 | L2 |

OR

- | | | | |
|--|----|-----|----|
| 10. a) Write a program to explain thread priorities usage. | 7M | CO4 | L3 |
| b) Write an Applet to draw a smiley picture accept user name as a parameter and display welcome message. | 7M | CO4 | L3 |

END

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III B.Tech. II Semester Regular & Supplementary Examinations July/August 2021

Radar Engineering

(Electronics and Communication Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

	Marks	CO	Blooms Level
UNIT-I			
1. a) List all the possible losses in a radar system and discuss the possible causes of each of them.	7M	1	L1
b) Describe the effect of pulse repetition frequency on the estimated unambiguous range of radar.	7M	1	L2
OR			
2. a) Derive fundamental radar range equation governed by minimum receivable echo power s_{min} .	7M	1	L1
b) Estimate the radar cross-section of a spherical target if the wavelength of transmitting signal with reference to the target size is in Rayleigh region.	7M	1	L4
UNIT-II			
3. a) With the help of a suitable block diagram, explain the operation of a CW radar with non-zero IF in the receiver..	7M	2	L2
b) Calculate the Doppler frequency of stationary CW radar transmitting at 6 MHz frequency when a moving target approaches the radar with a radial velocity of 100 Km/Hour	7M	2	L1
OR			
4. a) Write short notes on Range and Doppler measurement of a target using a FM-CW radar	7M	2	L1
b) Explain in detail the operation of FM-CW altimeter.	7M	2	L1
UNIT-III			
5. a) What are blind speeds? Suggest a method to reduce the effect of blind speeds for unambiguous detection of a moving target	7M	3	L2
b) Calculate the lowest blind speed of an MTI system operating at 4.2 cm wavelength and transmitting at a pulse repetition time of 286 μ s.	7M	3	L1
OR			
6. a) With the help of necessary block diagram explain the operation of an MTI radar system with a power amplifier in the transmitter.	7M	3	L1
b) Describe the method of staggering pulse repetition frequency to reduce the effect of blind speeds in an MTI system.	7M	3	L2
UNIT-IV			
7. a) Discuss the effect of surface quality and reflection characteristics of a target on the angular tracking accuracy of a tracking radar	7M	4	L3
b) Describe the Amplitude comparison monopulse tracking technique in a radar system with the help of necessary block diagram.	7M	4	L3
OR			
8. a) With the help of a suitable block diagram, Sequential lobing type of tracking technique in a tracking radar system.	7M	4	L2
b) Describe the process of acquiring a moving target prior to tracking it along with the patterns used for acquisition.	7M	4	L3
UNIT-V			
9. a) Derive the impulse response of a matched filter that is commonly used in a radar receiver.	7M	5	L4
b) Explain how a circulator can be utilized for a radar receiver protection.	7M	5	L3
OR			
10. a) Explain the principle behind the operation of duplexers and receiver protectors.	7M	5	L2
b) A radar receiver is connected to a 50 ohm resistance antenna that has an equivalent noise resistance of 30 ohms. Calculate the noise figure of the receiver and the equivalent noise temperature of the receiver.	7M	5	L1

END

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III B.Tech. II Semester Regular & Supplementary Examinations July/ Aug 2021

VLSI Design

(Electronics and Communication Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

	Marks	CO	Blooms Level
UNIT-I			
1. a) Write about Bi-CMOS fabrication with a diagram.	7M	CO1	L1,L2
b) Identify the differences between CMOS and Bipolar technologies.	7M	CO1	L1,L2
OR			
2. a) Explain about NMOS fabrication steps with neat diagrams.	7M	CO1	L1,L2
b) With neat sketches, explain how diodes and resistors are fabricated in PMOS process?	7M	CO1	L1,L2
UNIT-II			
3. a) Write about the stick diagrams and design a stick diagram for two input N-MOS NAND and NOR gates.	7M	CO2	L1,L2
b) Explain about the 2 nd MOS Design rules and discuss with a layout example	7M	CO3	L1,L2
OR			
4. a) Describe in detail about Layout design rules	7M	CO2	L1,L2
b) Draw the stick diagram and layout diagram for the CMOS gate computing. ((A+B+C).D)'	7M	CO3	L1,L2
UNIT-III			
5. a) Describe about the switch logic and alternate gate circuits used in VLSI.	7M	CO2	L1,L2
b) What are the alternate gate circuits available? Explain any one of them with suitable sketch.	7M	CO3	L1,L2
OR			
6. a) What is meant by sheet resistance Rs?	5M	CO2	L1,L2
b) Calculate on resistance of an inverter from VDD to GND. If n- channel sheet resistance Rsn=10 ⁴ per square and P-channel sheet resistance Rsp=3.5×10 ⁴ per square.(Zpu=4:4 and Zpd=2:2).	9M	CO3	L1,L3
UNIT-IV			
7. a) Describe the nature of a parity generator and explain its structured design approach	7M	CO3	L1,L2
b) Draw and give the design approach for a carry look ahead adder with its structure	7M	CO3	L1,L2
OR			
8. a) Explain the basic architecture of FPGA	7M	CO3	L1,L2
b) Explain about High density memory elements with neat diagrams.	7M	CO3	L1,L2
UNIT-V			
9. a) What is the need of testability? Explain design for testability	7M	CO3	L1,L2
b) What are the objectives of BIST?	7M	CO3	L1,L2
OR			
10. a) Explain test principles of VLSI circuits.	7M	CO3	L1,L2
b) Why stuck at faults occur in CMOS circuits? Explain with suitable logic diagram and layout?	7M	CO3	L1,L2

END