Hall Ticket Number :

R-20

Code: 20A453T

III B.Tech. I Semester Regular & Supplementary Examinations December 2023

Microprocessors and Interfacing
(Electronics and Communication Engineering)

Max. Marks: 70   Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. In Part-A, each question carries **Two mark.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A
(Compulsory question)

1. Answer **all** the following short answer questions   (5 X 2 = 10M)   CO BL

   a) Discuss the functions of IP and SP in 8086?   1   1

   b) Explain assembler directives related to segments?   2   2

   c) Draw BSR control word register?   3   1

   d) Draw and explain the Control word of 8253?   4   2

   e) Compare Asynchronous and Synchronous data transfer schemes.   5   1

PART-B
Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

			Marks	CO	BL

UNIT–I

2. a) With a neat sketch, Explain the architecture of 8085 microprocessor?   6M   1   2

   b) What do you understand by arithmetic & logical instructions?   6M   1   1

OR

3.   With a neat sketch, Explain the architecture of 8086 microprocessor   12M   1   2

UNIT–II

4. a) Explain the Minimum mode of operation of 8086 microprocessor?   6M   2   2

   b) Draw and explain clearly the Read cycle timing diagram under the Minimum mode system?   6M   2   4

OR

5. a) It is required to interface 32KX8 RAM to 8086. Give suitable scheme?   6M   2   6

   b) Draw internal architecture of 8257 DMA controller and explain its programming features?   6M   2   2

UNIT–III

6.   With the help of block diagram, explain the PPI.   12M   3   2

OR

7. a) Explain how Stepper Motor controller can be connected to Microprocessor?   6M   3   6

   b) Explain the different operational modes of 8255?   6M   3   2

UNIT–IV

8. a) Explain Interrupt structure of 8086.   6M   4   2

   b) Explain any three operating modes of 8253 timer.   6M   4   2

OR

9. a) With the help of block diagram explain about 8259?   6M   4   2

   b) With neat diagram explain the interfacing 8253 with 8086 processor?   6M   4   6

UNIT–V

10. a) Why are the two ground pins on an RS-232C connector not just jumper together? Explain?   6M   5   4

   b) A terminal is transmitting asynchronous serial data at 1200Bd. 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?   6M   5   4

OR

11. a) Draw the block diagram of 8251 and explain each block?   6M   5   2

   b) Explain in detail about IEEE – 488 GPIB interface?   6M   5   2

*** End ***

Code: 20A45BT

R-20

III B.Tech. I Semester Regular & Supplementary Examinations December 2023
Nano Electronics
(Electronics and Communication Engineering)

Max. Marks: 70   Time: 3 Hours
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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
      2. In Part-A, each question carries **Two marks.**
      3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A
(Compulsory question)

1. Answer *all* the following short answer questions (5 X 2 = 10M)   CO   BL

   a) Classify nanomaterials and give examples for them   CO1   L3
   b) What are the various applications of quantum well devices   CO2   L2
   c) What is short channel MOS Transistor   CO3   L2
   d) Explain briefly about Tunneling diode   CO4   L2
   e) Mention the Limits of Nano Integrated Electronics   CO5   L2

PART-B
Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

                                                                 Marks   CO   BL

UNIT-I

2. a) Explain the principle of functioning of scanning electron
      microscopy   6M   CO1   L2
   b) Analyze electron microscopic techniques are useful in
      characterization of nano materials   6M   CO1   L4

OR

3. a) Explain the features and working of optical microscope.   6M   CO1   L2
   b) Analyze the mechanical properties of nano materials   6M   CO1   L4

UNIT-II

4. a) Explain the applications of quantum dots   6M   CO2   L2
   b) Discuss the role of quantum mechanics in nanotechnology   6M   CO2   L2

OR

5. a) Analyze split gate technology   6M   CO2   L4
   b) Analyze Electron beam lithography with a neat sketch   6M   CO2   L4

UNIT-III

6. a) Explain the principle and operation of Electron wave
      Transistor   6M   CO3   L2
   b) Discuss the device applications of quantum dot array   6M   CO3   L2

OR

7. a) Analyze the limitations of short channel MOSFET   6M   CO3   L4
   b) Explain Quantum-dot Cellular Automata   6M   CO3   L2

UNIT-IV

8. a) Analyze V_I characteristics of Tunneling diode   6M   CO4   L4
   b) Explain the applications of Tunneling diode   6M   CO4   L2

OR

9. a) Explain three terminal RTDs technology   6M   CO4   L2
   b) Explain the Coulomb blockade phenomenon   6M   CO4   L2

UNIT-V

10. a) Explain Energy supply and heat dissipation in Integrated
    Electronics   6M   CO5   L2
    b) Explain thermal particle motion in Integrated Electronics   6M   CO5   L2

OR

11. a) Analyze Debye length in semiconductors   6M   CO5   L2
    b) Explain the hardware requirements of nano systems   6M   CO5   L2

*** End ***

Hall Ticket Number :

Code: 20A45DT

III B.Tech. I Semester Regular & Supplementary Examinations December 2023

Pulse and Digital Circuits

(Electronics and Communication Engineering)

Max. Marks: 70   Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. In Part-A, each question carries **Two mark.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A
(Compulsory question)

			CO	BL
1.	Answer **all** the following short answer questions	(5 X 2 = 10M)		
	a) What is the role of attenuator in CRO probes?		1	1
	b) Define 'ON' time and 'OFF' time of a transistor in terms of transistor switching times?		2	2
	c) Define the types of states in multi vibrators.		2	1
	d) Define the slope or sweep-speed error.		3	2
	e) What is meant by sampling gate and give its applications?		3	3

PART-B
Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

		Marks	CO	BL

UNIT–I

			Marks	CO	BL
2.	a)	Prove that et = T/2RC for ramp as input to the High pass RC-Circuit?	6M	1	1
	b)	A square wave whose peak to peak amplitude is 4 V extends ±2 V with respect to ground. The duration of the positive section is 0.3 s and that of the negative section is 0.1 s. If this waveform is impressed upon an RC differentiating network whose time constant is 0.3 s, what are the steady state maximum and minimum values of the output waveform?	6M	1	2

OR

			Marks	CO	BL
3.	a)	Explain the response of high pass circuit for square wave input.	6M	1	1
	b)	Draw the response of an RC high pass circuit when applied with exponential input. Explain the response for different time constants.	6M	1	2

UNIT–II

			Marks	CO	BL
4.	a)	State and prove clamping circuit theorem.	5M	2	1
	b)	A symmetrical 50 Hz square wave whose peak to peak excursions are ± 100 V with respect to ground is to be negatively clamped at 25 V. Draw the necessary circuit diagram and output waveform for this purpose.	7M	2	2

OR

5. a) Explain the working of negative clamping circuit. 5M 2 3

   b) Design a diode clamper to restore the negative peaks of the input signal to zero level. Use a silicon diode with Rf = 50 and Rr = 400 k . The frequency of the input signal is 5 kHz. 7M 2 1

UNIT–III

6. a) With the aid of circuit diagram, and necessary derivations show that a collector coupled astable multivibrator can function as a voltage to frequency converter. 6M 2 1

   b) Design a Schmitt trigger circuit to have UTP = 6 V, LTP = 3 V using silicon transistors whose hFE(min)=30, and IC(on)=4mA. Assume necessary data. 6M 2 2

OR

7. a) Explain about direct connected binary. Write the advantages and disadvantages of it. 5M 2 1

   b) Design astable multi vibrator to generate a square wave of 1 kHz frequency with a duty cycle of 25% using silicon n-p-n transistors with hFE(min) = 40. 7M 2 3

UNIT–IV

8. a) Explain the working of transistor based Bootstrap time base generator circuit, and draw the necessary waveforms. 6M 3 1

   b) Draw and clearly indicate the restoration time and flyback time on the typical waveform of a time base voltage. 6M 3 2

OR

9. a) Explain the working principle of Miller sweep circuit. 6M 3 3

   b) Explain the working principle of Boot-strap –time base generator. 6M 3 1

UNIT–V

10. a) Draw and explain the reduction of pedestal techniques in a gate circuit. 6M 3 1

    b) Design and verify the truth table of two input DTL NAND gate with the circuit diagram 6M 3 6

OR

11. a) With neat circuit diagram, Explain bidirectional sampling gate using transistors. 6M 3 3

    b) Explain about unidirectional diode sampling gate. Write its advantages and disadvantages. 6M 3 1

*** End ***

III B.Tech. I Semester Regular & Supplementary Examinations December 2023

VLSI Design

(Electronics and Communication Engineering)

Max. Marks: 70   Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
      2. In Part-A, each question carries **Two marks.**
      3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A
(Compulsory question)

		CO	BL
1. Answer *all* the following short answer questions (5 X 2 = 10M)			
a) Write down the equations for Ids of an n-channel enhancement MOSFET operating in Non-saturated region and saturated region?		CO1	BL2
b) Define stick diagram and layout diagram?		CO2	BL1
c) Explain working of magnitude comparator		CO3	BL2
d) Draw the basic structure of a dynamic CMOS gate?		CO4	BL1
e) What are the special features of design verification tools?		CO5	BL1

PART-B
Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

	Marks	CO	BL

UNIT–I

	Marks	CO	BL
2. Explain clearly about NMOS fabrication process flow with neat diagrams.	12M	CO1	BL2

OR

	Marks	CO	BL
3. Draw the V-I characteristics of MOSFET and prove that I_{ds} is linear function of V_{ds} and derive its expression.	12M	CO1	BL1

UNIT–II

	Marks	CO	BL
4. a) Draw the stick diagram and layout for a CMOS 2-input NAND gate	6M	CO2	BL3
b) Write short notes on driving large capacitive loads.	6M	CO2	BL2

OR

	Marks	CO	BL
5. a) Explain the 2µm CMOS design rules for contacts and transistors.	6M	CO2	BL2
b) Briefly discuss about scaling of MOS circuits and its limitations	6M	CO2	BL4

UNIT–III

6. a) Explain different switch logic used for designing of VLSI circuits.   6M CO3 BL3

   b) Derive an expression for sheet resistance R_S and apply the concept for calculation of sheet resistance for CMOS inverter.   6M CO3 BL3

OR

7. What are the alternate gate circuits are available? Explain them with suitable sketch   12M CO3 BL1

UNIT–IV

8. Explain the working principle of 6-transistor static RAM and 1-transistor dynamic RAM with necessary diagrams.   12M CO4 BL2

OR

9. Explain in detail about design flow of FPGA.   12M CO4 BL2

UNIT–V

10. a) Write a short note on design methods.   6M CO5 BL2

    b) Give comparison of design capture tools and design verification tools.   6M CO5 BL4

OR

11. Explain in detail about test principles.   12M CO5 BL2

*** End ***

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Code: 20A452T

III B.Tech. I Semester Regular & Supplementary Examinations December 2023

Control Systems

(Electronics and Communication Engineering)

Max. Marks: 70   Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
       2. In Part-A, each question carries **Two marks.**
       3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

1. Answer **all** the following short answer question (5 X 2 =10M)   CO   BL

a) Define open loop and closed loop control system by giving suitable examples.   CO1   L1

b) The dynamic behaviour of the system is described by the equation
$\frac{dC}{dt} + 10C = 40e$, where 'e' is the input and output. Determine the transfer
function of the system   CO2   L3

c) What is value of error in the approximate magnitude plot of a first order factor
at the corner?   CO3   L2

d) What are M and N circles?   CO4   L2

e) Write the general form of the state-transition matrix. How many constants
would have to be found?   CO5   L1

PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

                                                                         Marks   CO   BL

UNIT–I

2. a) Enumerate the properties of signal flow graph.   4M   CO1   L1

   b) Reduce the given block diagram to its canonical (simple) form
      and hence the equivalent transfer function $\frac{C(s)}{R(s)}$.
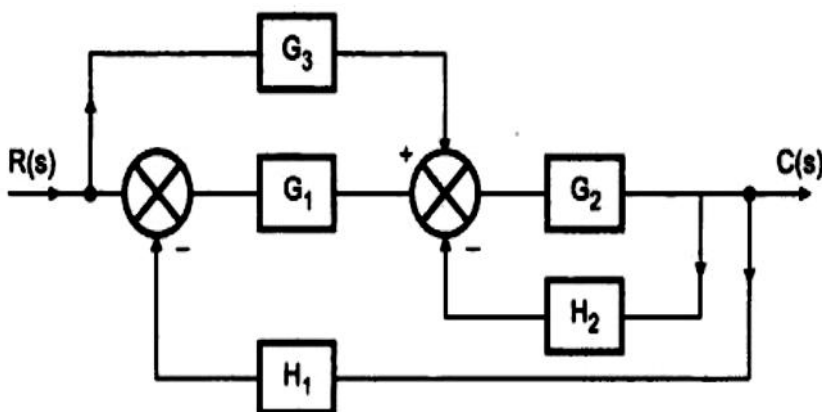
                                                                          8M   CO1   L3

OR

3. Find the $\dfrac{C(s)}{R(s)}$ for S.F.G shown in following figure.
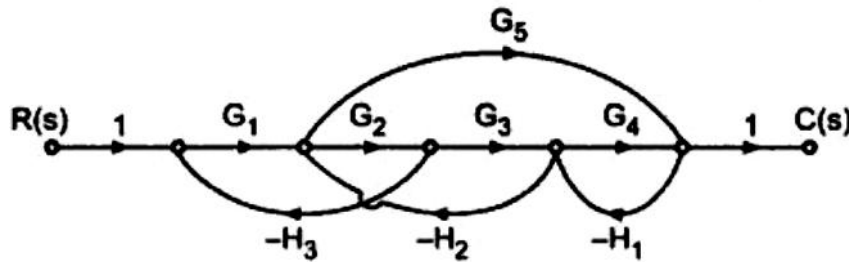
12M CO1 L3

UNIT–II

4. a) Derive the expression for steady state error for second order system with unit ramp signal. 5M CO2 L2

    b) For the unity feedback system having $G(s) = \dfrac{10(s+1)}{s^2(s+2)(s+10)}$

    Determine: i) Type of the system   ii) Error coefficients

    iii) Steady state error for input as $1+4t+\dfrac{t^2}{2}$ 7M CO2 L3

OR

5. a) Express the time domain specifiations of second order system. 6M CO2 L2

    b) For the unity feedback system $G(s) = \dfrac{200}{s(s+8)}$ and $r(t) = 2t$

    determine steady state error. If it is desired to reduce this existing error by 5% find new value of gain of the system. 6M CO2 L3

UNIT–III

6. a) Determine the stability of the system whose characteristic equation is $3s^4 + 10s^3 + 5s^2 + 5s + 2 = 0$, using Routh stability criterion. 6M CO3 L5

    b) Determine the stability of the system having the characteristic equation
    $s^6 + 2s^5 + 8s^4 + 12s^3 + 20s^2 + 16s + 16 = 0$ 6M CO3 L3

OR

7. Sketch the root locus plot of the system whose open loop transfer function is given by

    $G(s)H(s) = \dfrac{K}{s(s+4)(s^2+4s+13)}$.

    12M CO3 L4

UNIT–IV

8. a) Discuss the advantages of the Bode plot technique. 4M CO4 L2

   b) Consider the unity feedback system having an open loop function, $G(s) = \dfrac{k}{s(1+0.5s)(1+4s)}$, sketch the polar plot and determine the value of "k" so that (i) Gain margin is 20db and (ii) Phase margin is 30^0. 8M CO4 L3

OR

9. A certain system transfer function is

   $G(s)H(s) = \dfrac{75(1+0.2s)}{s(s^2+16s+100)}$ using Bode plots, find gain margin and phase margin. Comment on stability. 12M CO4 L3

UNIT–V

10. a) Discuss about the properties of the state transition matrix 4M CO5 L2

    b) The state equation of linear-time invariant system is given by

    $$\begin{bmatrix} \dot{X}_1 \\ \dot{X}_2 \end{bmatrix} = \begin{bmatrix} 0 & 5 \\ -1 & -2 \end{bmatrix} \begin{bmatrix} X_1 \\ X_2 \end{bmatrix} + \begin{bmatrix} 1 \\ 1 \end{bmatrix} u \text{ and } Y = \begin{bmatrix} 1 & 1 \end{bmatrix} X$$

    Determine state transition matrix. 8M CO5 L3

OR

11. a) Determine the controllability and observability for the transfer function given below

    $$\begin{bmatrix} \dot{X} \end{bmatrix} = \begin{bmatrix} 0 & 3 \\ -2 & -5 \end{bmatrix} \begin{bmatrix} X \end{bmatrix} + \begin{bmatrix} 1 & 1 \\ 1 & 1 \end{bmatrix} \begin{bmatrix} U \end{bmatrix} \text{ and } Y = \begin{bmatrix} 2 & 1 \\ 1 & 0 \end{bmatrix} X$$ 6M CO5 L3

    b) A state model of a system is given as:

    $$\begin{bmatrix} \dot{X} \end{bmatrix} = \begin{bmatrix} 0 & 1 & 0 \\ 0 & 0 & 1 \\ -1 & -3 & -3 \end{bmatrix} \begin{bmatrix} X \end{bmatrix} + Y = \begin{bmatrix} 0 \\ 0 \\ 1 \end{bmatrix} U \text{ and } Y = \begin{bmatrix} 1 & 0 & 0 \end{bmatrix} X$$

    Determine (i) Eigen values (ii) State transition matrix. 6M CO5 L3

*** End ***

Code: 20A25FT

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III B.Tech. I Semester Regular & Supplementary Examinations December 2023
Electric Vehicles
(Common to ME and ECE)

Max. Marks: 70   Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
    2. In Part-A, each question carries **Two marks.**
    3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A
(Compulsory question)

		CO	BL
1. Answer *all* the following short answer questions (5 X 2 = 10M)			
a)	Differentiate between hybrid vehicle and plug in hybrid vehicle.	CO1	L2
b)	What is Propulsion power?	CO2	L1
c)	Define state of charge.	CO3	L1
d)	Write the criteria for selection of EV motors.	CO4	L1
e)	Define converter.	CO5	L1

PART-B
Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

			Marks	CO	BL

UNIT-I

			Marks	CO	BL
2.	a)	With help of Block Diagram explain major components of electric vehicle	6M	CO1	L1
	b)	Compare petrol and electric vehicle with their merits and demerits.	6M	CO1	L2
		OR			
3.	a)	Explain about the history of hybrid and electric vehicles.	8M	CO1	L2
	b)	Write short notes of future of EVs.	4M	CO1	L1

UNIT-II

			Marks	CO	BL
4.	a)	Explain the laws of motion of vehicle.	6M	CO2	L2
	b)	Explain the concept of energy consumption of EV.	6M	CO2	L2
		OR			
5.	a)	Which are the resistive forces that retard the motion of a four wheel vehicle? Show with a diagram.	6M	CO2	L2
	b)	Write short notes on i) specific energy ii) specific power	6M	CO2	L1

UNIT-III

			Marks	CO	BL
6.	a)	What are battery parameters? Explain each briefly.	6M	CO3	L1
	b)	Explain Lead- acid battery batteries schematic and physical structure	6M	CO3	L2
		OR			
7.		Explain with a neat sketch the working principle of Li-ion battery used in EV	12M	CO3	L2

UNIT-IV

			Marks	CO	BL
8.		Draw and explain the block diagram of switched reluctance motor drive system.	12M	CO4	L1
		OR			
9.		Explain with a neat block diagram the torque control of BLDC motor	12M	CO4	L2

UNIT-V

			Marks	CO	BL
10.		Explain the working of DC-DC converter with neat diagram	12M	CO3	L1
		OR			
11.		Explain the working of DC-AC converter with neat diagram	12M	CO3	L2

*** End ***

R-20

Code: 20AE5AT

III B.Tech. I Semester Regular & Supplementary Examinations December 2023

Human Resource Management
(Common to CE, EEE & ECE)

Max. Marks: 70   Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
     2. In Part-A, each question carries **Two marks.**
     3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A
(Compulsory question)

		CO	BL
1. Answer *all* the following short answer questions (5 X 2 = 10M)			
a) Define Human Resource Management		1	1
b) What is Job Analysis?		2	1
c) Write a short note on Recruitment.		3	1
d) What are the Benefits of Employee Training		4	1
e) What is Industrial Relations?		5	1

PART-B
Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

		Marks	CO	BL
UNIT–I				
2.	What is meant by HRM? Explain scope and functions of HRM.	12M	1	2
	OR			
3.	Explain Competitive challenges influencing HRM	12M	1	2
UNIT–II				
4.	Briefly explain the concept of Human Resource Planning? Describe Human Resource Planning Process.	12M	2	2
	OR			
5. a)	Discuss Human Resource Information System.	6M	2	2
b)	Explain methods of collecting job data	6M	2	2
UNIT–III				
6.	What is the process of Recruitment? Explain?	12M	3	2
	OR			
7.	Explain Nature of Selection and Selection Process.	12M	3	2
UNIT–IV				
8.	Explain the stages of Career Development.	12M	4	2
	OR			
9.	Differentiate between Training and Development. Explain the process of identifying training needs.	12M	4	3
UNIT–V				
10.	Explain Wage policy in India	12M	5	2
	OR			
11.	Critically evaluate any five performance appraisal methods.	12M	5	2

*** End ***