

Hall Ticket Number :									
----------------------	--	--	--	--	--	--	--	--	--

R-17

Code: 7G362

III B.Tech. II Semester Supplementary Examinations April 2023

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)

UNIT-I

1. Based on Maxwell's equations, derive the field equations and prove that TEM wave cannot exist in Rectangular Wave Guide? 14M

OR

2. a) List the various bands in microwave spectrum. Write the advantages and applications of microwaves 7M
b) A rectangular waveguide with dimension of 3x2 cms operates in TM₁₁ mode at 10GHz. Determine the characteristic wave impedance. 7M

UNIT-II

3. a) Derive expressions for Phase Velocity, Group Velocity, Guide Wavelength, and Wave Impedance in Circular Waveguides 7M
b) Calculate resonant frequency for a circular waveguide resonator having dia of 6cm and length = 1.62 cm for the modes TM₀₁₁, TE₀₁₁, TE₀₁₂. 7M

OR

4. a) Derive the Cut-off Wavelength in Circular Waveguide, Dominant and Degenerate Modes 7M
b) In a circular cavity, its resonant frequency for TE₁₀₁ mode is 5 GHz, if d = 2 a. Find its dimensions. 7M

UNIT-III

5. a) Derive the S- Parameters for E plane Tee. Assume that the T is lossless and reciprocal. 7M
b) What is directional coupler? Explain the operation of 2-hole directional coupler with neat diagram. Give the expressions for Coupling Factor and for Directivity. 7M

OR

6. a) Derive the S- Parameters of Magic Tee and list the various applications of Magic Tee 7M
b) In a magic tee the ports 1, 2, and 4 are having load such that the reflection coefficients in these arms are $\Gamma_1 = 0.5$, $\Gamma_2 = 0.6$, $\Gamma_4 = 0.8$. When we feed 10 W into fully matched port 3, find the reflected power in this arm 3 and the power outputs in remaining arms 7M

UNIT-IV

7. With a neat sketch, explain the structure and principle of operation of TWT Amplifier 14M

OR

8. a) Explain output power and efficiency in reflex klystron. 7M
b) With neat diagram explain the operation of helix TWT 7M

UNIT-V

9. a) Explain the basic principle behind Gunn diode. 7M
b) Explain the operation of IMPATT Diode 7M

OR

10. Using microwave test bench setup ,Explain the measurement of
i) Power ii) Q-factor 14M

Hall Ticket Number :

R-17

Code: 7G16D

III B.Tech. II Semester Supplementary Examinations April 2023

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)

UNIT-I

- | | Marks | CO | BL |
|--|-------|----|-----|
| 1. a) Define constructor and write a C++ program to implement types of constructors. | 7M | 1 | 1,6 |
| b) What is a reference variable? Explain the usage of reference variable. | 7M | 1 | 1,2 |

OR

- | | | | |
|---|----|---|-----|
| 2. a) What are constructors? Explain constructor overloading with an example program. | 7M | 1 | 1,2 |
| b) Describe the benefits offered by OOP. | 7M | 1 | 2 |

UNIT-II

- | | | | |
|---|----|---|-----|
| 3. a) Define Inheritance. Write a C++ program to demonstrate multiple inheritances. | 7M | 2 | 1,6 |
| b) What is mean by Overloading? Explain about function overloading with suitable program. | 7M | 2 | 1,2 |

OR

- | | | | |
|--|----|---|-----|
| 4. a) What is polymorphism? Explain with an example. | 7M | 2 | 1,2 |
| b) Explain about various manipulators of C++ language. | 7M | 2 | 2 |

UNIT-III

- | | | | |
|---|----|---|-----|
| 5. a) Distinguish between Java & C++. | 7M | 3 | 4 |
| b) List and Explain Data types in Java. | 7M | 3 | 1,2 |

OR

- | | | | |
|--|----|---|---|
| 6. a) Explain about decision making statements in Java. | 7M | 3 | 2 |
| b) Write a program to find the number of and sum of all integers greater than 150 and less than 250 that are divisible by 6. | 7M | 3 | 6 |

UNIT-IV

- | | | | |
|--|----|---|-----|
| 7. a) Write an example program to create threads using Thread class. | 7M | 4 | 6 |
| b) Describe interface. How can you implement interface in java? Explain with suitable program. | 7M | 4 | 1,2 |

OR

- | | | | |
|--|----|---|---|
| 8. a) Give a detail note on interfaces and packages in java with examples. | 7M | 4 | 1 |
| b) Write a java program to implement the built-in exception. | 7M | 4 | 6 |

UNIT-V

- | | | | |
|--|----|---|---|
| 9. a) Demonstrate the passing parameters to the applet with example. | 7M | 5 | 3 |
| b) Explain thread class extending in JAVA with suitable example. | 7M | 5 | 2 |

OR

- | | | | |
|---|----|---|-----|
| 10. a) How can you create a thread in java? Write a Java Program to create a thread using Thread Class. | 7M | 5 | 1,6 |
| b) Explain role of applet in designing a web page. | 7M | 5 | 2 |

Important Note: 1. On completing your answers. Compulsorily draw diagonal cross line on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 32+8=40, will be treated as malpractice.

Hall Ticket Number :									
----------------------	--	--	--	--	--	--	--	--	--

R-17

Code: 7G361

III B.Tech. II Semester Supplementary Examinations April 2023

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	BL
UNIT-I			
1. a) What is Fin FET? Apply fabrication principles to nMOS process with neat diagrams.	10M		
b) Identify the differences between CMOS and Bipolar technologies.	4M		
OR			
2. a) Derive the $I_{ds}-V_{ds}$ relationship of MOS transistor in saturated and non saturated regions.	7M		
b) Translate MOS transistor threshold voltage and transconductance (g_m).	7M		
UNIT-II			
3. a) Write in detail about lambda based and micrometre based design rules with neat sketches	7M		
b) Draw the stick diagram and layout for a CMOS 2-input NAND gate	7M		
OR			
4. a) Discuss in detail about scaling and derive scaling factors for various parameters	7M		
b) What is stick diagram and explain about different symbols used for components in stick diagram during nmos process	7M		
UNIT-III			
5. a) Explain different switch logic used for designing of VLSI circuits?	7M		
b) Derive an expression for sheet resistance (R_s) and apply the concept for Calculation of sheet resistance for CMOS inverter.	7M		
OR			
6. a) Write short notes on Wiring capacitances.	6M		
b) What is ONresistance?. Check and find the R_{on} for nMOS with $L:W=4:1$ for pull up transistor and $L:W=1:1$ for pull down transistor and for CMOS with $L:W =1:1$ for pull up transistor and $L:W =1:1$ for pull down transistor.	8M		
UNIT-IV			
7. a) With a neat diagram, explain Comparators	7M		
b) Draw a neat diagram of FPGA architecture and explain.	7M		
OR			
8. a) Design an array multiplier and discuss the merits and demerits with an example	7M		
b) With neat diagrams explain about High density memory elements	7M		
UNIT-V			
9. a) Explain the concept of design verification and design capture tools used in VHDL synthesis.	10M		
b) What are the objectives of BIST?	4M		
OR			
10. a) Describe stuck at '0' and stuck at '1' fault models with examples.	6M		
b) Explain about Built In Self-Test Techniques?	8M		

Hall Ticket Number :

--	--	--	--	--	--	--	--	--	--	--	--

R-17

Code: 7G364

III B.Tech. II Semester Supplementary Examinations April 2023

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 BL

UNIT-I

1. a) Check the following systems are time invariant or not
 i. $y(n) = n x(n)$ ii. $y(n) = x(2n)$ 7M CO1 L1
 b) Draw the block diagram of Digital Signal Processing and explain 7M CO1 L3

OR

2. a) Compute the DFT of the following sequence $x = [1, 1, 1, 1, 1, 1, 1, 1]$ 8M CO1 L2
 b) Check the following systems are Static, Causal i. $h(t) = te^{at}u(t)$ ii. $h(n) = e^{n/2}u(n-4)$ 6M CO1 L1

UNIT-II

3. Find the DFT of a sequence $x[n] = \{1, 2, 3, 4, 4, 3, 2, 1\}$ using:
 a) DIT algorithm b) DIF algorithm 14M CO2 L2

OR

4. a) Derive DIF - FFT algorithm for 8 point sequence and draw the butterfly diagram 7M CO2 L6
 b) Find the IDFT of the sequence using DIF algorithm $X(k) = \{10, -2+j2, -2, -2-j2\}$ 7M CO2 L2

UNIT-III

5. Consider an analog filter with transfer function

$$H(s) = \frac{1}{(s+1)(s^2+s+1)}$$

 Is this a Butterworth or Chebyshev filter? Obtain the transfer function of an IIR digital filter using impulse invariant transformation. Assume $T = 1$ Sec. 14M CO2 L1

OR

6. a) Realize the following system in direct form I, direct form II

$$H(Z) = \frac{1}{1 + a_1 z^{-1} + a_2 z^{-2}}$$
 9M CO2 L4
 b) Compare and contrast IIR and FIR filters. 5M CO2 L2

UNIT-IV

7. a) Discuss the Filter Design and Implementation for Sampling rate conversion. 9M CO3 L2
 b) Discuss Interpolation by a factor I. 5M CO3 L2

OR

8. a) Explain the Polyphase structure of decimator and interpolator. 7M CO3 L1
 b) Write in brief about applications of multi-rate signal processing. 7M CO3 L1

UNIT-V

9. a) What are the major blocks in Musical sound processing? Explain briefly 7M CO4 L1
 b) Describe spectral analysis of non-stationary signals in DSP. 7M CO4 L2

OR

10. Explain in detail about Musical Sound processing algorithm 14M CO4 L1

Hall Ticket Number :

--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

R-17

Code: 7G363

III B.Tech. II Semester Supplementary Examinations April 2023

Microprocessors and 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)

UNIT-I

- | | Marks | CO | BL |
|---|-------|----|----|
| 1. a) Discuss the concept of Memory Addressing in 8086 with some example. | 7M | 1 | L6 |
| b) Explain about memory segmentation in 8086 microprocessor. | 7M | 2 | L2 |

OR

- | | | | |
|---|----|---|----|
| 2. a) With a neat block diagram explain the architecture of 8086 processor. | 7M | 1 | L1 |
| b) Discuss about assembler directives with examples. | 7M | 1 | L6 |

UNIT-II

- | | | | |
|--|----|---|----|
| 3. a) Interface 8k x 8 SRAM and 8k x 8 EPROM to 8086. Use 74138 decoder. | 7M | 2 | L6 |
| b) Discuss about mode control word to program 8257 with an example. | 7M | 1 | L6 |

OR

- | | | | |
|--|----|---|----|
| 4. a) Distinguish between a memory read and write machine cycle. Draw the timing diagrams in minimum and maximum modes of operation. | 7M | 2 | L4 |
| b) Explain need of DMA. Discuss in detail about DMA transfer method. | 7M | 2 | L4 |

UNIT-III

- | | | | |
|---|----|---|----|
| 5. a) Explain the operation of 8255 PPI Port A programmed as input and output in Mode 1 with necessary handshaking signals. | 7M | 3 | L5 |
| b) Illustrate the D/A converter interfacing with 8086 μ P. | 7M | 3 | L2 |

OR

- | | | | |
|--|----|---|----|
| 6. a) Show and explain the ADC interfacing with 8086 Microprocessor. | 7M | 3 | L5 |
| b) Discuss Interrupt Structure with their features in 8086. | 7M | 3 | L6 |

UNIT-IV

- | | | | |
|---|----|---|----|
| 7. a) Draw the internal architecture of 8251 and interface with 8086. | 7M | 2 | L3 |
| b) Distinguish between synchronous and asynchronous data transfer. | 7M | 2 | L4 |

OR

- | | | | |
|---|----|---|----|
| 8. a) A terminal is transmitting asynchronous serial data at 1200 Bd. What is the bit time? Assuming 8 data bits, a parity bit and 1 stop bit, How long does it take to transmit one character? | 8M | 2 | L1 |
| b) Show architecture of 8253 device with its silent features. | 6M | 2 | L1 |

UNIT-V

- | | | | |
|---|-----|---|----|
| 9. Compare and contrast between 80286 and 80386 processors with respect to architectures. | 14M | 4 | L2 |
|---|-----|---|----|

OR

- | | | | |
|--|----|---|----|
| 10. a) Explain the internal block diagram of 80286. | 7M | 4 | L2 |
| b) Discuss the concept of paging in 80386 processor. | 7M | 4 | L2 |

Important Note: 1. On completing your answers. Compulsorily draw diagonal cross line on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 42+8=50, will be treated as malpractice.