MANAV RACHNA UNIVERSITY

END SEMESTER EXAMINATION

SCHOOL OF ENGINEERING

ECE

DECEMBER – 2023

(1st /3rd /5th /7th)

INDEX to PYQs (Acc. To PDF)

MANAV RACHNA UNIVERSITY

MANAV RACHNA UNIVERSITY
SCHOOL OF SCIENCES
DEPARTMENT OF SCIENCES
"End Semester Examination, Dec-2023"

SEMESTER	**I**	**DATE OF EXAM/SESSION**	11.12.2023 (I)
COURSE NAME	**Probability and Statistics**	**COURSE CODE**	**MAH124B-T**
PROGRAM	**B.Tech.**	**CREDITS**	**4**
TIME DURATION	**3 Hrs.**	**MAX. MARKS**	**100**
NAME OF FACULTY	**Dr. Ramapati Maurya**	**NAME OF COURSE COORDINATOR**	**Dr. Advin Masih**

Note: All questions are compulsory

Q.NO.		QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART-A	1(A)	A couple has two children. Find the probability that both are boys, if it is known that at least one of the children is boy.	5	CO1	BT2	1.1.1 1.1.2
	1(B)	A bag contains 8 items of which 2 are defective. A man selects 3 items at random. Find the expected number of defective items he had drawn.	5		BT2	1.2.1 1.1.2
	1(C)	Two cards are drawn successively with replacement from a well shuffled pack of 52 cards. Find the mean and variance of the number of Kings.	5			1.1.1 1.1.2
PART-B	2(A)	Consider a sample of size 2 drawn without replacement from an urn containing three ball numbered 1,2 and 3 . Let X be the number on the first ball drawn and Y the larger of the two number drawn a) Find joint discrete density function of X and Y b) Find $\rho[X, Y]$	5	CO2	BT3	1.2.1 1.1.2
	2(B)	In a normal distribution 31% of the items are under 45 and 8% are over 64. Find mean and standard deviation of the distribution.	5		BT3	1.1.1 1.2.1
	2(C)	X and Y are two random variables having joint density function = $\frac{1}{27}(2x + y)$ where x and y can assume only integer value 0, 1 and 2. Find the conditional distribution of Y for X= x.	5		BT3	1.2.1 1.2.1

****

PART-C

3(A) Find the missing frequency from the following data , it is being given that 19.92 is the average number of tablets for being cured

No. of Tablets	No of Persons cured	No. of Tablets	No of Persons cured
4-8	11	24-28	9
8-12	13	28-32	17
12-16	16	32-36	6
16-20	14	36-40	4
20-24	?		

9 | CO3 | BT3 | 1.1.1 1.1.2

3(B) Find the Lower quartile (Q_1) and upper quartile(Q_3) from the following data

Overtime Hours	Number of Employees	Overtime Hours	Number of Employees
20-25	50	40-45	150
25-30	70	45-50	120
30-35	100	50-55	70
35-40	180	55-60	60

9 | BT4 | 1.2.1 1.1.2

3(C) A random sample of 5 students were selected and their grades in Mathematics and Statistics were found to be

	1	2	3	4	5
Maths.	85	60	73	40	90
Stats.	93	75	65	50	80

Calculate Spearman's rank correlation coefficients.

8 | BT4 | 1.1.1 1.1.2

3(D) From the given data obtain two regression equations using the method of least squares

X	2	4	6	8	10
Y	5	7	9	8	11

9 | BT3 | 1.2.1 1.1.2

PART-D

4(A) Fit a second degree parabola to the following data

x	1929	1930	1931	1932	1933	1934	1935	1936	1937
y	352	356	357	358	360	361	361	360	359

12 | CO4 | BT4 | 1.1.1 1.1.2

4(B) The demand for a particular spare part in a factory was found to vary from day to day as given below. Test the hypothesis that the number of parts demanded does not depends on the day of the week

Days	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.
No. of Parts demanded	124	125	110	120	126	115

11 | BT3 | 1.2.1 1.1.2

****

4(C)	To test whether extra classes in mathematics improved performance , a similar test was given to 11 students, their scores both before and after the extra classes are given Test 5% level of significance if the extra classes were useful in terms of performance on the test.	12		BT4	1.1.1 1.1.2

Before	23	20	19	21	18	20	18	17	23	16	19
After	24	19	21	18	20	22	20	20	23	20	17

********** END **********

****

MANAV RACHNA UNIVERSITY
SCHOOL OF SCIENCES
DEPARTMENT OF SCIENCES
"End Semester Examination, Dec-2023"

SEMESTER	**I**	**DATE OF EXAM/SESSION**	11.12.2023 (I)
COURSE NAME	**Calculus and Linear Algebra**	**COURSE CODE**	**MAH101B-T**
PROGRAM	**B.Tech CSE, R & AI**	**CREDITS**	**4**
TIME DURATION	**3 hrs**	**MAX. MARKS**	**100**
NAME OF FACULTY	**Dr. Kamlesh Kumar**	**NAME OF COURSE COORDINATOR**	**Dr. Ramapati Maurya**

Note: All questions are compulsory.

Q.NO.		QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
UNIT-I	1(A)	Using Taylor's series, compute the value of $\sin 31^0$ to four decimal places.	5	CO1	BT2	1.1.1 1.1.2
	1(B)	Find the radius of curvature of the curve $y = e^x$ at the point where it crosses the y-axis.	5	CO1	BT1	1.2.1 1.1.2
	1(C)	If $u = \frac{x^2y}{x+y}$, show that $x\frac{\partial^2 u}{\partial x^2} + y\frac{\partial^2 u}{\partial y \partial x} = \frac{\partial u}{\partial x}$.	5	CO1	BT2	1.1.2
UNIT-II	2(A)	Evaluate $\int_0^1 \int_x^{\sqrt{2-x^2}} \frac{x\,dy\,dx}{\sqrt{x^2+y^2}}$ by changing the order of integration.	5	CO2	BT2	1.1.1 1.1.2
	2(B)	Find the volume of the solid generated by the revolution of the plane area bounded by $y^2 = 9x$ and $y = 3x$ about the x-axis.	5	CO2	BT3	1.1.1
	2(C)	Evaluate $\int\int\int (x+y+z)dx\,dy\,dz$ over the tetrahedron bounded by the planes $x = 0, y = 0, z = 0$ and $x + y + z = 1$.	5	CO2	BT2	1.1.1 1.1.2
UNIT-III	3(A)	Test whether the following matrix is invertible. If so, use Gauss-Jordan method, to find the inverse of the matrix $A = \begin{bmatrix} 2 & 0 & -1 \\ 5 & 1 & 0 \\ 0 & 1 & 3 \end{bmatrix}$. Also verify $AA^{-1} = I_3$.	9	CO3	BT3	1.1.1 1.1.2
	3(B)	Test for the consistency of the following equations and if possible find the solution: $x + y + z = 3$	14	CO3	BT4	1.2.1 1.1.2

****

		$x + 2y + 3z = 4$ $x + 4y + 9z = 6.$				
	3(C)	Find two non-singular matrix P and Q such that PAQ is in the normal form for the matrix $A = \begin{bmatrix} 2 & 1 & -3 & 6 \\ 3 & -3 & 1 & 2 \\ 1 & 1 & 1 & 2 \end{bmatrix}$.	12	CO3	BT4	1.1 1.1
PART-D	4(A)	Are the following vectors linearly dependent? If so, find a relation between them. $X_1 = (1,2,1), X_2 = (2,1,4), X_3 = (4,5,6).$	9	CO4	BT4	1.1. 1.1.
	4(B)	Find the Eigen values and Eigen vectors of the matrix $A = \begin{bmatrix} 3 & 1 & 4 \\ 0 & 2 & 0 \\ 0 & 0 & 5 \end{bmatrix}$.	14	CO4	BT3	1.2. 1.1.
	4(C)	Verify Cayley Hamilton theorem for the matrix $A = \begin{bmatrix} 1 & 0 & 2 \\ 0 & 2 & 1 \\ 2 & 0 & 3 \end{bmatrix}$ and hence find A^{-1}.	12	CO4	BT3	1.1. 1.1.

********** END **********

****

MANAV RACHNA UNIVERSITY

MANAV RACHNA UNIVERSITY
SCHOOL OF SCIENCES
DEPARTMENT OF SCIECNES (Program-Physics)
"End Semester Examination, Dec-2023"

SEMESTER	1st	DATE OF EXAM/SESSION	14.12.2023 (I)
COURSE NAME	Quantum Mechanics for Engineers	COURSE CODE	PHH101B-T
PROGRAM	B.Tech. CSE A/B/C/R&AI	CREDITS	4
TIME DURATION	3hrs	MAX. MARKS	100
NAME OF FACULTY	Dr. Jaiparkash	NAME OF COURSE COORDINATOR	Dr. Jaiparkash

Note: "All questions are compulsory. *SET –A*

	Q. No.	QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART-A	1(a)	What voltage must be applied to an electron to produce electrons of wavelength o 0.5 Å?	2	CO1	BT3	
	1(b)	Calculate the de-Broglie wavelength associated with electrons, which are accelerated by a voltage of 50kV.	3		BT3	
	1(c)	What is the minimum uncertainty in the energy state of an atom if an electron remains in this state for 10^{-8}sec?	3		BT3	
	1(d)	Derive an expression for time dependent Schrodinger wave equation.	7		BT2	
PART-B	2	Find the probability of finding a particle in a region 0 · 4L to 0.6L trapped in an infinite potential well of width L.	5	CO2	BT3	
	3	Solve Schrodinger equation for a particle confined to an infinite potential box of width 'L' in order to derive the expression for energy eigen values.	10		BT2	
PART-C	4	Apply Schrödinger wave equation to find the eigen values and eigen functions for a particle trapped in three dimensional potential box.	10	CO3	BT3	
	5(a)	Calculate the energy difference between the first two rotational energy levels of the $^{12}C^{16}O$ molecule if the intermolecular separation is 1.2 Å. Assume the molecule to be rigid rotator. (Given: h = 6.63×10^{-34} Js, N_A= 6.02×10^{23})	5		BT4	
	5(b)	Apply the Schrodinger equation for the H- atom and hence obtain the solution for θ and ϕ – dependent parts, respectively.	10+3		BT2	
	6	Show that $[L_x, L_y] = i\hbar L_z$.	7		BT3	
PART-D	7	Realize the basic logic classical gates (NAND, NOR and NOT logic gates) along with truth table using diode and transistor logics.	5+5+5=15	CO4	BT2	
	8	Write the notes on the following: (i) Entropy (ii) Entanglement (iii) Qubits (iv) $(1010)_{10}$= ( )$_2$	2.5×4=10		BT2, BT3	
	9	Discuss the following: (i) Identity gate, (ii) Identity gate, (iii) Phase shift gate, (iv) Hadamard gate (v) CNOT gate	2×5=10		BT2	

END

****

MANAV RACHNA UNIVERSITY

DEPARTMENT OF COMPUTER SCIENCE & TECHNOLOGY

SEMESTER (I)

END TERM EXAMINATION

COURSE NAME: Introduction To Information Security	COURSE CODE: CSH109B-T	CREDIT: 4	MAX. MARKS:100	TIME DURATION:3 Hrs	DATE OF EXAM: 14.12.2023
PROGRAM: B.Tech (CSTI)		SEMESTER: 1st			
FACULTY NAME: Ms. Sanjeeda Saifi			NAME OF COURSE COORDINATOR: Mr. Agha Imran Husain		

	Q.NO.	QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART-A	1(A)	What are the primary objectives of information security? Explain with the help of example.	2	CO1	L2	1.1.1
	1(B)	What is the difference between Attacker and Defender? Support your answer with the help of case senarios.	2	CO3	L3	1.1.2
	1(C)	An organization wants to check the possible vulnerabilities in the network and server so what can you suggest and name of tools?	2	CO1	L4	1.1.1
	1(D)	What do you understand by Phishing? What are the possible countermeasure to save ourselves from phishing?	2	CO3	L3	1.1.2
	1(E)	Explain the term cyber stalking with the help of real-life case scenario	2	CO3	L3	1.2.1
	1(F)	What do you understand by the sociology of cyber criminals? Explain with the help of a case study.	2	CO2	L3	1.2.2
	1(G)	Explain the terms Risk, Threat, and Vulnerability with the help of real-life case scenarios.	2	CO1	L2	1.2.3
	1(H)	What are the differences between White Hat hackers and Black Hat hackers? Give a real-life example to support your answer.	2	CO3	L3	1.2.1
	1(I)	What do you understand by Distribution Attack? Why it is hard to track and counter?	2	CO3	L3	1.2.1
	1(J)	What do you understand by insider attacks? Explain each with the help of suitable examples.	2	CO1	L2	1.2.2
PART-B	2(A)	A fresh graduate who just put his/her first step toward cyber security comes under which type of hacker? Which OS will be helpful in cyber security?	2	CO1	L4	2.2.1
	2(B)	Write a short on IT Act 2000 with suitable case study.	4	CO2	L3	2.1.2
	2(C)	What do you understand by Ethical Hacking? Explain with the help of example.	4	CO2	L2	2.1.1

PART - C	3(A)	What do you understand by the term CIA Triad? What are the different elements of information security? How Parkerian Hexad is better compared to CIA Triad. Explain with suitable examples.	10	CO1	L3	2.1.3
	3(B)	Briefly explain the different job roles available in the field of information security. Which job role will be suitable for you and why. Support your answer with the help of real-life case scenarios.	10	CO2	L4	2.2.2
	3(C)	Explain different types of hackers in information security. Which type of hacker inspires you the most and why. Give suitable case studies or examples to support your answer.	10	CO3	L4	2.1.2
	3(D)	An organization wants to implement RBAC for restricting its network access. What are your view and benefits of the RBAC over other types of Access control?	10	CO4	L4	2.1.2
PART - D	4(A)	What do you understand by the term VAPT? Explain various steps involved in VAPT with suitable examples.	10	CO1	L2	3.1.1
	4(B)	Explain all the terms mentioned below with the help of case study: 1. Ethics 2. Morals 3. Values 4. Law	10	CO2	L3	3.2.1
	4(C)	**Scenario:** You have recently been appointed as the Information Security Officer for a multinational technology corporation. The organization is undergoing a digital transformation, and there's a need to enhance awareness of information security jargon among employees. Develop a scenario-based plan to educate employees on key information security jargon, emphasizing their relevance in the context of the company's evolving digital landscape. **Question:** As the Information Security Officer, outline a scenario-based plan to educate employees on essential information security jargon. Choose three pieces of jargon relevant to the organization's digital transformation, and provide real-world scenarios to illustrate the practical application of each term. How would you ensure that employees not only understand these jargon but also incorporate them into their daily work practices to enhance information security?	10	CO3	L5	3.2.2
	4(D)	What are the difference between Mandatory Access Control and Discretionary Access Control? Give a suitable example to support your answer.	10	CO4	L3	4.1..1

********** END **********

MANAV RACHNA UNIVERSITY

MANAV RACHNA UNIVERSITY

SCHOOL OF LAW

DEPARTMENT OF LAW

"End Semester Examination, Dec-2023"

SEMESTER	I/III	DATE OF EXAM	15/12/2023 (II)
COURSE NAME	Indian Constitution	COURSE CODE	LWS324
PROGRAM	B.Tech CSE/ECE/ME	CREDITS	
TIME DURATION	1:30 hours	MAX. MARKS	60
NAME OF FACULTY	Mr. Shubhank Sanjeev, Mr. Bharatendu Agarwal, Ms. Sampriti Phukan, Ms Sumbul Fatima, Ms Surbhi.	NAME OF COURSE COORDINATOR	Mr. Shubhank Sanjeev, Mr. Bharatendu Agarwal

Note: There are four sections in the paper. Attempt all questions from each part.

	Q.NO.	QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL
PART A	Q1	Constitution of India borrows heavily from other constitutions of the world. Discuss.	5	CO1	BT2
	Q2(A)	Fundamental Duties are a constant reminder for us to be model citizens. Do you agree? Also explain Fundamental Duties in Constitution of India.	5	CO2	BT 2
	Q2(B)	Position of President in Indian Constitution is special. Discuss.	5	CO 2	BT 3
PART B	Q3	Explain the position and importance of preamble to the Constitution of India in your own words..	5	CO 1	BT 2
	Q4(A)	Elaborate upon the federal features of the Constitution of India	5	CO 3	BT 1
	Q4(B)	Analyse the Emergency provisions of the Indian Constitution.	5	CO 3	BT 3
PART C	Q5	Amending the constitution of India is a complicated process. Give your opinion highlighting the limitations therein.	5	CO 4	BT 3
	Q6	How are Directive Principles of State Policy in the Indian Constitution inter-connected with Fundamental Rights? **OR** Explain the position and concept of Fundamental Rights in Indian Constitution?	5	CO 2	BT 3
	Q7	Explain 'Right to Life' as provided for in the Constitution of India.	5	CO 2	BT 3

****

PART B	Q8	What is National Emergency? Explain its impact on Fundamental Rights.	5	CO 3	BT 2
	Q9	What are Fundamental Duties? Are they enforceable in India?	5	CO 2	BT 1
	Q10	What do you understand by 'Right to Equality' as provided for in the Constitution of India? **OR** Explain the position of Prime Minister under the Constitution of India.	5	CO 4	BT2

****

MANAV RACHNA UNIVERSITY

SCHOOL OF SCIENCES

DEPARTMENT OF SCIENCES

"End Semester Examination , Dec-2023"

SEMESTER	1st	DATE OF EXAM	16.12.2023 (I)
SUBJECT NAME	ODSML	SUBJECT CODE	CSH107B-T
BRANCH	AIML, Robotics & AI	SESSION	I
TIME	3 hrs.	MAX. MARKS	100
PROGRAM	B.Tech.	CREDITS	4
NAME OF FACULTY	Dr. Ankita Gaur	NAME OF COURSE COORDINATOR	Dr. Ankita Gaur

Note: All questions are compulsory.

	Q.NO.	QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL
PART-A	Q.1(a)	Find the median, Q_1, Q_3, D_7 and P_{85} from the following data: x: 200-400 | 400-600 | 600-800 | 800-1000 | 1000-1200 | 1200-1400 | 1400-1600 | 1600-1800 | 1800-2000 f: 6 | 9 | 11 | 14 | 20 | 15 | 10 | 8 | 7	8	CO1	BT-3
	Q.1(b)	Calculate mean median and mode of the following data pertaining to marks in statistics out of 140 marks for 80 students in a class Marks more than: 0 | 20 | 40 | 60 | 80 | 100 | 120 No. of Students: 80 | 7 | 50 | 28 | 18 | 9 | 3	7	CO1	BT-3
PART-B	Q.2(a)	A random variable X has the following probability distribution: x: 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 $p(x)$: A | 3a | 5a | 7a | 9a | 11 a | 13a | 15a | 17a (i) Determine the value of a. (ii) Find $P(X < 3), P(X \geq 3), P(2 \leq X < 5)$.	8	CO2	BT-3
	Q.2(b)	Assume that on an average one telephone number out of fifteen is busy. What is the probability that if six randomly selected telephone numbers are selected randomly are called (i) Not more than three will be busy?	7	CO2	BT-4

****

		(ii) At least three of them will be busy?			
PART-C	Q.3	Use the Gauss-Jordan method to find the inverse of the following matrix $A = \begin{bmatrix} 1 & 2 & -1 \\ -1 & 1 & 2 \\ 2 & -1 & 1 \end{bmatrix}$.	11	CO3	BT-3
	Q.4	Find nonsingular matrices P and Q such that PAQ is in the normal form for the matrix $A = \begin{bmatrix} 3 & 1 & 2 & 1 \\ 1 & 4 & 6 & 1 \\ 2 & -3 & 1 & -2 \end{bmatrix}$.	12	CO3	BT-3
	Q.5	State Cayley Hamilton theorem. Using Cayley Hamilton theorem find inverse of $\begin{bmatrix} 0 & 0 & 1 \\ 3 & 1 & 0 \\ -2 & 1 & 4 \end{bmatrix}$	12	CO3	BT-3
PART-D	Q.6	Find the value of λ , the equations $x + y + z = 6$, $x + 2y + 3z = 10$, $x + 2y + \lambda z = \mu$ have (i) no solution (ii) unique solution (iii) more than one solution?	11	CO3	BT-4
	Q.7	Diagonalize the matrix $A = \begin{bmatrix} 1 & 6 & 1 \\ 1 & 2 & 0 \\ 0 & 0 & 3 \end{bmatrix}$, and hence find A^4.	12	CO4	BT-3
	Q.8	Solve the system of equations $x + y + z = 1$, $3x + y - 3z = 5$, $x - 2y - 5z = 10$ by writing the coefficient matrix as a product of the lower and the upper triangular matrix.	12	CO4	BT-4

********** END **********

****

MANAV RACHNA UNIVERSITY

MANAV RACHNA UNIVERSITY

SCHOOL OF SCIENCES

DEPARTMENT OF SCIENCES

"End Semester Examination, Dec-2023"

SEMESTER	I/III	DATE OF EXAM	19.12.2023 (II)
COURSE NAME	ENVIRONMENTAL SCIENCE	COURSE CODE	CHH137/CHH107B
PROGRAM	B.TECH. CSE/BBA/B.Sc. B.ED./B.A. B.ED.	CREDITS	NIL/04
TIME DURATION	120 MINUTES	MAX. MARKS	50
NAME OF FACULTY	PROF. MEENA KAPAHI/DR. V. V. PATHAK/DR. PRITI GUPTA/DR. EKTA RAWAT/DR. HARSHA DEVNANI/Dr. VINOD KUMAR/ MS. ANJU SHARMA	NAME OF COURSE COORDINATOR	PROF. (DR.) MEENA KAPAHI

Asst Prof (Sr Scale)

Note: All questions are compulsory. Some questions may offer internal choice.

Q.NO.		QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL
PART-A	1(A)	Can you analyze the advantages and disadvantages of ex-situ conservation methods, providing examples of how these approaches contribute to the preservation of biodiversity in natural habitats.	5	CO3	BT3
	1(B)	Explain the multidisciplinary nature of Environmental Studies. Provide at least two examples to explain the collaboration between different disciplines to address environmental challenges.	5	CO1	BT2
	1(C)	Compare and contrast the levels of biodiversity, including genetic, species, and ecosystem diversity, highlighting their functional significance in ecological systems.	5	CO3	BT5
	2(A)	Briefly outline the salient features of the water (prevention and control of pollution) Act 1974.	5	CO2	BT1
PART-B	2(B)	Compare and contrast point and non-point sources of water pollution considering their characteristics and impacts. Discuss the challenges associated with pollution from agricultural runoff considering its impact.	3+2=5	CO4	BT3
	2(C)	Apply your knowledge of pollution prevention by outlining the specific roles and responsibilities an individual can undertake to contribute to environmental well-being.	5	CO2	BT3
	3(A)	Write a short note on following population characteristics: (i) Doubling time (ii) HIV/AIDS	2.5+2.5=5	CO4	BT1
	3(B)	Discuss the variation of a country's population having urn shaped age pyramid. How does this demographic pattern impact factors such as workforce distribution and economic development?	2+3=5	CO4	BT4
	3(C)	What is population explosion? How does it affect the overall development of a country?	2+3=5	CO4	BT2
	3(D)	What are agents responsible for ozone depletion? Comment on the long-term consequences and propose mitigation strategies to address the challenges posed by ozone depletion.	2+3=5	CO2	BT2

****

MANAV RACHNA Vidyaparishad

MANAV RACHNA UNIVERSITY

Declared as State Private University vide Haryana Act 26 of 2014

DEPARTMENT OF COMPUTER SCIENCE & TECHNOLOGY

"End Term Examination, Dec-2023"

SEMESTER	**1st**	**DATE OF EXAM**	**20.12.2023**
SUBJECT NAME	**INTRODUCTION TO ROBOTICS**	**SUBJECT CODE**	**MEH108B-T**
BRANCH	**R&AI**	**SESSION**	**Morning**
TIME	**08.30AM - 11.30AM**	**MAX. MARKS**	**100**
PROGRAM	**B.Tech**	**CREDITS**	**3**
NAME OF FACULTY	**Dr. Ajit**	**NAME OF COURSE COORDINATOR**	**Dr. Ajit**

Note: All questions are compulsory.

Q.NO.		QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL
PART-A	1(A)	Define degrees of freedom. Mention its importance in robotics.	5	CO1	BT1
	1(B)	Describe the Laws of robots.	5	CO1	BT2
	1(C)	With the help of line diagram explain basic components of a robot system.	5	CO1	BT2
PART-B	2(A)	Discuss the working principle of hydraulic actuators.	5	CO2	BT3
	2(B)	Discuss the Mechanical and hydraulic drives associated for transmission of power for robot.	5	CO2	BT3
	2(C)	Elaborate role of stepper motor in robotics .	5	CO2	BT2
PART-C	3(A)	Explain use of robot in assembly operation.	8	CO3	BT2
	3(B)	What are the types of End effectors?	9	CO3	BT1
	3(C)	What do you mean by sensor and transducer explain with the example?	9	CO4	BT2

****

PART-D	3(D)	What is a proximity sensor, explain in details the temperature and electric sensors.	9	CO4	BT2
	4(A)	What are the material handling applications of robot?	9	CO3	BT1
	4(B)	Discuss are the future applications of Robot?	8	CO3	BT2
	4(C)	Justify the applications of robots in continuous arc welding and spray painting.	9	CO4	BT5
	4(D)	Analyze the robot economics and safety of robot.	9	CO4	BT4

****

MANAV RACHNA UNIVERSITY

DEPARTMENT OF EDUCATION AND HUMANITIES

End Term Examination -B. Tech Sem 1

SEMESTER	**1**	**DATE OF EXAM**	**21.12.2023**
SUBJECT NAME	**Professional English (Set-A)**	**SUBJECT CODE**	**EDS 166**
BRANCH	**Computer Science**	**SESSION**	**I**
TIMING	**2 Hrs**	**MAX. MARKS**	**50**
PROGRAM	**B. Tech**	**CREDITS**	**02**
NAME OF FACULTY	**Dr. Chhavi Kulshrestha**	**COURSE COORDINATOR**	**Dr. Akhilesh Dwivedi**

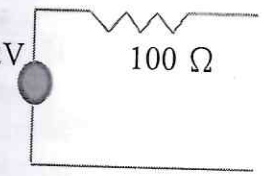
Note: All the questions are compulsory.

Q.NO.		QUESTIONS	MARKS	CO	BT
PART-A	1	Differentiate between simple and Complex sentences. Explain them with the help of examples.	05	CO1	BT2
	2	Explain the use of stress in communication.	05	CO2	BT2
PART-B	3 (a)	"Effective communication is obligatory for professional life," Justify this statement.	02	CO3	BT5
	3 (b)	"Decoding is key in the process of communication," Discuss.	02	CO3	BT4
	3 (c)	What do you understand by expository writing? Exemplify it.	02	CO4	BT2
	3 (d)	How does presentation make communication more effective? Give reasons in support of your answer.	02	CO3	BT4
	3 (e)	Exemplify the difference between semi-colon and full stop.	02	CO4	BT2
	4	Barriers and filters are keys for effective communication. How do they make communication ineffective? Explain their types as well.	5+5	CO1	BT2
	5	What do you understand by Verbal Communication? Explain their types in details.	5+5	CO3	BT2
	6	Write an essay in 500 words on "Pollution and Urbanization." Discuss with contemporary examples. Or "Writing needs to make effective introduction and informative conclusion," justify the statement. Write an example of 200 words on the topic "Digital Literacy."	5+5	CO4	BT5

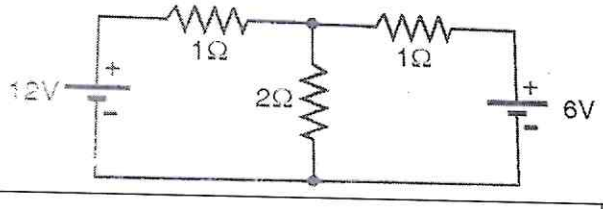
MANAV RACHNA UNIVERSITY
SCHOOL OF ENGINEERING
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
"End Semester Examination, Dec-2023"

SEMESTER	I	DATE OF EXAM	22.12.2023 (I)
COURSE NAME	BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING	COURSE CODE	ECH103B-T
PROGRAM	B.TECH ECE/CSTI/AIML/R&AI	CREDITS	4
TIME DURATION	3 hrs	MAX. MARKS	100
NAME OF FACULTY	LOKESH BHARDWAJ, BHANU PRATAP CHAUDHARY, K.DEEPA, PIYUSH CHARAN, SUNANDA MENDIRATTA	NAME OF COURSE COORDINATOR	LOKESH BHARDWAJ

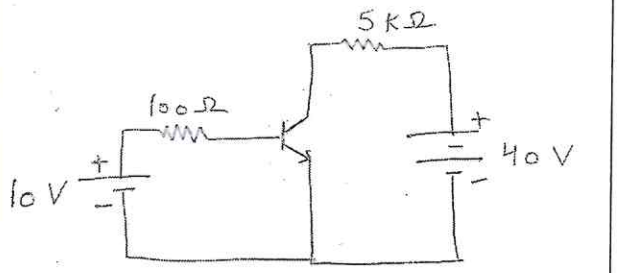
Note: All questions are compulsory.

	Q.NO.	QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART-A	1(A)	Which theorem is used to simplify complex linear circuits into an equivalent circuit with a single current source and a single resistor? Also write the statement.	2	CO1	L2	1.2.1
	1(B)	What is current division rule? Explain with the help of a circuit.	2	CO1	L2	1.2.1
	1(C)	Convert the following voltage source into equivalent current source. 	2	CO1	L2	1.2.1
	1(D)	What is the significance of Volt equivalent of temperature V_{TH}	2	CO1	L2	1.2.1
	1(E)	Why the PN junction diode is considered as a non-linear device?	2	CO1	L3	1.3.1

****

	1(F)	For the following circuit, find the value of current through 2 Ω resistance through Norton's theorem. 	5	CO1	L3	1.3.1
PART-B	Q2(A)	Why Bridge type full wave rectifier is preferred over center tap full wave rectifier.	2	CO2	L1	1.3.1
	Q2(B)	Write the relationship between current amplification factors of CE and CB transistors.	2	CO2	L2	1.1.1, 1.3.1
	Q2(C)	What is the basic difference between LED and photodiode?	2	CO2	L2	1.2.1
	Q2(D)	Voltage regulation is possible with Zener diode. Explain the reason.	2	CO2	L2	1.2.1
	Q4(E)	Draw a symbol of OP-AMP with proper labeling.	2	CO2	L3	1.2.1
	Q4(F)	Derive the equation of current in a purely capacitive circuit. Draw the phasor diagram along with current and voltage waveforms.	5	CO2	L2	1.1. 1, 1.3.1
PART-C	Q3(A)	Determine the value of forward voltage across a Silicon based PN-Junction diode if the forward current through the diode is 5 mA and the reverse saturation current is 2 μ A.	4	CO3	L4	1.3.1, 1.4.1, 2.3.1, 3.1.1
	3(B)	Explain the working of a Full Wave bridge type rectifier in detail with suitable waveforms and diagram.	6	CO3	L2	1.3.1, 2.3.1
	Q3(C)	Explain the working of CE transistor amplifier in detail. Also, discuss the output characteristics and explain the different regions of operation.	6+5+4	CO3	L2	2.3.1, 3.2.1
	Q3(D)	Find the value of collector and base currents for the transistor circuit given below. Assume that the transistor is working in active region. β=90	10	CO3	L1	2.3.1, 2.3.2

****

						
PART-D	Q4(A)	Explain the RC-Phase shift oscillator with the help of labeled diagram.	7	CO4	L2	1.3.1, 1.4.1, 2.3.1, 3.1.1
	Q4(B)	List down the applications of Operational Amplifier. Why OP-AMP is called differential amplifier. Write the ideal characteristics of OP-AMP.	3+5	CO4	L1, L2	1.4.1
	Q4(C)	Derive the expression for the output voltage of a non-inverting OP-AMP. What is slew rate?	7+3	CO4	L2	1.4.1, 2.3.1
	Q4(D)	Explain the working of OP-AMP as subtractor with properly labeled diagram. Draw an OP-AMP circuit such that $V_0 = V_i$.	7+3	CO4	L2	1.4.1, 2.3.1, 2.3.2

********** END **********

****

MANAV RACHNA UNIVERSITY

MANAV RACHNA UNIVERSITY
SCHOOL OF ENGINEERING
DEPARTMENT OF COMPUTER SCIENCE & TECHNOLOGY
"End Semester Examination, Dec-2023"

SEMESTER	**I**	**DATE OF EXAM**	**26/12/2023 (I)**
COURSE NAME	Programming for Problem Solving using C	**COURSE CODE**	**CSH101B-T**
PROGRAM	CSE/AIML/FSD/CSTI/R&AI/ECE	**CREDITS**	**4**
TIME DURATION	**3 hrs**	**MAX. MARKS**	**100**
NAME OF FACULTY	**Dr. Susmita Ray** **Dr. Manpreet Kaur** **Dr. Parneeta Dhaliwal** **Ms. Chandni Magoo** **Dr. Shalu** **Dr. Meena Chaudhary**	**NAME OF COURSE COORDINATOR**	**Dr. Meena Chaudhary**

Note: All questions are Compulsory.

	Q.NO.	QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
Part-A	1(A)	Can one type of data be converted into another? If Yes, explain with an example.	3	CO1	BT1	1.4.1
	1(B)	Differentiate between Structure and Union.	3	CO3	BT2	1.3.1
	1(C)	State the use of break and continue statements along with an example.	3	CO1	BT2	1.4.1

	1(D)	Define the term keyword.
		Find the output of the following code snippet:
		main ()
		{
		int x, y;
		x = 5;
		y = x++ / 2;
		printf("%d", y);
		return 0;
		}
			1+2	CO1	BT3	2.1.3

	1(E)	Differentiate between Pre and Post increment operator with suitable example.	3	CO2	BT2	1.4.1

****

Part-B	2(A)	Why functions are needed ? Differentiate between Local and Global variable using suitable example.	3	CO3	BT2	1.4.1
	2(B)	Write a program to enter two numbers. Make a comparison between them with the conditional operator. If the first number is greater than the second, perform division operation otherwise multiplication operation.	3	CO2	BT3	1.4.1
	2(C)	Differentiate between selection and iteration statements in C along with their syntax and examples.	3	CO2	BT2	1.4.1
	2(D)	Write a program in C to calculate power of a number inputted by the user.	3	CO2	BT3	1.4.1
	2(E)	What are Pointers? What are the benefits of using pointers? Explain with an example.	1+2	CO3	BT2	1.4.1
Part-C	Q3	What is Recursion? WAP to find the sum of n numbers using recursion.	1+4	CO3	BT3	1.4.1
	Q4	Write a C program to search a particular roll no. in an array. If that roll no. exist in an array print "number is present" else print "number is absent".	10	CO3	BT3	1.4.1
	Q5	a) Consider a scenario of convocation of 5 M.tech students holding the score 60,54,83,75,66 respectively .For the distribution of the degree they have to sit in ascending order as the topper has to be specially honoured with an award in the end .Apply Bubble sort to order the sequence for the smooth conduction of the process with stepwise execution. b) Write a program to subtract two matrices and get the result in third matrix.	10+10	CO3	BT3	2.1.3
Part-D	Q6	Explain any 5 different operations performed on a file with the help of an example.	5	CO4	BT2	1.4.1

	Q7	Consider the following declaration for Structure employee,
		struct employee {
		int emp_id;
		char name[20];
		float salary;
		};
		Write the C program for displaying above information for four employees given by the user using the concept of array of structure.
			10	CO3	BT3	2.1.3

****

	Q8	Why call by reference method is preferred over call by value method? Write a C program to swap contents of two variables using call by reference..	2+8	CO3	BT3	1.4.1
	Q9	Briefly explain the significance of dynamic memory allocation. Differentiate the following functions using examples 1)malloc() and calloc() 2)free() and realloc()	2+8	CO4	BT2	1.4.1

********** END **********

******

MANAV RACHNA UNIVERSITY

SCHOOL OF SCIENCES

DEPARTMENT OF SCIENCES

"End Semester Examination, Dec-2023"

SEMESTER	**Ist**	**DATE OF EXAM**	**11.12.2023 (I)**
COURSE NAME	**Mathematics-I(Calculus and Linear Algebra)**	**COURSE CODE**	**MAH103B**
PROGRAM	**B.Tech- ECE & VLSI**	**CREDITS**	**4**
TIME DURATION	**3 Hours**	**MAX. MARKS**	**100**
NAME OF FACULTY	**Dr. Y K Sharma**	**NAME OF COURSE COORDINATOR**	**Dr. Y K Sharma**

Note: Attempt All Questions.

Q.NO.		QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART-A	1(A)	Find the radius of curvature at $(\frac{a}{4}, \frac{a}{4})$ of the curve $\sqrt{x} + \sqrt{y} = a$	5	CO1	BT1	1.1.1 1.2.1
	1(B)	Verify $\frac{\partial^2 u}{\partial x \partial y} = \frac{\partial^2 u}{\partial y \partial x}$ for $u(x,y) = sin^{-1}(\frac{y}{x})$	5	CO1	BT2	1.1.2 1.3.1
	1(C)	Compute to three decimal places, the value of $\sqrt{26}$ by use of Taylor's series.	5	CO1	BT2	1.1.2 1.3.1 2.1.3
PART-B	1(D)	Find $div(3x^2\hat{\imath} + 5xy^2 + x\,y\,z^3)$ at the point (1,2,3)	5	CO2	BT1	1.1.2 1.3.1 2.1.3
	1(E)	If $\vec{r} = x\hat{\imath} + y\hat{\jmath} + z\hat{k}$, show that div $\hat{r} = 3$	5	CO2	BT3	1.1.2 1.3.1 2.1.3
	1(F)	Change the order of integration $\int_0^a \int_x^a \frac{x\,dx\,dy}{x^2+y^2}$ and hence solve.	5	CO2	BT2	1.1.2 1.3.1 2.1.3
PART-C	Q2	Examine the convergence/ divergence of the series $\sum_{n=1}^{\infty}[\sqrt{n^3+1} - \sqrt{n^3}]$	9	CO3	BT4	1.1.2 1.3.1 2.1.3
	Q3	Examine the convergence/ divergence of the series $\frac{1}{2} + \frac{1.3}{2.4} + \frac{1.3.5}{2.4.6} + \cdots \ldots \infty$	10	CO3	BT4	1.1.2 1.3.1 2.1.3
	Q4	Examine the convergence/ divergence of the series	8	CO3	BT4	1.1.2 1.3.1

****

		$\Sigma\left(\frac{n}{n+1}\right)^{n^2}$				2.1.3
	Q5	Examine the convergence/ divergence of the series $1-\frac{1}{2}+\frac{1}{3}-\frac{1}{4}+\cdots.\infty$	8	CO3	BT4	1.1.2 1.3.1 2.1.3
PART-D	Q6	Find the inverse of the matrix $\begin{bmatrix} 8 & 4 & 3 \\ 2 & 1 & 1 \\ 1 & 2 & 1 \end{bmatrix}$ By Gauss –Jordan method.	7	CO4	BT1	1.1.2 1.3.1 2.1.3
	Q7	With the help of matrix , solve the simultaneous equations $x+y+z=3, x+2y+3z=4, x+4y+9z=6.$	8	CO4	BT3	1.1.2 1.3.1 2.1.3
	Q8	Find the Eigen values and Eigen vectors of the matrix A, Where A $\begin{pmatrix} 2 & 3 & -2 \\ -2 & 1 & 1 \\ 1 & 0 & 2 \end{pmatrix}$	10	CO4	BT3	1.1.2 1.3.1 2.1.3
	Q9	Verify Cayley- Hamilton theorem for the matrix A $=\begin{pmatrix} 2 & 1 & 1 \\ 0 & 1 & 0 \\ 1 & 1 & 2 \end{pmatrix}$. Also find the invers of A.	10	CO4	BT3	1.1.2 1.3.1 2.1.3

********** END **********

****

MANAV RACHNA UNIVERSITY

SCHOOL OF SCIENCES

DEPARTMENT OF SCIENCES

"End Semester Examination, Dec-2023"

SEMESTER	Ist	DATE OF EXAM/SESSION	11.12.2023 (I)
COURSE NAME	Mathematics – I (CALCULUS & LINEAR ALGEBRA)	COURSE CODE	MAH102B-T
PROGRAM	B.TECH. – SMA	CREDITS	4
TIME DURATION	3 Hrs.	MAX. MARKS	100
NAME OF FACULTY	Dr. ADVIN MASIH	NAME OF COURSE COORDINATOR	Dr. Ankita Gaur

Note: All questions are compulsory.

Q.NO.		QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART-A	Q.1(a)	If $x^x + y^y + z^z = c$, show that at $x = y = z$, $\frac{\partial^2 z}{\partial x \partial y} = -(x \log ex)^{-1}$.	7	CO1	BT-3	1.1. 9.1.
	Q.1(b)	If $u = \sin^{-1}\left(\frac{x+2y+3z}{\sqrt{x^8+y^8+z^8}}\right)$, show that $x\frac{\partial u}{\partial x} + y\frac{\partial u}{\partial y} + z\frac{\partial u}{\partial z} + 3\tan u = 0$.	8	CO1	BT-3	1.1. 9.1.
	Q.2(a)	Discuss the convergence of the series : $\frac{1}{2} + \frac{1}{3} + \frac{1}{5} + \cdots + \frac{1}{2^{n-1}+1} + \cdots$.	8	CO2	BT-2	1.1. 9.1.
	Q.2(b)	Test the convergence of the series $\frac{1}{2} + \frac{1.3}{2.4} + \frac{1.3.5}{2.4.6} + \cdots$.	7	CO2	BT-4	1.1. 9.1.
PART-B	Q.3	Use the Gauss-Jordan method to find the inverse of the following matrix $A = \begin{bmatrix} 1 & 2 & -1 \\ -1 & 1 & 2 \\ 2 & -1 & 1 \end{bmatrix}$.	8	CO3	BT-3	1.1. 9.1.
	Q.4	Find nonsingular matrices P and Q such that PAQ is in the normal form for the matrix $A = \begin{bmatrix} 3 & 1 & 2 & 1 \\ 1 & 4 & 6 & -1 \\ 2 & -3 & 1 & -2 \end{bmatrix}$.	12	CO3	BT-3	1.1. 9.1.

****

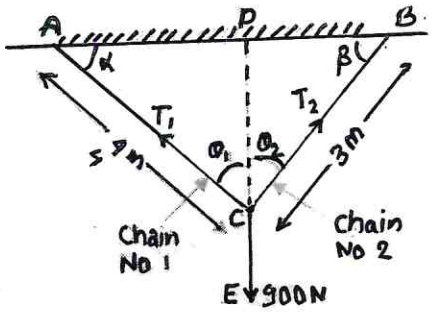
	Q.5	Find the value of λ , the equations $x + y + z = 6$ $x + 2y + 3z = 10$ $x + 2y + \lambda z = \mu$ have (i) no solution (ii) unique solution (iii) more than one solution?	15	CO3	BT-4	1.1.1 9.1.1
PART-D	Q.6	Show that $div\ (grad\ r^n) = n\ (n+1)r^{n-2}$.	12	CO4	BT-3	1.1.1 9.1.1
	Q.7	Find the angle between the surfaces $x^2 + y^2 + z^2 = 9$ and $z = x^2 + y^2 - 3$ at the point $(2, -1, 2)$.	12	CO4	BT-3	1.1.1 9.1.1
	Q.8	How do you find a vector is irrotational? If $\vec{V} = (\sin y + z)\,\hat{\imath} + (x\cos y - z)\,\hat{\jmath} + (x - y)\hat{k}$ is irrotational.	6	CO4	BT-3	1.1.1 9.1.1
	Q.9	Evaluate $\int_C \vec{f}.\ d\vec{r}$ where $\vec{f} = (x^2 + y)\hat{\imath} + (x + y^2)\hat{\jmath}$ C is the arc of the parabola of $y = 2x^2$ from(0,0) to (1,2).	5	CO4	BT-3	1.1.1 9.1.1

********** END **********

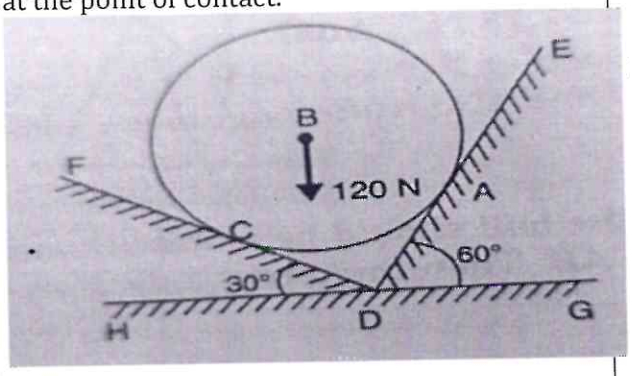
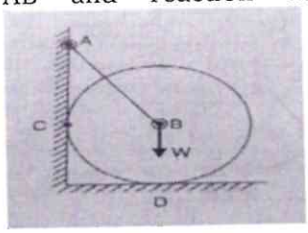
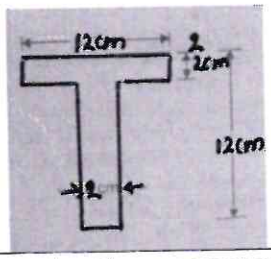
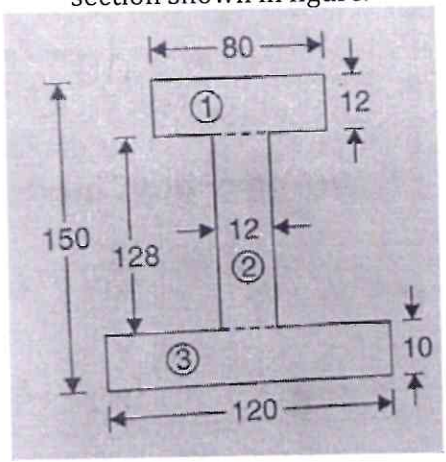
****

MANAV RACHNA UNIVERSITY
SCHOOL OF ENGINEERING
DEPARTMENT OF MECHANICAL
"End Semester Examination, Dec-2023"

SEMESTER	**1st**	**DATE OF EXAM/SESSION**	**14/12/2023(Morning)**
COURSE NAME	**Engineering Mechanics**	**COURSE CODE**	**MEH101B**
PROGRAM	**B.TECH**	**CREDITS**	**4**
TIME DURATION	**3 HOURS**	**MAX. MARKS**	**100**
NAME OF FACULTY	**PRADEEP KR. MOURIA**	**NAME OF COURSE COORDINATOR**	**PRADEEP KR. MOURIA**

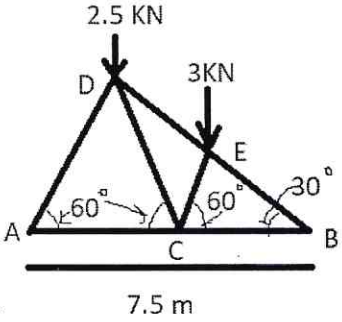
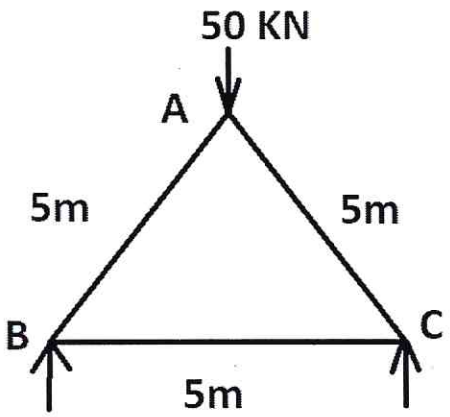
Q.NO.		QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL
PART-A	Q:1	Q:1 (a) Explain and drive parallelogram law.	5	CO1	BT2
		Q:1 (b) A weight of 900 N is supported by two chains of length 4 m and 3 m as shown in fig. Determine the tension in each chain. 	10		BT4

****

PART-B	Q:2	Q:2 (a) A ball of weight 120N rests in a right-angled grooves, as shown in figure. The sides of the groove are inclined to an angle of 30° and 60°to the horizontal. If all the surface are smooth, then determine the reaction R_A and R_c at the point of contact. 	10	CO2	BT4
		Q: 2 (b) Draw the free body diagram of a ball of weight W=500N also calculate tension in string AB and reaction at point C and D. 	5		BT2
PART-C	Q:3	Q:3 (a) Find out the moment of inertia of rectangular section about the C.G of the section. 	15	CO3	BT2
		Q:3 (b) Determine the moment of inertia of I section shown in figure. 	20		BT4

****

PART-D

Q:4	Q:4(a) A truss AB of span 7.5 m is loaded as shown in fig. Find the reactions and forces in the member of the truss.  	20	CO4	BT4
	Q:4(b) Find the forces in the member AB, AC and BC of the truss shown in fig.  	15		BT4

****

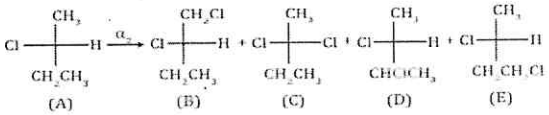
MANAV RACHNA UNIVERSITY
SCHOOL OF SCIENCES
DEPARTMENT OF SCIENCES
"End Semester Examination, Dec-2023"

SEMESTER	**I**	**DATE OF EXAM**	18/12/2023
COURSE NAME	**CHEMISTRY-1**	**COURSE CODE**	**CHH144B-T (I)**
PROGRAM	**B.Tech ECE,VLSI & SMA**	**CREDITS**	**3**
TIME DURATION	**3 hrs**	**MAX. MARKS**	**100**
NAME OF FACULTY	**Dr. Vinod Kumar**	**NAME OF COURSE COORDINATOR**	**Dr. A. Jayamani** Arpit Sand

Note:Part A is compulsory. Part B- Questions will be of descriptive type or numerical. Sandeep Kumar

	Q.NO.	QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART-A	1(A)	Deduce de-Broglie equation for dual nature of particle and state its importance.	5	CO1	BT2	
	1(B)	Define acid and base on the basis of Arhenius theory and Lewis concept with examples.	5	CO2	BT2	
	1(C)	Briefly explain Born-Openheimer approximation.	5	CO4	BT1	
	1(D)	What are three purposes of green chemistry?	5	CO3	BT1	
PART-B	Q2(A)	Discuss the screening constant and effective nuclear charge and its significance.	6	CO1	BT2	
	2(B)	What do you know about (i) Hund's rule (ii) Pauli's exclusion Principle	4	CO1	BT2	
	2(C)	What are the two theories of corrosion? Explain with suitable examples. Also discuss the methods of its preventions.	6+4	CO2	BT3	
	Q3(A)	Discuss the methods of synthesis of Ibuprofen and Biodiesel	5+5=10	CO3	BT1	

****

3(B)	Explain with minimum two examples of each (i) enantiomers (ii) distereomers	5+5	CO3	BT4	
Q4(A)	Assign the R and S configurations of the following compounds  (A) (B) (C) (D) (E)	2*5=10	CO3	BT3	
4(B)	Explain degrees of freedom of linear and non-linear molecule. Calculate the vibrational degrees of freedom for CO_2 and H_2O molecule.	4+3+3	CO4	BT3	
Q5(A)	The pure rotational constant for CN molecule is 1.8 cm^{-1}. Calculate bond length of C-N bond. (molar masses are: C = 12 g/mol, N = 14 g/mol)	8	CO4	BT3	
5(B)	Explain selection rule for P,Q,R branches of IR spectra.	6	CO4	BT4	
5(C)	What types of molecules exhibit rotational spectra? Out of H_2, N_2, HCl, CO_2, H_2O, CO and CH_4 which will give rotational spectra.	6	CO4	BT4	

********** **END** **********

****

MANAV RACHNA UNIVERSITY
SCHOOL OF ENGINEERING
DEPARTMENT OF MECHANICAL ENGINEERING
"End Semester Examination, Dec-2023"

SEMESTER	**1st**	**DATE OF EXAM/SESSION**	**26.12.2023/MORNING**
COURSE NAME	**Thermodynamics**	**COURSE CODE**	**MEH105B**
PROGRAM	**B.Tech ME-SMA**	**CREDITS**	**04**
TIME DURATION	**3 Hours**	**MAX. MARKS**	**100**
NAME OF FACULTY	**GIANENDER KAJAL**	**NAME OF COURSE COORDINATOR**	**GIANENDER KAJAL**

Note: All questions are compulsory. Questions will be of the descriptive type or numerical.

Q.NO.		QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART (A)	1(A)	A cylinder contains 5 m^3 of an ideal gas at a pressure of 1 bar. This gas is compressed in a reversible isothermal process till its pressure increases to 5 bar. Calculate the work in KJ required for the process is?	05	CO1	BT4	
	1(B)	Define the following (a) Microscopic & Macroscopic View Points (b) Thermodynamic Equilibrium (c) Process and Cycle	05	CO1	BT1	
	1(C)	Explain two statements of second law of thermodynamics. Establish its equivalence.	05	CO1	BT2	
PART (B)	2(A)	An industrial heat pump operates between the temperature of 27°C and -13°C. The rate of heat addition and heat rejection are 750W and 1000W, respectively. Calculate the COP for the heat pump is?	05	CO2	BT4	
	2(B)	Write short notes on following associated with S.F.E.E. (i) Nozzle (ii) Throttle Valve (iii) Turbine	05	CO2	BT2	
	2(C)	A carnot cycle is having an efficiency of 0.75. If the temperature of the high temperature reservoir is 727°C, Calculate the temperature of low temperature reservoir?	05	CO2	BT4	

PART (C)	3(A)	What do you mean by Ton of refrigeration? Derive expression for the refrigeration system, heat pump and heat engine with neat sketch.	07	CO3	BT3	
	3(B)	Explain the working of carnot cycle using P-V and T-S diagram. State why Carnot cycle can't be realized? Also explain the relation in between C_p, C_v, Adiabatic index and 'R'.	07	CO3	BT2	
	3(C)	Determine the work done and heat transfer for following process: a) C-V Process, b) C-P process, c) C-T process, d) Adiabatic process, e) Polytrophic process.	07	CO3	BT5	
	3(D)	Determine the heat transfer for following process: a) C-V Process, b) C-P process, c) C-T process, d) Adiabatic process, e) Polytrophic process.	07	CO3	BT5	
	3(E)	Define thermodynamic work. Write similarities & dissimilarities between Heat and Work	07	CO3	BT1	
PART (D)	4(A)	A heat reservoir at 700 K is brought into contact with the ambient at 200 K for a short time. During the period 7000 KJ of heat is lost by the heat reservoir. Calculate the total loss in availability due to this process is?	07	CO4	BT4	
	4(B)	How the First Law of Thermodynamics is applied to a process? Show how this formulation changes when it completes a thermodynamic cycle. Also explain the limitation of first law of thermodynamics.	07	CO4	BT2	
	4(C)	Develop the diesel cycles on P-V diagram and T-S diagram, and mark the various process and find out its efficiency.	07	CO4	BT6	
	4(D)	Define the following with examples. i) Open system ii) Closed system iii) Isolated system	07	CO4	BT1	
	4(E)	Define physical significance of entropy and explain Principle of increase of entropy.	07	CO4	BT1	

********** END **********

MANAV RACHNA Vidyaparishad

MANAV RACHNA UNIVERSITY
Declared as State Private University vide Haryana Act 26 of 2014

MANAV RACHNA UNIVERSITY
SCHOOL OF EDUCATION & HUMANITIES
DEPARTMENT OF EDUCATION & HUMANITIES
"End Semester Examination, Dec-2023"
Set-B

SEMESTER	V / VII / III	DATE OF EXAM	15/12/2023
SUBJECT NAME	Applied Psychology	SUBJECT CODE	EDS289
BRANCH	Management, Applied Sciences	SESSION	II
TIME	1:50 Hours	MAX. MARKS	50
PROGRAM	BBA/B.Tech/BSc	CREDITS	2
NAME OF FACULTY	Mr. Sharv Datt Anand/Dr Mira Mishra	NAME OF COURSE COORDINATOR	Dr. Mira Mishra

Note: Part A: All questions are compulsory. Each question will be 2 Marks.
Part B: All questions are compulsory. Each question will be 2 Marks.
Part C: Questions will be of 5 marks. Internal choice will be there
Part D: Questions will be of 5 marks. Internal choice will be there.

Q.NO.		QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	
PART-A	1(A)	Differentiate between aptitude and attitude with the help of suitable example.	2	CO3	BT2	
	1(B)	Discuss the role of social factors in the formation of personality.	2	CO4	BT2	
	1(C)	Differentiate between introvert and extrovert traits of personality.	2	CO4	BT2	
	1(D)	Illustrate the difference between stereotype and prejudice with the support of suitable example.	2	CO1	BT2	
	1(E)	"Your attitude, not your aptitude, will determine your altitude." Comment.	2	CO2	BT3	
	2(A)	Describe the role of psychology across multi-disciplinary aspects.	2	CO3	BT2	

****

PART-B	2(B)	Describe the term social conflict?	2	CO 3	BT2
	2(C)	Explain the application of psychology in various professional organization.	2	CO 3	BT2
	2(D)	Examine the significance of the effective "team management" in day-to-day life.	2	CO2	BT4
	2 (E)	Describe the concept of Attitude.	2	CO2	BT2
PART-C	3(A)	Analyze the concept of organizational psychology and its significance in professional world. OR Explain Carl Jung's Theory of personality and its implications.	5	CO4	BT2
	3(B)	"Personality is conscious" comment in the light of characteristic features of personality. OR Explain the strategies that can be for stress management in organizations.	5	CO 5	BT3
	3(C)	Discuss the significance of Cooperation and Competition in group. Or Describe any trait theory of Personality of your choice.	5	CO 3	BT2
PART-D	4(A)	Analyse the process of Group formation with the focus on the factors that affect effective group dynamics.	5	CO5	BT 4
	4(B)	"Family is an organization with its own unique problems of human behavior". Justify this statement.	5	CO 4	BT 5
	4 (C)	How do incorporate the concept of social conflicts in your organization? Explain the same with the help of an example. **Or** Analyze the situational factors that lead to the development of prejudice and discrimination	5	CO6	BT4

****

		evident in the personality of an individual.		CO 1	

****

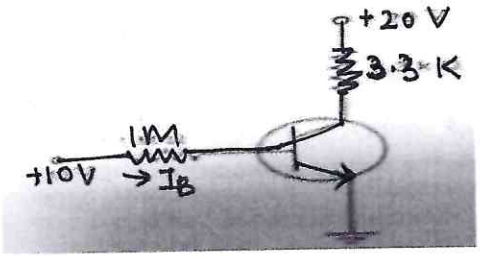
MANAV RACHNA UNIVERSITY

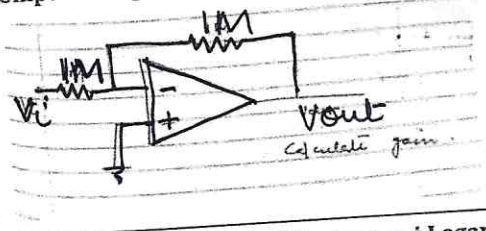
DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ODD SEMESTER (DEC-2023)

END TERM EXAMINATION

COURSE NAME:ANALOG ELECTRONICS	COURSE CODE:ECH203B Session - II	MAX. MARKS:100	TIME DURATION:3hrs	DATE OF EXAM:14.12.23
PROGRAM:(B. Tech.) - ELECTRONICS & COMMUNICATION ENGINEERING & ELECTRONICS AND COMMUNICATION ENGG WITH SPECIALIZATION IN VLSI DESIGN AND VERIFICATION				SEMESTER-III
FACULTY NAME:Dr.Shruti Vashist		NAME OF COURSE COORDINATOR:Dr.Shruti Vashist		

Q.NO.		QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART-A	Q1(A)	Differentiate between BJT and JFET	2	CO4	BT3	3.3.1
	Q1(B)	Deduce the relation between α and β	2	CO1,CO2	BT3	2.1.1
	Q1(C)	Construct circuit for Darlington pair and highlight its features	2	CO1,CO2, CO3	BT3	3.2.2
	Q1(D)	Differentiate between Voltage and Power Amplifiers	3	CO1,CO2, CO3	BT3	3.2.2
	Q1(F)	Explain the working of BJT as a switch	3	CO2,CO3	BT2	2.3.2
	Q1(G)	Analyse base current for the silicon transstor as shown in the circuit 	3	CO4,CO5	BT4	3.1.1
PART-B	Q2(A)	Illustrate the working principle of n Channel MOSFET. Sketch and explain the basic structure along with its circuit symbol and ouput characteristics.	7	CO3,CO5	BT4	5.3.1
	Q2(B)	Create a hybrid model for a low-frequency, small-signal transistor and deduce the expressions for current gain, voltage gain, input impedance, output admittance, and power gain utilizing h-parameters.	8	CO3,CO5	BT4	7.1.1
PART-C	Q3(A)	Analyse the working of Class A Direct coupled power Amplifier and calculate the efficiency	10	CO3,CO5	BT3	3.1.1
	Q3(B)	A power transistor working in class A operation has zero signal power dissipation of 15 watts. If the ac output power is 5 watt, deduce its efficiency	5	CO3,CO5	BT3	4.2.1
	Q4(A)	Design a Wien Bridge oscillator using Op-Amp and deduce the frequency of oscillation for the same	15	CO3,CO5	BT5	4.3.2
	Q4(B)	For a RC Phase shift network,Given R1=R2=R3=R=50K;C1=C2=C3=C=10^{-} pF; Calculate the frequency of Oscillations	5	CO3,CO5	BT2	7.2.2

PART - D	Q5(A)	Analyze the concept of a multivibrator and explain any one briefly with neat diagram	8	CO2,CO5	BT4	3.4.1
	Q5(B)	Compute the gain for the inverting amplifier 	4	CO2,CO5	BT4	3.4.1
	Q5(C)	Determine the working of Op-Amp as i.Logarithmic Amplifier ii.Differentiator iii.Subtractor	15	CO3,CO5	BT3	4.1.1
	Q5(D)	Descibe the key fetures of Op-Amp	8	CO2,CO3	BT2	3.1.1

END

MANAV RACHNA UNIVERSITY
SCHOOL OF ENGINEERING
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
"End Semester Examination, Dec-2023"

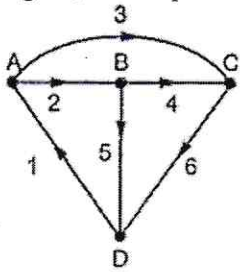
SEMESTER	III	DATE OF EXAM	19/12/2023 (II)
COURSE NAME	NETWORK THEORY	COURSE CODE	ECH202B-T
PROGRAM	B.TECH ECE /ECE-VLSI	CREDITS	4
TIME DURATION	3 HRS	MAX. MARKS	100
NAME OF FACULTY	BHANU PRATAP CHAUDHARY	NAME OF COURSE COORDINATOR	BHANU PRATAP CHAUDHARY

Bhanu Pratap

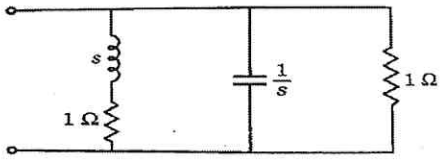
Note: Part-A-All questions are compulsory.
Part-B-attempt any 8 questions.

	Q.NO.	QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART-A	1(A)	What is the condition for symmetry and reciprocity in a two-port network? a. The product of impedances should be equal b. The product of admittances should be equal c. The forward and reverse transmission parameters should be equal d. The open circuit impedance and short circuit admittance should be equal	2	CO1	L1	1.1.1, 1.1.2, 2.1.3, 2.4.1, 2.4.2
	1(B)	What are the parameters used to characterize a two-port network when the output terminals are open-circuited? a. Impedance parameters b. Admittance parameters c. Transmission parameters d. Hybrid parameters	2	CO1	L3	1.1.1, 1.1.2, 2.1.3, 2.4.1
	1(C)	In a circuit with multiple sources, which theorem can be used to find the total current through or voltage across a particular element? a. Compensation theorem b. Superposition theorem c. Reciprocity theorem d. Maximum power transfer theorem	2	CO1	L2	1.1.2, 2.1.3, 2.4.1, 2.4.2
	1(D)	For an ac circuit, what is the condition for maximum power transfer? a. The load impedance should be equal to the source impedance b. The load impedance should be half of the source impedance c. The load impedance should be double the source impedance d. The load impedance should be zero	2	CO1	L2	1.1.2, 2.1.3, 2.4.1, 2.4.2

****

	1(E)	Which theorem is most suitable for finding the voltage across or current through a specific resistor in a complex circuit? a. Maximum power transfer theorem b. Reciprocity theorem c. Superposition theorem d. Compensation theorem	2	CO1	L2	1.1.1, 1.1.2, 1.3.1, 1.4.1
	1(F)	Derive Y parameters in terms of h parameters.	5	CO1	L2	1.1.1
PART-B	2(A)	What is the primary purpose of Laplace transform in circuit analysis? a. To convert time-domain signals to frequency-domain signals b. To convert frequency-domain signals to time-domain signals c. To measure circuit impedance d. To find the maximum power transfer	2	CO2	L1	1.1.1, 1.1.2, 1.3.1,
	2(B)	What is the time constant of an RC circuit? a. The time required for the voltage to reach 63.2% of its final value b. The time required for the voltage to reach 50% of its final value c. The reciprocal of the resistance d. The reciprocal of the capacitance	2	CO2	L2	1.1.1, 1.3.1, 1.4.1
	2(C)	Which matrix is used in graph theory to represent the connections between nodes and branches in a circuit? a. Incidence matrix b. Admittance matrix c. Impedance matrix d. Kirchhoff matrix	2	CO2	L2	1.1.2, 1.3.1, 1.4.1
	2(D)	What is the forced response of a circuit? a. The response due to initial conditions only b. The response due to external inputs or sources c. The response after the circuit reaches steady-state d. The response when all sources are turned off	2	CO2	L2	1.1.1, 1.1.2, 1.3.1, 1.4.1
	2(E)	What is the significance of duality in graph theory and circuit analysis? a. It allows the interchange of nodes and branches in a circuit b. It simplifies complex circuits into equivalent graphs c. It provides a way to analyze circuits with multiple sources d. It establishes a one-to-one correspondence between theorems	2	CO2	L3	1.1.1, 1.1.2, 1.3.1, 1.4.1,
	2(F)	For the given oriented graph shown in Figure, develop the tie-set schedule.  	5	CO2	L2	1.1.1, 1.1.2,

****

PART-C	Q3(A)	Design constant-k low-pass T section filter to be terminated in 600 having cut-off frequency of 3 kHz	5	CO3	L3	1.2.1, 1.4.1, 2.1.1
	Q3(B)	Design constant-k low-pass π-section filter to be terminated in 600 having cut-off frequency of 3 kHz	5	CO3	L3	1.2.1, 1.4.1, 2.1.1
	Q3(C)	Design a low pass filter for a cut-off frequency of 50 Hz. (π-section only)	5	CO3	L3	1.2.1, 1.4.1, 2.1.1
	Q3(D)	Design a high pass filter for a cut-off frequency of 50 Hz. (T-section only)	5	CO3	L3	1.2.1, 1.4.1, 2.1.1
	Q3(E)	Design a T-section constant-K high-pass filter having cut-off frequency of 10 kHZ and design impedance Ro = 600 ohms. Find its characteristic impedance and constant at 25 kHz.	7.5	CO3	L3	1.2.1, 1.4.1, 2.1.1
	Q3(F)	A prototype high-pass filter has a cut-off frequency of 10 kHz and design impedance of 600 ohm. Find the values of L and C. Also find attenuation in dB and phase shift in degrees at a frequency of 8 kHz.	7.5	CO3	L3	1.2.1, 1.4.1, 2.1.1
PART-D	Q4(A)	Find the driving point impedance of the network shown in figure 	5	CO4	L3	1.2.1, 1.4.1,
	Q4(B)	Determine whether the function $Z(S) = \frac{(s+2)(s+4)}{(s+1)(s+3)}$ is positive real or not.	5	CO4	L3	2.1.1, 3,1,1
	Q4(C)	Check whether the given polynomial $P(S) = s^4 + s^3 + 2s^2 + 4s + 1$ is Hurwitz or not.	5	CO4	L4	2.1.1, 3,1,1
	Q4(D)	Find the range of values of a so that $P(S) = 2s^4 + s^3 + as^2 + s + 2$ is Hurwitz.	5	CO4	L4	1.2.1,1 .4.1,
	Q4(E)	An impedance function is given by $Z(S) = \frac{(s+1)(s+4)}{s(s+2)(s+5)}$ Find the RC representation of Foster-II and Cauer-II forms.	7.5	CO4	L3	1.2.1, 1.4.1, 2.1.1, 3,1,1
	Q4(F)	Synthesize the following L-C driving point impedance using Cauer forms. $Z(S) = \frac{s(s^2+4)(s^2+16)}{(s^2+9)(s^2+25)}$	7.5	CO4	L3	1.2.1, 1.4.1, 2.1.1, 3,1,1

********** END **********

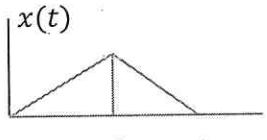
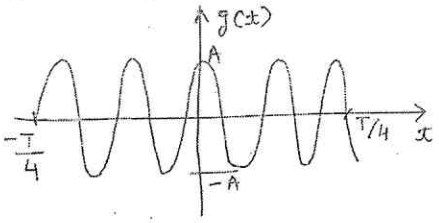
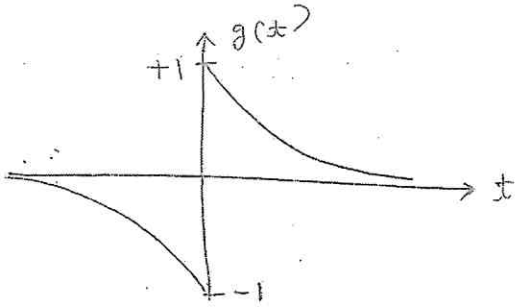
****

MANAV RACHNA UNIVERSITY
SCHOOL OF ENGINEERING
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
"End Semester Examination, Dec-2023"

SEMESTER	**III**	**DATE OF EXAM**	**21.12.2023 (II)**
COURSE NAME	**SIGNALS AND SYSTEMS**	**COURSE CODE**	**ECH204B**
PROGRAM	**B.TECH ECE**	**CREDITS**	**4**
TIME DURATION	**3 hrs**	**MAX. MARKS**	**100**
NAME OF FACULTY	**LOKESH BHARDWAJ**	**NAME OF COURSE COORDINATOR**	**LOKESH BHARDWAJ**

Note: All questions are compulsory.

Q.NO.		QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART-A	1(A)	Draw the following signal: $x(t) = 3\delta(t-2) - 2\delta(t-4)$	2	CO1	L1	1.2.1
	1(B)	Formulate and write the relationship between $\delta(t)$ and $u(t)$	2	CO1	L2	1.2.1
	1(C)	With respect to $h(t)$, comment on the stability of an LTI system.	2	CO1	L3	1.2.1
	1(D)	What are 1-D and multi-dimensional signals? Give examples.	2	CO1	L2	1.2.1
	1(E)	What are causal and non-causal systems? Given one example of each.	2	CO1	L2	1.3.1
	1(F)	Determine whether the following signal is Energy or Power signal. Hence, evaluate the same. $x[n] = e^{j5n}u[n]$	5	CO1	L4	1.1.1
PART-B	2(A)	Draw the waveform of $3rect(t/4T)$	2	CO2	L1	1.3.1
	2(B)	What is the Fourier Transform of Signum function?	2	CO2	L2	1.1.1, 1.3.1
	2(C)	If $G(f)$ is the Fourier transform of $g(t)$, what is the Fourier Transform of $g(kt)$.	2	CO2	L2	1.2.1

	2(D)	What is the condition for a system to be Anti-causal and stable in Z-Transform.	2	CO2	L2	1.2.1
	2(E)	If $X(Z) = 1/(1 - 2Z^{-1})$ with ROC: $Z > 2$, What is $x[n]$.	2	CO2	L2	1.2.1
	2(F)	Find even and odd parts of the following signal. $g(t) = 4rect[t/T - 1/6]$	5	CO2	L3	1.1.1, 1.3.1
PART-C	Q3(A)	Identify whether the following input-output relationship is causal or not. $y[n] = \sin[n + 3].x[n - 2]$	6	CO2	L3	1.3.1, 1.4.1, 2.3.1,3.1.1
	Q3(B)	Transform the following signal: $x\left(\frac{2}{3}t + 1\right)$ 	6	CO3	L3	1.3.1, 2.3.1
	Q3(C)	For an impulse train, calculate the complex coefficient of complex exponential Fourier Series and Hence determine the Fourier Transform and draw the spectrum.	6+5	CO3	L3	2.3.1, 3.2.1
	Q3(D)	Determine the Fourier Transform of the signal given below: 	6	CO3	L4	2.3.1, 2.3.2
	Q3(E)	Using the following signal given below, evaluate the Fourier Transform of Sgn(t) 	6	CO3	L4	2.3.1, 2.3.2

PART-D	Q4(A)	Evaluate the area under the curve given below: $\int_{-\infty}^{+\infty} 3Sinc(fT)\,dt$	7	CO4	L4	1.4.1
	Q4(B)	Obtain the Z-Transform for the following signals given below: (a). $x[n] = \cos[w_0 n]\,u[n]$ (b). $x[n] = 1; 0 \le n \le N-1$ (c). $x[n] = [1, 2, 3, 2, 4]$ ↑ Hence find the ROC of all parts.	3+3+2	CO4	L3	1.4.1, 2.3.1
	Q4(C)	(a). For the following signal $x[n] = \propto^n u[n]$ and impulse response $h[n] = \beta^n u[n]$, evaluate $y[n] = x[n] * h[n]$. Given $Y[Z] = X[Z].H[Z]$ (b). Find $X[Z]$ for $x[n] = [sinw_0 n]u[n]$	7+3	CO4	L4	1.4.1, 2.3.1, 2.3.2
	Q4(D)	Evaluate the sequence $x[n]$ for the Z-Transform: (a). $X(Z) = \log(1 + aZ^{-1})$, $\lvert Z\rvert > \lvert a\rvert$ (b). $X(Z) = {}^{1}/_{1+\frac{1}{4}Z^{-1}}$, $\lvert Z\rvert < \lvert\frac{1}{4}\rvert$	8+2	CO4	L4	1.4.1, 2.3.1, 2.3.2

********** END **********

****

MANAV RACHNA UNIVERSITY
SCHOOL OF ENGINEERING
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
"End Semester Examination, Dec-2023"

SEMESTER	**V**	**DATE OF EXAM**	8/12/2023 (I)
COURSE NAME	**SYSTEM DESIGN USING VERILOG**	**COURSE CODE**	**ECH323B-T**
PROGRAM	**B.TECH ECE VLSI**	**CREDITS**	**3**
TIME DURATION	3HRS ECE-VLSI	**MAX. MARKS**	**100**
NAME OF FACULTY	**NEHA SHARMA(TRUECHIP)**	**NAME OF COURSE COORDINATOR**	**NEHA SHARMA(TRUECHIP)**

Note: All questions are compulsory.

Q.NO.		QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART-A	1(A)	Explain the purpose of a testbench in Verilog?	2	CO1	L1	1.1.1, 1.2.1
	1(B)	Explain the difference between blocking and non-blocking assignments in Verilog.	2	CO1	L2	1.1.1, 1.2.1
	1(C)	Identify the need of sensitivity list in always block?	2	CO1	L3	1.1.1, 1.2.1
	1(D)	Explain the different types of Verilog delays?	2	CO1	L2	1.1.1, 1.2.1
	1(E)	Describe the difference between combinational and sequential logic in Verilog.	2	CO1	L3	1.2.1, 1.3.1
	1(F)	Define half adder	5	CO1	L2	1.1. 1, 1.3.1
PART-B	2(A)	How does parameterization work in Verilog modules?	2	CO2	L1	1.3.1
	2(B)	List the advantages of using always @(posedge clk) compared to always @(*) in Verilog?	2	CO2	L2	1.1.1, 1.3.1
	2(C)	Explain the difference between a task and a function in Verilog.	2	CO2	L2	1.2.1, 1.3.1
	2(D)	Explain is the significance of the wire and reg keywords in Verilog?	2	CO2	L2	1.2.1
	2(E)	Explain hierarchical design?	2	CO2	L2	1.2.1
	2(F)	Write Verilog code for a 2:1 multiplexer	5	CO2	L3	1.1.1, 1.3.1
PART-C	Q3(A)	Define multiplexer?	5	CO3	L2	1.3.1,1.4.1, 2.3.1,3.1.1
	Q3(B)	Write Verilog code for a 4:1 multiplexer.	5	CO3	L3	1.3.1, 2.3.1
	Q3(C)	Explain decoder ?	5	CO3	L3	2.3.1, 3.2.1
	Q3(D)	Write the code for 2:4 decoder.	5	CO3	L3	2.3.1, 2.3.2
	Q3(E)	Explain encoder ?	5	CO3	L2	1.4.1

****

	Q3(F)	Implement a 4-to-2 encoder in Verilog.	5	CO3	L4	1.4.1,2.3.1
	Q3(G)	Explain the working of D Flip Flop ?	5	CO3	L2	1.4.1, 2.3.1, 2.3.2
PART-D	Q4(A)	Create a D flip-flop using Verilog.	5	CO4	L4	1.4.1, 2.3.1, 2.3.2
	Q4(B)	Explain module ?	5	CO4	L3	1.4.1, 2.3.1
	Q4(C)	Explain Instance ?	5	CO4	L2	1.4.1, 2.3.1
	Q4(D)	Explain the purpose of a simulation in Verilog, and how is it conducted?	5	CO4	L3	1.4.1,2.3.1, 2.3.2
	Q4(E)	Which type of datatype is supposed by Verilog ?	5	CO4	L2	1.4.1, 2.3.1, 2.3.2
	Q4(F)	Define the flow of test code ?	5	CO4	L2	1.4.1, 2.3.1, 2.3.2
	Q4(G)	explain the use of sensitivity list ?	5	CO4	L2	1.4.1, 2.3.1, 2.3.2

********** END **********

****

MANAV RACHNA UNIVERSITY

SCHOOL OF ENGINEERING

DEPARTMENT OF ECE

"End Semester Examination, Dec-2023"

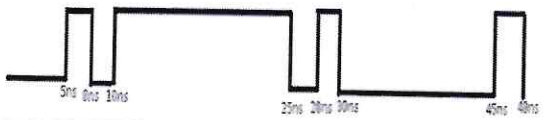
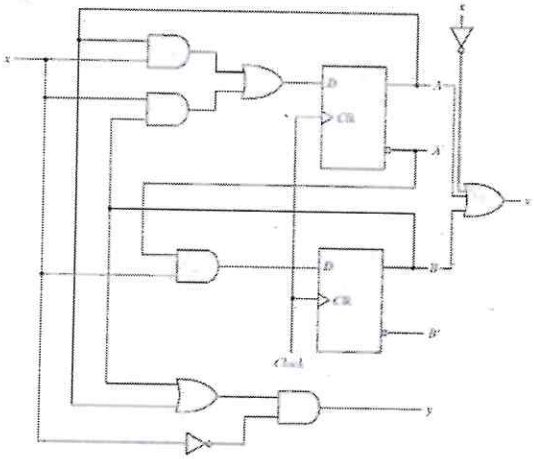
SEMESTER	**5**	**DATE OF EXAM**	12/12/2023 (I)
COURSE NAME	**DIGITAL SYSTEM DESIGN**	**COURSE CODE**	ECH3096-T
PROGRAM	**B.Tech. ECE/ECE-VLSI**	**CREDITS**	**4**
TIME DURATION	**3 hrs**	**MAX. MARKS**	**80**
NAME OF FACULTY	**Dr. Nitika**	**NAME OF COURSE COORDINATOR**	**Dr. Nitika**

Note: All questions are compulsory.

Chau Pathak

Q.NO.		QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART-A	Q1	(A) Draw the flowchart of Digital design flow. (B) Discuss the digital design flow in detail. OR (A) Define Data type. Name different data types available in VHDL. (B) Discuss Scalar data type in detail.	5+5	CO2	L2	1.4.1, 2.2.2, 2.2.3
PART-B	Q2	Discuss following VHDL statements with proper syntax and example. a) EXIT b) Unaffected value c) Assertion and report statement d) component declaration OR a) Draw the signal driver for given signal assignment statements. **Process** **Begin** **Z <= 1 after 5 ns, 21 after 9 ns 6 after 10 ns, 12 after 19 ns;** **Z <= reject 4 ns inertial 6 after 12 ns, 20 after 17 ns, 15 after 24ns;** **Wait;** **end process;** b) Sketch the output waveform for given signal assignment statement. Z<= reject 5ns inertial A after 10ns;	2.5 each (10)	CO1	L2	1.4.1, 2.2.2, 2.2.3

****

						
PART-C	Q3 (A)	(A) Draw the diagram for 4:1 multiplexer. (B) Design the structural model in VHDL for 4:1 multiplexer. OR (A) Draw the diagram for Decade Counter. (B) Design Decade Counter in VHDL .	3+7	CO3	L3	1.4.1, 2.2.2, 2.2.3
	3(B)	(A) Discuss the process of creating test benches in VHDL. (B) Provide an example test bench for a half adder.	4+6	CO3	L3	1.4.1, 2.2.2, 2.2.3
	3(C)	For the given clocked sequential circuit derive the following: (a)State Equation (b) State Table (c) State Diagram  **OR** Design the Boolean expression in VHDL with suitable diagram and proper truth table. Y=A'B+CD	4+3+3	CO3	L3	1.4.1, 2.2.2, 2.2.3
PART-D	Q4 (A)	Implement the following Boolean functions using PAL. *F1 = A'B+AC'+A'BC'* *F2= AC'+B'C* **OR** Write short note on following. 1. FPGA 2. PLA	6+6	CO4	L4, L2	1.4.1, 2.2.2, 2.2.3
	4(B)	Design 8-bit ALU in VHDL	8	CO4	L4	1.4.1, 2.2.2, 2.2.3
	Q4 (C)	(A) Draw the diagram for Microcomputer System. (B) Design Microcomputer System in VHDL. OR (A) Draw the diagram for Memory sub-System. (B) Design Memory sub-System in VHDL.	4+6	CO4	L2	1.4.1, 2.2.2, 2.2.3

********** END **********

****

MANAV RACHNA UNIVERSITY
SCHOOL OF ENGINNERING
DEPARTMENT OF ELECTRONICS & COMMUNICATION
"End Semester Examination, Dec-2023"

SEMESTER	**5TH**	**DATE OF EXAM/SESSION**	**19/12/2023**
COURSE NAME	**MICROCONTROLLERS & INTERFACING**	**COURSE CODE**	**ECH316B-T (I)**
PROGRAM	**B.Tech ECE/ ECE-VLSI**	**CREDITS**	**4**
TIME DURATION	**3 HOUR**	**MAX. MARKS**	**100**
NAME OF FACULTY	**VIJAY KUMAR GILL**	**NAME OF COURSE COORDINATOR**	**VIJAY KUMAR GILL**

Q.NO.		QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART-A	Q. 1a	Explain the advantages and disadvantages of CISC and RISC architectures.	7	CO1	L2	1.4.1, 2.2.4
	Q. 1b	Explain how the memory hierarchy contributes to overall system performance	8	CO1, CO2	L2	1.4.1, 2.2.4
PART-B	Q. 2a	Identify and define the primary CPU registers in a PIC microcontroller.	7	CO2, CO3	L3	1.4.1, 2.2.4
	Q. 2b	Explain how pipelining improves the performance of a PIC microcontroller.	8	CO2, CO3	L2	1.4.1, 2.2.4
PART-C	Q. 3a	Explain and draw the PSW register for 8051 Microcontroller with help of some example.	5	CO2, CO3	L2	1.4.1, 2.2.4

****

	Q. 3b	Build an assembly language the sum of the values 79H, F5H, E2H. Put the sum in registers R0 (low byte) and R5 (high byte).	8	CO1, CO3	L3	1.4.1, 2.2.4
	Q. 3c	Build an assembly language program to (a) load the accumulator with the value 55H, and (b) complement the ACC 700 times	7	CO1, CO3	L3	1.4.1, 2.2.4
	Q. 3d	Develop an assembly language program to generate Square wave of 5ms for 8051 Microcontroller. (Crystal Ferq. = 11.0592 MHz).	7	CO1, CO3	L3	1.4.1, 2.2.4
	Q. 3f	Design an interface between a microcontroller and Matrix Keyboard for a real-time application. Also write the program code using Assembly language program.	8	CO3, CO4	L4	1.4.1, 2.2.4
PART-D	Q. 4a	List three examples of hardware units in an Embedded System.	5	CO2	L1	1.4.1, 2.2.4
	Q. 4b	Discuss the difference between operating systems for general-purpose computers and real-time operating systems (RTOS) used in Embedded Systems.	7	CO3, CO4	L3	1.4.1, 2.2.4
	Q. 4c	Provide three real-world examples of products or applications that heavily rely on Embedded Systems.	7	CO4	L4	1.4.1, 2.2.4
	Q. 4d	Differentiate between RAM and ROM memory.	8	CO2	L2	1.4.1, 2.2.4
	Q. 4e	Summarize the importance of bus architecture in interfacing different components of an Embedded System.	8	CO3, CO4	L2	1.4.1, 2.2.4

********** END **********

****

MANAV RACHNA UNIVERSITY
SCHOOL OF ENGINEERING
DEPARTMENT OF ELECTRONICS AND COMMUNICATION
"End Semester Examination, Dec-2023"

SEMESTER	**7TH**	**DATE OF EXAM/SESSION**	**11.12.2023 (II)**
COURSE NAME	**INTRODUCTION TO WIRELESS SENSOR NETWORKS**	**COURSE CODE**	**ECH403B**
PROGRAM	**B.TECH. (ECE)**	**CREDITS**	**4**
TIME DURATION	**3 Hrs.**	**MAX. MARKS**	**100**
NAME OF FACULTY	**Dr. Piyush Charan**	**NAME OF COURSE COORDINATOR**	**Dr. Piyush Charan**

Note: Attempt all questions.

Charu Pathak

Q.NO.		QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART-A	Q1(A).	Define the term 'MANETs' (Mobile Ad Hoc Networks) in the context of wireless sensor networks, demonstrating your understanding of its role and significance.	2	CO1	BT2	1.2.1, 2.1.2
	1(B).	Distinguish between MANETs and WSNs. Giving examples of each	3	CO1	BT2	2.1.2
	Q2(A).	Examine the various challenges encountered when deploying a Wireless Sensor based Network.	5	CO1	BT4	1.4.1, 2.1.2
	2(B).	Apply your knowledge to discuss the transceiver design considerations for Wireless Sensor Networks (WSNs), covering key factors such as power consumption, communication range, and data rate, and how these considerations impact the overall performance of the network	5	CO1	BT3	2.2.1, 2.2.2
PART-B	Q3(A).	Explain the concept of data aggregation in wireless sensor networks.	2	CO2	BT2	2.1.2, 2.3.1
	3(B).	Distinguish between the applications of WSNs in Agriculture and Healthcare sectors respectively.	3	CO2	BT3	1.2.1, 2.1.2

****

	Q4(A).	Analyze the DSDV (Destination-Sequenced Distance Vector) routing protocol, providing a comprehensive explanation. Critically discuss the various processes involved in this routing scheme, examining their interactions and evaluating their impact on network dynamics and performance.	5	CO2	BT4	1.2. 2.1. 2.3
	4(B).	Elucidate on the exposed node problem in WSNs? Suggest a solution to overcome it.	5	CO2	BT4	2.1 2.3
PART-C	Q5(A).	Differentiate between contention-based and schedule-based MAC protocols.	7	CO3	BT3	2.1 2.3
	5(B).	Analyze the challenges faced in deploying wireless sensor networks in harsh environments.	7	CO3	BT4	2.3
	Q6(A).	What are power aware MAC protocols? Discuss the LEACH routing protocol in detail.	7	CO3	BT2	3.
	6(B).	Discuss the SMAC (Sensor MAC) protocol in detail, demonstrating your understanding of its key features and functions in wireless sensor networks.	7	CO3	BT2	2. 2.
	Q7.	Compare and contrast the advantages of the BMAC (Berkeley MAC) protocol with the SMAC (Sensor MAC) protocol in wireless sensor networks.	7	CO3	BT4	2 2
PART-D	Q8(A).	Develop a wireless sensor network application for habitat monitoring of a wild animal in a forest. Discuss the type of sensors deployed for such an application.	7	CO4	BT3	2 2
	8(B).	Apply your learning to describe the architecture for sensor deployment in Precision Agriculture. Discuss the types of sensors you would use to capture relevant data, considering factors such as crop health, soil conditions, and environmental variables	7	CO4	BT3	
	Q9(A).	WSNs are prone to various kinds of attacks. Elucidate on Denial of Service and flooding attacks.	7	CO4	BT4	
	9(B).	Evaluate the ethical and privacy implications of using wireless sensor networks in pervasive healthcare.	7	CO4	BT4	
	Q10.	Distinguish between COOJA and NS2 simulation software for WSNs?	7	CO4	BT3	

********** END **********

****

MANAV RACHNA UNIVERSITY

SCHOOL OF ENGINEERING

DEPARTMENT OF ELECTRONICS & COMMUNICATION

END TERM EXAMINATION (DEC-2023)

COURSE NAME: VLSI TESTING	COURSE CODE: ECH411 T	CREDIT: 4	MAX. MARKS: 100	TIME DURATION: 3 HRS	DATE OF EXAM: 16/12/2023
PROGRAM: B.TECH ECE		SEMESTER: 7TH			Session II
FACULTY NAME: DR. MEENAKSHI GUPTA			NAME OF COURSE COORDINATOR: DR. MEENAKSHI GUPTA		

Q.NO.		QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART-A	Q1: (A)	State the two basic differences between combinational and sequential circuits.	4	CO1	L1	2.1
	(B)	Give the expressions to compute the controllability and observability values for a T flip flop with a synchronous clear input.	4	CO2	L1	2.3
	(C)	What do you mean by BIST?	3	CO1	L2	3.2
	(D)	Draw the functional diagram of the TAP.	4	CO1	L2	3.2
PART-B	Q2: (A)	What are the two basic steps in Test Generation using Path Sensitization method?	4	CO2	L3	5.1, 8.1
	(B)	Give the name of two algorithms that is used for pattern generation in Embedded RAM's.	4	CO1	L1	9.1
	(C)	State the need for Ad-hoc design in testing a digital circuit.	4	CO1	L1	5.4
	(D)	What do you mean by Pseudo Exhaustive test?	3	CO2	L3	7.2
PART-C	Q3: (A)	(i)Write a note on the event driven simulation and what action an event driven true value simulator will take when it evaluates a zero-delay gate. (ii)Using functional fault modeling, determine the test sets for the following: 1.A 8-line to 1-line multiplexer 2.A 3 to 8 decoder	4+5	CO2	L3	5.1, 8.2
	(B)	For a 2-input CMOS NAND circuit: (i)Find a two-pattern test for each single transistor stuck-open fault. (ii)Rearrange the eight vectors in a compact set, and show that this set can be constructed from the single stuck-at faults tests for the NAND gate. For each stuck- at fault of the NAND gate, find an equivalent transistor (stuck-open, stuck-short and combination) fault.	5+4	CO1	L3	9.1, 10,1
	(C)	Explain in detail about LSSD with example and justify how it is specifically used to scan paths in sensitive latches.	3+6	CO3	L2	2, 8.1, 7.2
	(D)	Discuss in detail about various DFT approaches used in testing a digital circuit.	8	CO3	L3	9.2
PART-D	Q4: (A)	Explain with circuit diagram, how double latch and single latch LSSD techniques to improve testability.	2+4+3	CO3	L2	3.2
	(B)	Give comparision between testing and verification.	8	CO3	L4	2.1
	(C)	Draw the life cycle of VLSI testing and discuss in detail.	3+6	CO4	L4	1.1, 4.2
	(D)	Explain transistor faults in detail. (any three types)	3*3	CO4	L2	5.2

********** END **********

DEPARTMENT OF ECE

ODD SEMESTER (DEC-2023)

END TERM EXAMINATION

COURSE NAME:RTL Simulation and Synthesis with PLDs	COURSE CODE:ECH501B-T	CREDIT:3	MAX. MARKS:80	TIME DURATION:3 Hrs.	DATE OF EXAM: 12/12/2023
PROGRAM: M.Tech.		SEMESTER: I		Session: I	
FACULTY NAME: Dr. Nitika			NAME OF COURSE COORDINATOR: Dr. Nitika		

Q.NO.		QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART-A	1(A)	(a) Define Finite State Machine (FSM) and explain its significance in digital circuit design. (b) Differentiate between Mealy and Moore machines. **OR** (a) Define meta-stability in the context of digital circuits. (b) Discuss the factors that contribute to meta-stability and its potential impact on system performance.	5 each (10)	CO1	L2	1.4.1, 2.2.2, 2.2.3
PART-B	Q2(A)	(a) Develop a VHDL code of 16 to 1 multiplexer using CASE statement. (b) Explain various loop statements in Verilog.	5 each (10)	CO2	L2	1.4.1, 2.2.2, 2.2.3
PART-C	Q3(A)	(a) Outline the steps involved in physical verification during the design process. (b) How does physical verification contribute to ensuring the manufacturability of the final product?	5 each (10)	CO3	l3	1.4.1, 2.2.2, 2.2.3
	3(B)	(a) Outline the ASIC (Application-Specific Integrated Circuit) design flow. (b)Discuss each stage of the flow, including specification, synthesis, and physical design.	5 each (10)	CO3	L2	1.4.1, 2.2.2, 2.2.3
	3(C)	(a) Explain the architecture of Field-Programmable Gate Arrays (FPGAs). (b)How does the reconfigurability of FPGAs contribute to their versatility in various applications?	5 each (10)	CO3	L2	1.4.1, 2.2.2, 2.2.3
PART-D	Q4(A)	(a) Compare and contrast the different forms of IP available during the design process. (b) List the advantages and challenges faced while using different forms of IP. (c)How does the choice of IP form impact the overall design cycle?	7+7+6	CO4	L2	1.4.1, 2.2.2, 2.2.3
	4(B)	(a) Discuss the speed issues associated with high-performance digital designs. (b) What factors contribute to timing violations, and how can these issues be addressed during the design phase? OR (a) Define Design for Testability (DFT) and its significance in the context of digital circuit design. (b) How does DFT help in improving the testability and manufacturability of integrated circuits?	5 each (10)	CO4	L2	1.4.1, 2.2.2, 2.2.3

********** END **********

MANAV RACHNA UNIVERSITY
SCHOOL OF ENGINNERING
DEPARTMENT OF ELECTRONICS & COMMUNICATION
"End Semester Examination, Dec-2023"

SEMESTER	**1st**	**DATE OF EXAM/SESSION**	14/12/2023 (I)
COURSE NAME	**MICROCONTROLLERS AND PROGRAMMABLE DIGITAL SIGNAL PROCESSORS**	**COURSE CODE**	**ECH502B-T**
PROGRAM	**M.Tech ECE**	**CREDITS**	**3**
TIME DURATION	**3 HOUR**	**MAX. MARKS**	**80**
NAME OF FACULTY	**VIJAY KUMAR GILL**	**NAME OF COURSE COORDINATOR**	**VIJAY KUMAR GILL**

Q.NO.		QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART-A	Q. A1	How Stack is implemented in Cortex-M3?	5	CO1	B2	1.1.1, 1.3.1
	Q. A2	Outline the reset sequence of the ARM Cortex-M3 processor.	5	CO1	B2	1.1.1, 1.3.1
PART-B	Q. B1	Explain following instructions with examples: i) CLZ ii) MVN	5	CO2	B1	1.1.1, 1.3.1
	Q. B2	How can system designers minimize interrupt latency for critical applications?	5	CO2	B3	1.1.1, 1.3.1
PART-C	Q. C1	Discuss the efficiency and limitations of barrel shifters in the context of P-DSP architectures.	5+5	CO3	B1	1.1.1, 1.3.1

****

	Q. C2	What is multi-port memory, and how is it utilized in P-DSP processors? List few examples of scenarios where multi-port memory is beneficial in DSP applications.	6+6+8	CO3	B3	1.1.1, 1.3.1
PART-D	Q. D1	Explain the addressing modes for TMS320C6000 series processor? Also list few examples for the same	9+6	CO4	B2	1.1.1, 1.3.1
	Q. D2	Illustrate the functional block diagram of TMS320C25 and also list few limitation of TMS320C25?	8+7	CO4	B3	1.1.1, 1.3.1

********** END **********

****

MANAV RACHNA UNIVERSITY
Declared as State Private University vide Haryana Act 26 of 2014

SCHOOL OF ENGINEERING

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

"End Semester Examination, Dec-2023"

SEMESTER	**I**	**DATE OF EXAM**	16/12/2023 (I)
SUBJECT NAME	**VLSI Signal Processing**	**SUBJECT CODE**	**ECH505B**
BRANCH	**ECE**	**SESSION**	I
TIME	8.30 - 11.30	**MAX. MARKS**	**80**
PROGRAM	**M.TECH ECE**	**CREDITS**	**3**
NAME OF FACULTY	**BHANU PRATAP CHAUDHARY**	**NAME OF COURSE COORDINATOR**	**BHANU PRATAP CHAUDHARY** Bhanu Pratap

Note: All questions are compulsory.

Q.NO.		QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART-A	1(A)	Explain the fundamental differences between time-domain and frequency-domain DSP algorithms. Provide examples of applications where each type is most suitable.	5	CO1	L1	1.4.1,2.2.1, 2.2.2
	1(B)	Differentiate between loop-bound and iteration-bound in the context of DSP algorithms. Provide an example to illustrate the concept.	5	CO1	L2	1.4.1,2.1.1
	1(C)	Discuss the significance and techniques involved in retiming for optimizing DSP algorithms.	5	CO1	L2	1.4.1,2.1.1
PART-B	2(A)	Explain the process of round-off noise calculation in lattice filters.	5	CO2	L3	1.3.1,1.4.1
	2(B)	Given a space representation containing delays, outline the steps for designing a systolic array.	5	CO2	L3	1.3.1,1.4.1
	2(C)	Analyze the basic structure and functioning of a Digital Lattice filter.	5	CO2	L4	3.1.1,3.4.1
PART-C	Q3(A)	Propose a scenario where Power Analysis is crucial for VLSI design. Discuss the effectiveness of different Power Reduction Techniques in specific DSP applications.	7	CO3	L4	3.1.1,3.4.1
	Q3(B)	What are the advantages and challenges associated with Asynchronous Pipelining? Discuss the use of Signal Transition Graphs in the analysis of asynchronous pipelined circuits.	6	CO3	L2	2.1.1,2.2.2, 2.4.1

****

	Q3(C)	Define Clock Skew and its impact on the performance of bit-level pipelined VLSI designs. Discuss the challenges associated with Clock Distribution in such designs.	6	CO3	L3	2.2.2,2.4.1, 2.4.2
	Q3(D)	Evaluate the trade-offs between scaling and power consumption in digital signal processing.	6	CO3	L4	3.1.1,3.4.1
PART-D	Q4(A)	Choose a real-world application where programmable DSP processors are extensively used. Explain the significance of DSP processors in optimizing performance for the chosen application.	6	CO4	L1	1.4.1,2.2.1, 2.2.2
	Q4(B)	Discuss how DSP processors are integrated into larger systems for signal processing applications. Highlight any challenges or considerations involved in integrating DSP processors into complex systems.	6	CO4	L3	2.2.2,2.4.1, 2.4.2
	Q4(C)	Identify a recent innovation in DSP processor technology. Discuss its potential impact on the field of digital signal processing.	6	CO4	L3	3.1.1,3.4.1
	Q4(D)	Analyze the role of DSP processors in optimizing signal processing tasks for mobile and wireless communication.	7	CO4	L4	3.1.1,3.4.1

********** END **********

****

MANAV RACHNA UNIVERSITY

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

ODD SEMESTER (DEC-2023)

END TERM EXAMINATION

COURSE NAME:CAD for DIGITAL SYSTEM	COURSE CODE:ECH509B	CREDIT:3	MAX. MARKS:80 Session - I	TIME DURATION:3hrs	DATE OF EXAM:19.12.23
PROGRAM:(M. Tech.) - ELECTRONICS & COMMUNICATION ENGINEERING WITH SPECIALIZATION IN EMBEDDED SYSTEM AND VLSI				SEMESTER: I	
FACULTY NAME:Dr.Shruti Vashist			NAME OF COURSE COORDINATOR:Dr.Shruti Vashist		

Q.NO.		QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART-A	1(A)	Explain the concept of Die Attachment Styles	2	CO1	BT2	2.1.2
	1(B)	What is the significance of Design Rules in VLSI layout	2	CO1	BT3	2.1.2
	1(C)	Describe the CMOS Fabrication Process in VLSI	2	CO1	BT1	3.1.1
	1(D)	Express the SIA Roadmap in the context of VLSI design	2	CO2	BT3	3.2.2
	1(E)	Signify the importance of lithography in VLSI fabrication	2	CO1	BT3	3.2.1
	1(F)	Discuss the importance of layout specification languages in VLSI design	2	CO2	BT3	3.3.1
	1(G)	Explain the challenges and limitations associated with existing data structures in VLSI design.	3	CO2	BT4	3.1.1
PART-B	Q2(A)	Describe the role of computational complexity in VLSI design and how it influences the choice of algorithms	7	CO2,CO3	BT4	3.2.1
	Q2(B)	Kernighan-Lin Algorithm used for in combinational optimization-Justify	3	CO3	BT3	3.3.1
	Q3(A)	Analyse the role of Simulated Annealing in floorplanning algorithms	5	CO1	BT3	4.2.1
PART-C	Q4(A)	Explain the significance of Simulated Evolution Algorithms in floor planning and how they contribute to overcoming optimization challenges.	7	CO2	BT3	4.3.1
	Q4(B)	How does the Sequence-Pair Technique contribute to placement algorithms	5	CO3	BT2	3.1.1
	Q5(A)	Explore the significance of the Resistive Network Optimization algorithm in routing and how it addresses challenges related to signal integrity	7	CO3	BT3	3.2.1
	Q5(B)	In VHDL, express the need for simulation	6	CO2	BT3	3.3.1
PART-D	Q6(A)	Create the process of logic synthesis and express its significance in the design flow of digital circuits	7	CO3	BT5	3.2.1
	Q6(B)	Provide a brief overview of Finite State Machines (FSMs) and mention their applications	5	CO3	BT2	3.3.1
	Q7(A)	Describe the process of logic synthesis and its significance in the design flow of digital circuits.	8	CO3	BT3	3.2.1
	Q7(B)	Differentiate between combinational and sequential circuits. Provide an example of each	5	CO3	BT2	6.1.1

********** END **********

MANAV RACHNA UNIVERSITY

MANAV RACHNA UNIVERSITY
SCHOOL OF ENGINEERING
DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
"End Semester Examination, Dec-2023"

SEMESTER	**I**	**DATE OF EXAM**	21/12/2-23 (I)
COURSE NAME	**RESEARCH METHODOLOGY & IPR**	**COURSE CODE**	**ECS510B**
PROGRAM	**M.TECH ECE**	**CREDITS**	**2**
TIME DURATION	1.30 hrs.	**MAX. MARKS**	**50**
NAME OF FACULTY	**LOKESH BHARDWAJ**	**NAME OF COURSE COORDINATOR**	**LOKESH BHARDWAJ** Lokesh Bhardwaj

Note: *Part A is short answer type. Part B- Questions will be of descriptive type or numerical.*

Q.NO.		QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART-A	1(A)	Explain briefly the concept of intellectual property infringement.	2	CO1	L1	1.2.1
	1(B)	What is patent harmonization?	2	CO1	L2	1.2.1
	1(C)	What are trends in patent information dissemination?	2	CO3	L2	1.2.1
	1(D)	Explain briefly the impact of digitalization on the administration of patent systems.	2	CO2	L1	1.2.1
	1(E)	What is the importance of using a standardized citation style in a research proposal?	2	CO4	L2	1.3.1
PART-B	Q2(A)	What is the fundamental purpose of patents, designs, trade, and copyright in protecting intellectual property?	6	CO1	L2	1.1.1
	Q2(B)	Explain the step-by-step process of obtaining a patent for a new technological innovation.	4	CO1	L1	1.1.1, 1.3.1
	Q3(A)	Explore the challenges and debates surrounding the scope of patent rights in emerging technologies like biotechnology and artificial intelligence.	6	CO2	L4	1.3.1, 1.4.1, 2.3.1, 3.1.1

****

3(B)	Examine the challenges and opportunities associated with the international transfer of patented technologies.	4	CO2	L4	1.3.1, 2.3.1
Q4(A)	Discuss the role of patent databases in conducting prior art searches and assessing the novelty of inventions.	5	CO3	L2	2.3.1, 3.2.1
4(B)	Outline the typical structure and format of a research proposal, including any specific guidelines or standards commonly followed	10	CO3	L4	2.3.1, 2.3.2
Q5	Explain how identifying gaps in existing knowledge can serve as a source for formulating research problems.	5	CO4	L1, L2	1.4.1

********** END **********

****

MANAV RACHNA UNIVERSITY

SCHOOL OF ENGINEERING

DEPARTMENT OF ELECTRONICS & COMMUNICATION

END TERM EXAMINATION (DEC-2023)

COURSE NAME: NANO MATERIALS & NANO TECHNOLOGY	COURSE CODE: ECH602B T	CREDIT: 3	MAX. MARKS: 100	TIME DURATION: 3 HRS	DATE OF EXAM: 11/12/2023
PROGRAM: M.TECH ECE		SEMESTER: 3RD			Session II
FACULTY NAME: DR. MEENAKSHI GUPTA		NAME OF COURSE COORDINATOR: DR. MEENAKSHI GUPTA			

Q.NO.		QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART-A	Q1: (A)	Define Nanotechnology.	3	CO1	L1	1.4
	(B)	Classify the different modes of Nanomaterials.	4	CO1	L4	3.6
	(C)	Identify the challenges faced by Nanotechnology.	4	CO1	L3	3.4
	(D)	List out the Applications of Nanotechnology in electronics.	4	CO2	L1	1.2
PART-B	Q2: (A)	Write short note on Carbon nanotube.	4	CO2	L2	4.7
	(B)	Illustrate the applications of nano materials?	4	CO1	L2	9.1
	(C)	Identify the advantages of carbon nano technology.	4	CO2	L3	5.1
	(D)	What are opto elctronics properties?	3	CO1	L1	7.2
PART-C	Q3: (A)	Explain X-Ray Diffraction (XRD).	8	CO3	L2	9.3
	(B)	Discuss the Classification of Nanomaterials in detail. Give the suitable examples.	5+4	CO3	L2	8.4
	(C)	Discuss Bottom up approach of synthesis of Nanomaterial. (Any two types)	4+5	CO4	L2	10.1
	(D)	List out applications of Nanomaterials and neatly explain them.	3+6	CO4	L1	9.2
PART-D	Q4: (A)	Describe the crystal planes and crystal directions in detail.	4+5	CO3	L3	4.1
	(B)	Discuss the four applications of nano technology in medicines.	3+2+2+3	CO3	L2	1.1, 4.2
	(C)	Comparision between homogenous and heterogenous nucleation.	4.5*2	CO4	L4	5.2
	(D)	Write a short note on growth of single crystal.	8	CO3	L2	3.2

********** END **********