



MANAV RACHNA
UNIVERSITY 

Declared as State Private University vide Haryana Act 26 of 2014

MANAV RACHNA UNIVERSITY

END SEMESTER EXAMINATION

SCHOOL OF ENGINEERING

ME

DECEMBER – 2023

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

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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 ADDRESS ED	BLO OM' S LEV EL	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	9	CO3	BT3	1.1.1 1.1.2																										
		<table border="1"> <thead> <tr> <th>No. of Tablets</th> <th>No of Persons cured</th> <th>No. of Tablets</th> <th>No of Persons cured</th> </tr> </thead> <tbody> <tr> <td>4-8</td> <td>11</td> <td>24-28</td> <td>9</td> </tr> <tr> <td>8-12</td> <td>13</td> <td>28-32</td> <td>17</td> </tr> <tr> <td>12-16</td> <td>16</td> <td>32-36</td> <td>6</td> </tr> <tr> <td>16-20</td> <td>14</td> <td>36-40</td> <td>4</td> </tr> <tr> <td>20-24</td> <td>?</td> <td></td> <td></td> </tr> </tbody> </table>	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	?					
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12-16	16	32-36	6																													
16-20	14	36-40	4																													
20-24	?																															
3(B)	Find the Lower quartile (Q_1) and upper quartile(Q_3) from the following data	9		BT4	1.2.1 1.1.2																											
	<table border="1"> <thead> <tr> <th>Overtime Hours</th> <th>Number of Employees</th> <th>Overtime Hours</th> <th>Number of Employees</th> </tr> </thead> <tbody> <tr> <td>20-25</td> <td>50</td> <td>40-45</td> <td>150</td> </tr> <tr> <td>25-30</td> <td>70</td> <td>45-50</td> <td>120</td> </tr> <tr> <td>30-35</td> <td>100</td> <td>50-55</td> <td>70</td> </tr> <tr> <td>35-40</td> <td>180</td> <td>55-60</td> <td>60</td> </tr> </tbody> </table>	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											
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30-35	100	50-55	70																													
35-40	180	55-60	60																													
3(C)	A random sample of 5 students were selected and their grades in Mathematics and Statistics were found to be	8		BT4	1.1.1 1.1.2																											
	<table border="1"> <thead> <tr> <th></th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> </tr> </thead> <tbody> <tr> <td>Maths.</td> <td>85</td> <td>60</td> <td>73</td> <td>40</td> <td>90</td> </tr> <tr> <td>Stats.</td> <td>93</td> <td>75</td> <td>65</td> <td>50</td> <td>80</td> </tr> </tbody> </table> <p>Calculate Spearman's rank correlation coefficients.</p>		1	2	3	4	5	Maths.	85	60	73	40	90	Stats.	93	75	65	50	80													
	1	2	3	4	5																											
Maths.	85	60	73	40	90																											
Stats.	93	75	65	50	80																											
3(D)	From the given data obtain two regression equations using the method of least squares	9		BT3	1.2.1 1.1.2																											
	<table border="1"> <tbody> <tr> <td>X</td> <td>2</td> <td>4</td> <td>6</td> <td>8</td> <td>10</td> </tr> <tr> <td>Y</td> <td>5</td> <td>7</td> <td>9</td> <td>8</td> <td>11</td> </tr> </tbody> </table>	X	2	4	6	8	10	Y	5	7	9	8	11																			
X	2	4	6	8	10																											
Y	5	7	9	8	11																											
PART-D	4(A)	Fit a second degree parabola to the following data	12	CO4	BT4	1.1.1 1.1.2																										
		<table border="1"> <thead> <tr> <th>x</th> <th>1929</th> <th>1930</th> <th>1931</th> <th>1932</th> <th>1933</th> <th>1934</th> <th>1935</th> <th>1936</th> <th>1937</th> </tr> </thead> <tbody> <tr> <td>y</td> <td>352</td> <td>356</td> <td>357</td> <td>358</td> <td>360</td> <td>361</td> <td>361</td> <td>360</td> <td>359</td> </tr> </tbody> </table>	x				1929	1930	1931	1932	1933	1934	1935	1936	1937	y	352	356	357	358	360	361	361	360	359							
x	1929	1930	1931	1932	1933	1934	1935	1936	1937																							
y	352	356	357	358	360	361	361	360	359																							
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	11		BT3	1.2.1 1.1.2																											
	<table border="1"> <thead> <tr> <th>Days</th> <th>Mon.</th> <th>Tue.</th> <th>Wed.</th> <th>Thu.</th> <th>Fri.</th> <th>Sat.</th> </tr> </thead> <tbody> <tr> <td>No. of Parts demanded</td> <td>124</td> <td>125</td> <td>110</td> <td>120</td> <td>126</td> <td>115</td> </tr> </tbody> </table>	Days	Mon.	Tue.	Wed.	Thu.	Fri.	Sat.	No. of Parts demanded	124	125	110	120	126	115																	
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No. of Parts demanded	124	125	110	120	126	115																										

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

Bef ore	23	20	19	21	18	20	18	17	23	16	19
Aft er	24	19	21	18	20	22	20	20	23	20	17

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

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 ADDRESS	BLOO M'S LEVEL	PI
PART A	1(A) Using Taylor's series, compute the value of $\sin 31^\circ$ 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
PART B	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 $\iiint (x+y+z) dx dy dz$ 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
PART C	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
SCHOOL OF SCIENCES
DEPARTMENT OF SCIENCE (Program-Physics)
"End Semester Examination, Dec-2023"

SEMESTER	1 st	DATE OF EXAM/SESSION	14.12.2023 (J)
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	MAR KS	CO ADDRESS ED	BLOOM 'S LEVEL	PI
PART-A	1(a) What voltage must be applied to an electron to produce electrons of wavelength 0.5 \AA ?	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 $^{12}\text{C}^{16}\text{O}$ molecule if the intermolecular separation is 1.2 \AA . Assume the molecule to be rigid rotator. (Given: $h = 6.63 \times 10^{-34} \text{ Js}$, $N_A = 6.02 \times 10^{23}$)	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

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 ADDRESS	BLOOM'S LEVEL	PI
P A R T - 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 scenarios.	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
P A R T - 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

Manjeet Kan

P A R T - 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
P A R T - 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

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. Sampri 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.

Carver

Q.NO.	QUESTIONS	MAR KS	CO ADDRE SSED	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 D	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	1 st	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

Dr. Ankita Gaur
Sundar K. L.

Note: All questions are compulsory.

Q.NO.	QUESTIONS	MA RKS	CO ADD RES SED	BLOOM'S LEVEL																								
PART-A Q.1(a)	Find the median, Q_1 , Q_3 , D_7 and P_{85} from the following data: <table border="1"> <tr> <td>x</td> <td>200-400</td> <td>400-600</td> <td>600-800</td> <td>800-1000</td> <td>1000-1200</td> <td>1200-1400</td> <td>1400-1600</td> <td>1600-1800</td> <td>1800-2000</td> </tr> <tr> <td>f</td> <td>6</td> <td>9</td> <td>11</td> <td>14</td> <td>20</td> <td>15</td> <td>10</td> <td>8</td> <td>7</td> </tr> </table>	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				
	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																			
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 <table border="1"> <tr> <td>Mark</td> <td>0</td> <td>20</td> <td>40</td> <td>60</td> <td>80</td> <td>100</td> <td>120</td> </tr> <tr> <td>more than</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>No. of Students</td> <td>80</td> <td>7</td> <td>50</td> <td>28</td> <td>18</td> <td>9</td> <td>3</td> </tr> </table>	Mark	0	20	40	60	80	100	120	more than								No. of Students	80	7	50	28	18	9	3	7	CO1	BT-3
Mark	0	20	40	60	80	100	120																					
more than																												
No. of Students	80	7	50	28	18	9	3																					
PART-B Q.2(a)	A random variable X has the following probability distribution: <table border="1"> <tr> <td>x</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> <td>8</td> </tr> <tr> <td>$p(x)$</td> <td>A</td> <td>3a</td> <td>5a</td> <td>7a</td> <td>9a</td> <td>11a</td> <td>13a</td> <td>15a</td> <td>17a</td> </tr> </table> <p>(i) Determine the value of a.</p> <p>(ii) Find $P(X < 3)$, $P(X \geq 3)$, $P(2 \leq X < 5)$.</p>	x	0	1	2	3	4	5	6	7	8	$p(x)$	A	3a	5a	7a	9a	11a	13a	15a	17a	8	CO2	BT-3				
	x	0	1	2	3	4	5	6	7	8																		
$p(x)$	A	3a	5a	7a	9a	11a	13a	15a	17a																			
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 <p>(i) Not more than three will be busy?</p>	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 $\begin{aligned} x + y + z &= 6 \\ x + 2y + 3z &= 10 \\ x + 2y + \lambda z &= \mu \end{aligned}$ 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 $\begin{aligned} x + y + z &= 1 \\ 3x + y - 3z &= 5 \\ x - 2y - 5z &= 10 \end{aligned}$ by writing the coefficient matrix as a product of the lower and the upper triangular matrix.	12	CO4	BT-4

***** END *****



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 KAPAH/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 KAPAH <i>Asst. Prof. Meena Kapa</i> <i>Sanjay</i>

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

Q.NO.	QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL
PART I	1(A)	5	CO3	BT3
	1(B)	5	CO1	BT2
	1(C)	5	CO3	BT5
	2(A)	5	CO2	BT1
	2(B)	3+2=5	CO4	BT3
PART II	2(C)	5	CO2	BT3
	3(A)	2.5+2.5= 5	CO4	BT1
	3(B)	2+3=5	CO4	BT4
	3(C)	2+3=5	CO4	BT2
	3(D)	2+3=5	CO2	BT2



DEPARTMENT OF COMPUTER SCIENCE & TECHNOLOGY

"End Term Examination, Dec-2023"

SEMESTER	1 st	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

DEPARTMENT OF EDUCATION AND HUMANITIES

End Term Examination -B. Tech Sem 1

SEMESTER	1	DATE OF EXAM	21-12-2023 (I)
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.

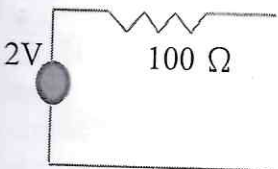
Q.NO.	QUESTIONS	MARKS	CO	BT	
PART-A	1	Differentiate between simple and Complex sentences. Explain them with the help of examples.	05	CO1	BT2
	2	Explain the use of stress in communication.	05	CO2	BT2
PART-B	3 (a)	"Effective communication is obligatory for professional life," Justify this statement.	02	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"

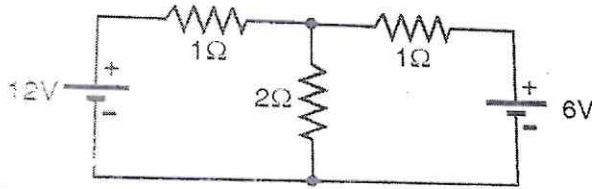
SEMESTER	I	DATE OF EXAM	22.12.2023 (I)
COURSE NAME	BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING	COURSE CODE	ECH103B-T
PROGRAM	B.TECH ECE/CSTI/AIML/R&AI	CREDITS	4
TIME DURATION	3 hrs	MAX. MARKS	100
NAME OF FACULTY	LOKESH BHARDWAJ, BHANU PRATAP CHAUDHARY, K.DEEPA, PIYUSH CHARAN, SUNANDA MENDIRATTA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

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 $2\ \Omega$ 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 $2\ \mu\text{A}$.

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)

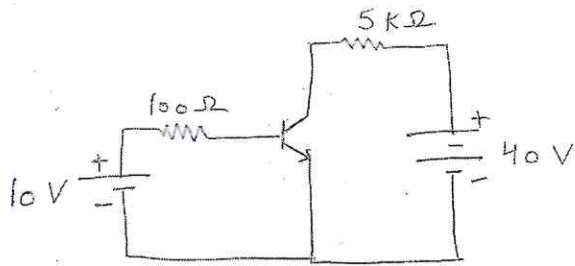
Find the value of collector and base currents for the transistor circuit given below. Assume that the transistor is working in active region. $\beta=90$

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	C04	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	C04	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	C04	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	C04	L2	1.4.1, 2.3.1, 2.3.2

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

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 <i>Manpreet Kaur</i>

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
	Q6	Explain 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, <pre> struct employee { int emp_id; char name[20]; float salary; }; </pre> 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
Part-D						

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.

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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 $\text{div}(3x^2\hat{i} + 5xy^2 + x y z^3)$ at the point (1,2,3)	5	CO2	BT1	1.1.2 1.3.1 2.1.3
	1(E) If $\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$, show that $\text{div } \vec{r} = 3$	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 $\frac{1}{2} + \frac{1.3}{2.4} + \frac{1.3.5}{2.4.6} + \dots \dots \infty$	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

		$\sum \left(\frac{n}{n+1}\right)^{n^2}$				2.1.3
	Q5	Examine the convergence/ divergence of the series $1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4} + \dots, \infty$	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 MASHI	NAME OF COURSE COORDINATOR	Dr. Ankita Gaur

Note: All questions are compulsory.

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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 : $\frac{1}{2} + \frac{1}{3} + \frac{1}{5} + \dots + \frac{1}{2^{n-1}+1} + \dots$.	8	CO2	BT-2	1.1. 9.1.
	Q.2(b) Test the convergence of the series $\frac{1}{2} + \frac{1.3}{2.4} + \frac{1.3.5}{2.4.6} + \dots$.	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.

PART-D	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
	Q.6	Show that $\text{div}(\text{grad } r^n) = n(n+1)r^{n-2}$.	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 $\vec{V} = (\sin y + z)\hat{i} + (x \cos y - z)\hat{j} + (x - y)\hat{k}$ is irrotational.	6	CO4	BT-3	1.1.1 9.1.1
	Q.9	Evaluate $\int_C \vec{f} \cdot d\vec{r}$ where $\vec{f} = (x^2 + y)\hat{i} + (x + y^2)\hat{j}$ 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

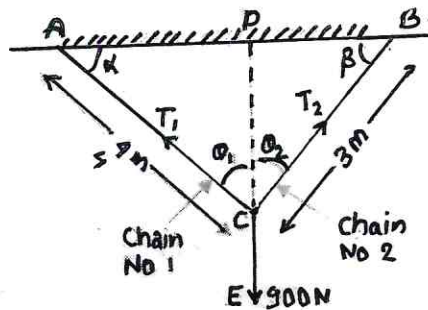
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MANAV RACHNA UNIVERSITY
SCHOOL OF ENGINEERING
DEPARTMENT OF MECHANICAL
"End Semester Examination, Dec-2023"

SEMESTER	1 st	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



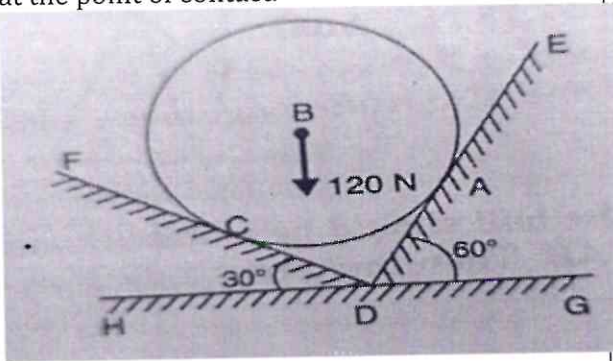
Q.NO.	QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL
PART-A Q:1	Q:1 (a) Explain and drive parallelogram law.	5	CO1	BT2
	Q:1 (b) A weight of 900 N is supported by two chains of length 4 m and 3 m as shown in fig. Determine the tension in each chain.	10		BT4



PART-B

Q:2

Q:2 (a) A ball of weight 120N rests in a right-angled groove, 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.

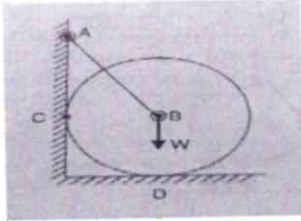


10

BT4

C02

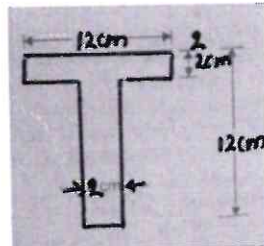
Q: 2 (b) Draw the free body diagram of a ball of weight $W=500N$ also calculate tension in string AB and reaction at point C and D.



5

BT2

Q:3 (a) Find out the moment of inertia of rectangular section about the C.G of the section.

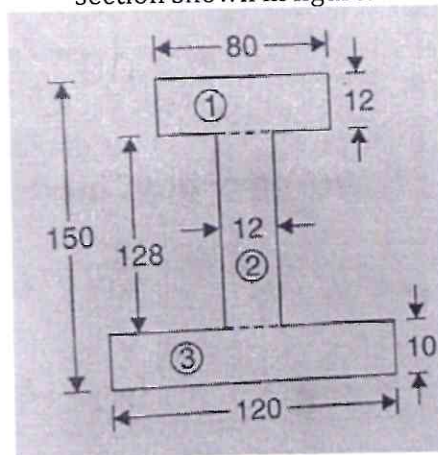


15

BT2

Q:3

Q:3 (b) Determine the moment of inertia of I section shown in figure.



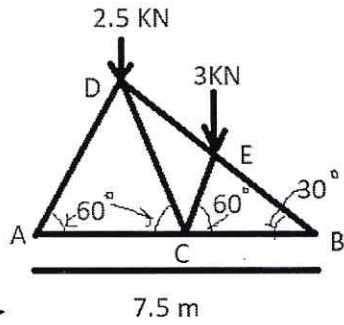
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C03

BT4

PART-C

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.



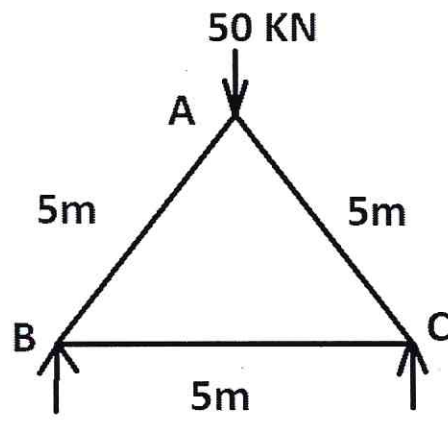
Q:4

20

BT4

CO4

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	18/12/23
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 <i>Aspit sand</i> <i>Vinod Kumar</i>

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

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 Arrhenius 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)	<p>Explain with minimum two examples of each</p> <p>(i) enantiomers</p> <p>(ii) distereomers</p>	5+5	CO3	BT4
Q4(A)	<p>Assign the R and S configurations of the following compounds</p> <p style="text-align: center;"> $\text{Cl} - \begin{array}{c} \text{CH}_3 \\ \\ \text{C} - \text{H} \\ \\ \text{CH}_2\text{CH}_3 \end{array} \xrightarrow{\alpha} \text{Cl} - \begin{array}{c} \text{CH}_2\text{Cl} \\ \\ \text{C} - \text{H} \\ \\ \text{CH}_2\text{CH}_3 \end{array} + \text{Cl} - \begin{array}{c} \text{CH}_3 \\ \\ \text{C} - \text{Cl} \\ \\ \text{CH}_2\text{CH}_3 \end{array} + \text{Cl} - \begin{array}{c} \text{CH}_3 \\ \\ \text{C} - \text{H} \\ \\ \text{CHOCH}_3 \end{array} + \text{Cl} - \begin{array}{c} \text{CH}_3 \\ \\ \text{C} - \text{H} \\ \\ \text{CH}_2\text{CH}_2\text{Cl} \end{array}$ </p> <p style="text-align: center;">(A) (B) (C) (D) (E)</p>	2*5=10	CO3	BT3
4(B)	<p>Explain degrees of freedom of linear and non-linear molecule. Calculate the vibrational degrees of freedom for CO₂ and H₂O molecule.</p>	4+3+3	CO4	BT3
Q5(A)	<p>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)</p>	8	CO4	BT3
5(B)	<p>Explain selection rule for P,Q,R branches of IR spectra.</p>	6	CO4	BT4
5(C)	<p>What types of molecules exhibit rotational spectra? Out of H₂, N₂, HCl, CO₂, H₂O, CO and CH₄ which will give rotational spectra.</p>	6	CO4	BT4
<p>***** END *****</p>				

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	MAR KS	CO ADDR ESSED	BLOO M'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) Polytropic 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) Polytropic 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 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. Sampri 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.

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Q.NO.	QUESTIONS	MAR KS	CO ADDRE SSED	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-D	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



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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

Rachna

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	MAR KS	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	BT 2 ₄
	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 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

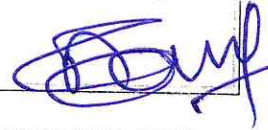
evident in the personality of an individual.

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

SEMESTER	3rd	DATE OF EXAM/SESSION	11-12-2023 (II)
COURSE NAME	Fluid Mechanics and Machines	COURSE CODE	MEH207B-T
PROGRAM	B.Tech ME-SMA	CREDITS	04
TIME DURATION	12:30PM – 3:30 PM	MAX. MARKS	100
NAME OF FACULTY	Dr. ZEBA NAAZ	NAME OF COURSE COORDINATOR	Dr. ZEBA NAAZ



Q.NO.	QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART-A	Q.1 Define the following terms: Density, Specific Volume, Viscosity and Compressibility.	04	CO1	BT1	
	Q.2 Distinguish the following: (i) Newtonian and Non-Newtonian fluids (ii) Compressible and Incompressible fluids	04		BT4	
	Q.3 A plate 0.025 mm distance from a fixed plate, moves at 60 cm/s and requires a force of 2N per unit area i.e, 2N/m ² to maintain this speed. Determine the fluid viscosity between the plates.	07		BT5	
PART-B	Q.4 Show that the maximum velocity in a circular pipe for viscous flow is equal to two times the average velocity of flow.	05		BT1	
	Q.5 Explain the term coefficient of friction. On what factors does this co-efficient depend.	04		BT2	
	Q.6 Find: (i) the pressure gradient along flow, (ii) the average velocity, and (iii) the discharge for an oil of viscosity 0.02 Ns/m ² flowing between two stationary parallel	06		BT1	

PART-C		plates 1 m wide maintained 10mm apart. The velocity midway between the plates is 2 m/s.		C02		
	Q.7	Define the reciprocating pump? Describe the principle and working of reciprocating pump with a neat sketch.	07		BT1	
	Q.8	A centrifugal pump delivers water against a net head of 14.5 metres and a design speed of 1000 r.p.m. the vanes are curved back to an angle of 30° with the periphery. The impeller diameter is 300 mm and outlet width is 50mm. Determine the discharge of the pump if manometric efficiency is 95%.	08		BT5	
	Q.9	A double acting reciprocating pump, running at 40 r.p.m., is discharging 1 m ³ of water per minute. The diameter of the piston is 200 mm and stroke length 400 mm. The delivery and suction head are 20 m and 5 m respectively. Find the slip of the pump and power required to drive the pump.	08		BT1	
	Q.10	Explain the following terms: (i) Suction and delivery head (ii) Manometric efficiency and mechanical efficiency of pump (iii) Model analysis and dimensional analysis	08		BT2	
PART-D	Q.11	Explain the term, "dimensionally homogeneous equation.	04	C03	BT2	
	Q.12	A pelton wheel is to be designed for the following specifications: Shaft power = 11772kW; head=380 metres; speed = 750 r.p.m.; overall efficiency = 86%; jet diameter is not to exceed one-sixth of the wheel diameter. Determine: (i) The wheel diameter (ii) The number of jets required, and (iii) Diameter of the jet.		C04		
	Q.13	Take $K_{v1} = 0.985$ and $K_{u1} = 0.45$	08		BT5	

		Outline the differences between Impulse and Reaction turbine.	06		BT2	
	Q.14	Explain the specific speed of turbine? State its significance in the study of hydraulic machines.				
	Q.15	Define the term 'Governing of a turbine'.	08		BT2	
	Q.16	Explain the working of Francis turbine with neat sketch.	08		BT2	
		Define draft tube and what are the uses of a draft tube?	05		BT1	

END

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

SEMESTER	3 RD	DATE OF EXAM	16 th Dec. 2023 (II)
COURSE NAME	APPLIED THERMODYNAMICS	COURSE CODE	MEH204B-T
PROGRAM	B.TECH ME	CREDITS	4
TIME DURATION	12:30PM to 3:30PM	MAX. MARKS	100
NAME OF FACULTY	DR. PRASHANT BHARDWAJ	NAME OF COURSE COORDINATOR	DR. PRASHANT BHARDWAJ

Q.NO.	QUESTIONS	MARKS	CO ADDRESS D	BLOOM'S LEVEL
PART-A	1(A) Explain the need of turbine and compressor in steam power plant?	5	CO1	BT2
	1(B) Differentiate water tube and fire tube boiler. Which boiler is more efficient on the basis of safety?	5	CO1	BT4
	1(C) Briefly explain the following terms: • Economiser • Air Preheater	5	CO1	BT2
PART-B	Q2(A) Steam at a pressure of 15 bar and 250°C is expanded through a turbine at first to a pressure of 4 bar. It is then reheated at constant pressure to the initial temperature of 250°C and it is finally expanded to 0.1 bar. Estimate the work done per kg of steam flowing through the turbine and amount of heat supplied during the process of reheat. Assume all process are isentropic. h1 at 15 bar and 250°C= 2920kJ/kg h2 at 4 bar after expansion= 2660kJ/kg h3 at 4 bar after reheat and 250°C= 2960kJ/kg h4 at 0.1 bar= 2335kJ/kg	8	CO2	BT5
	2(B) Explain reheat cycle with the help of neat diagram. Also explain need for reheating in Rankine cycle and how it will improve the efficiency of the steam power plant.	7	CO2	BT3
PART-C	Q3(A) Briefly explain classification of steam turbines. Also explain impulse turbine with the help of its salient features and neat diagram.	8	CO3	BT2
	3(B) Differentiate impulse and reaction turbines. Which turbine is found more efficient in steam power plant? Justify your answer on the basis of power produced by the steam power plant.	9	CO3	BT4
	3(C) What is the need of compounding in a steam turbine? Briefly explain velocity and pressure compounding with the help of neat diagram.	9	CO3	BT2

PART-D	3(D)	Explain the need of steam nozzle in steam power plant. How it will vary the velocity of the steam used in power generation. Write down the main factors on which nozzle efficiency depends.	9	CO3	BT3
	Q4(A)	What is the need of steam condenser in power plant? Write down main parts of steam condenser and also explain its classification.	8	CO4	BT3
	4(B)	Briefly explain parallel flow and counter flow steam condenser with the help of neat diagram. Which condenser is found more efficient to produce condensate while steam generation.	9	CO4	BT2
	4(C)	Write down the formula of steam condenser efficiency. A steam jet turbo generator develops 100 kW using 13.6 kg of steam per kWh. The exhaust steam pressure is 0.14 bar and 680.4 kg of cooling water are passed through the condenser per minute. The inlet and outlet temperature are respectively 15.6°C and 32.2°C. Estimate the dryness fraction of exhaust steam temperature of hot well is 35°C.	9	CO4	BT5
	4(D)	Briefly explain the working and significance of air compressors. Differentiate reciprocating and centrifugal type air compressor. How compressor is different from pump.	9	CO4	BT4

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

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

SEMESTER	3	DATE OF EXAM	18/12/2023, 12:30-3:30
COURSE NAME	Manufacturing Technology	COURSE CODE	MEH301B-T
PROGRAM	B.Tech ME	CREDITS	3
TIME DURATION	3 Hours	MAX. MARKS	100
NAME OF FACULTY	Prof. (Dr.) Joginder Singh	NAME OF COURSE COORDINATOR	Prof. (Dr.) Joginder Singh

Note: All questions are compulsory.

Q.NO.	QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI	
Part-A	1	Classify the Heat Treatment Processes on the basis of bulk and surface area?	5	CO2	BT4	
	2	Solve the clearance (in percentage) required for the material having a thickness of 2 mm and a shear strength of 450 MPa?	5	CO2	BT3	
	3	Omit the Cold Working Process?	5	CO1	BT1	
Part-B	4	In a rolling operation using rolls of diameter 500 mm, if a 25 mm thick plate (under ideal rolling condition) can be atmost reduced to 20 mm in one pass. Estimate the coefficient of friction between the roll and the plate?	5	CO3	BT5	
	5	Classify the Joining Processes?	5	CO2	BT4	
	6	In a rolling process, sheet of 30 mm is rolled to 20 mm thickness by using rolls of diameter 300 mm. Analyze the angle subtended by the deformation zone at the roll center in radian?	5	CO2	BT4	
Part-C	7	Develop the diagram of Single Point Cutting Tool? Also construct the tool signature with example?	7	CO4	BT6	
	8	Conclude the types of chips in metal cutting?	7	CO4	BT5	
	9	Solve shear area in case of a circular hole of 15 mm diameter and 5 mm sheet thickness (in mm ²)?	7	CO2	BT3	
	10	Label the different parts of a Lathe Machine?	7	CO1	BT1	
	11	Roll a 12 inch wide strip that is 1 inch thick, to 0.875 inch thickness in one pass with roll speed of 50 RPM and radius is 10 inches. Material has k=40000 psi, n = 0.15 and coefficient of friction is 0.12. Compose the Force, Torque and Power of the system?	7	CO4	BT6	
Part-D	12	Compare between the Hot Working and Cold Working?	7	CO2	BT2	
	13	In a wire drawing operation, diameter of steel wire is reduced from 10 to 8 mm. The mean flow stress of the materials is 400 MPa. Compile the ideal force required for drawing?	7	CO4	BT6	
	14	Distinguish between Blanking and Punching Operation?	7	CO2	BT4	
	15	Construct the Milling Machine with nomenclature?	7	CO2	BT3	
	16	Compose the Iron Carbon Phase Diagram?	7	CO4	BT6	

***** END *****

MANAV RACHNA UNIVERSITY

SCHOOL OF SCIENCES

DEPARTMENT OF SCIENCES

"End Semester Examination, Dec-2023"

SEMESTER	III	DATE OF EXAM	21/12/2023
COURSE NAME	MATHEMATICS-III (PDE, Prob. & Numerical Method)	COURSE CODE	MAH203B (II)
PROGRAM	B.Tech-Mechanical Engineering	CREDITS	4
TIME DURATION	3 Hours	MAX. MARKS	100
NAME OF FACULTY	Dr. Y K Sharma	NAME OF COURSE COORDINATOR	Dr. Y K Sharma <i>Y K Sharma</i>

Note: Attempt all Questions.

Q.NO.	QUESTIONS	MARKS	CO ADDRESS ED	BLOOM' S LEVEL	PI
PART-A	1(A) Form the differential Equation of the function $z = ax^3 + by^3$.	5	CO1	BT2	1.1.1 2.1.1 3.2.2 4.1.2
	1(B) Solve the PDE $x^2(y-z)p + y^2(z-x)q = z^2(x-y)$.	5	CO1	BT2	1.1.1 2.1.1 3.2.2 4.1.2
	1(C) Solve the PDE $2\frac{\partial^2 u}{\partial x^2} + 5\frac{\partial^2 u}{\partial x \partial y} + 2\frac{\partial^2 u}{\partial y^2} = 0$.	5	CO1	BT2	1.1.1 2.1.1 3.2.2 4.1.2
	1(D) A pair of dice is tossed twice. Find the probability of scoring 7 points (a) Once, (b) at least once (c) twice.	5	CO2	BT2	1.1.1 2.1.1 3.2.2 4.1.2
	1(E) A box contains 2 white, 4 black balls. Two balls are drawn at random. Find the probability that	5	CO2	BT2	1.1.1 2.1.1

PART-B

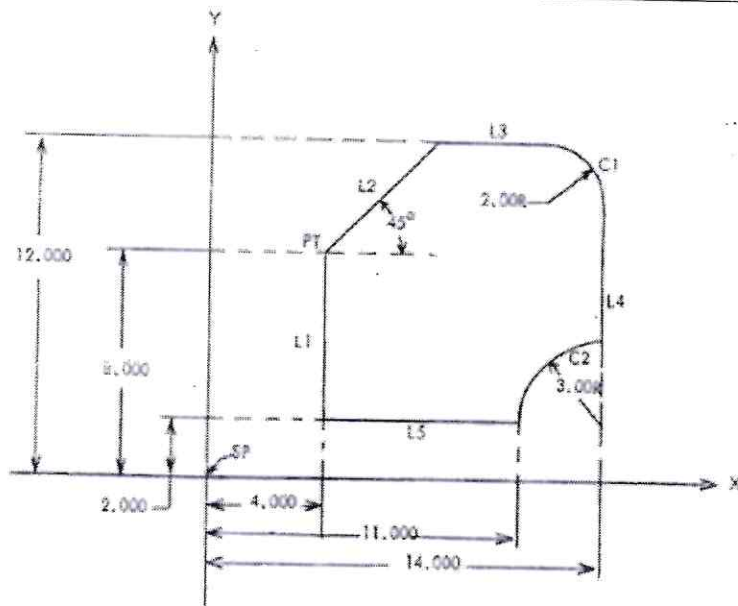
	they will be both be white.				3.2.2 4.1.2												
1(F)	First bag contains 2 white and 3 red balls and Second bag contains 4 white and 5 red balls. One ball is drawn at random from one of the bags and is found to be red. Find the probability that it was drawn from second bag.	5	CO2	BT2	1.1.1 2.1.1 3.2.2 4.1.2												
Q2	<p>Find $f'(0.6)$ and $f''(0.6)$ from the following data</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td>x:</td> <td>0.4</td> <td>0.5</td> <td>0.6</td> <td>0.7</td> <td>0.8</td> </tr> <tr> <td>f(x):</td> <td>1.583</td> <td>1.797</td> <td>2.044</td> <td>2.327</td> <td>2.651</td> </tr> </table>	x:	0.4	0.5	0.6	0.7	0.8	f(x):	1.583	1.797	2.044	2.327	2.651	10	CO3	BT3	1.1.1 2.1.1 3.2.2 4.1.2
x:	0.4	0.5	0.6	0.7	0.8												
f(x):	1.583	1.797	2.044	2.327	2.651												
Q3	Solve $\int_0^2 \frac{dx}{1+x^2}$ by Trapezoidal rule taking $h = \frac{1}{4}$.	8	CO3	BT3	1.1.1 2.1.1 3.2.2 4.1.2												
Q4	Using Bisection Method determine a real root of the equation $f(x) = 8x^3 - 2x - 1 = 0$.	7	CO3	BT3	1.1.1 2.1.1 3.2.2 4.1.2												
Q5	Use Taylor series method, find $y(0.1)$ and $y(0.2)$ given that $\frac{dy}{dx} = y^2 + x$, $y(0) = 1$.	10	CO3	BT3	1.1.1 2.1.1 3.2.2 4.1.2												
Q6	Apply R K Method of fourth order to find an approximate value of y for $x = 0.2$ in steps of 0.1, if $\frac{dy}{dx} = x + y$ given that $y = 1$ when $x = 0$.	8	CO4	BT3	1.1.1 2.1.1 3.2.2 4.1.2												
Q7	Using Picard's method of successive approximation to solve $\frac{dy}{dx} = 3x + y^2$, given that $y(0) = 1$, find $y(0.1)$	7	CO4	BT3	1.1.1 2.1.1 3.2.2 4.1.2												
Q8	Solve numerically $\frac{dy}{dx} = \frac{y-x}{y+x}$ with $y(0) = 1$ find y for $x=0.1$ in four steps by Euler's method.	10	CO4	BT3	1.1.1 2.1.1 3.2.2 4.1.2												
Q9	Given $\frac{dy}{dx} = x + y$ with initial condition $y(0) = 1$. Find $y(0.5)$ and $y(0.1)$ correct to 6 decimal places.	10	CO4	BT3	1.1.1 2.1.1 3.2.2												

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

SEMESTER	5 th	DATE OF EXAM/SESSION	11 th Dec. 2023
COURSE NAME	COMPUTER AIDED DESIGN & MANUFACTURING	COURSE CODE	MEH318-T
PROGRAM	B.Tech. SMA	CREDITS	3
TIME DURATION	8:30AM to 11:30AM	MAX. MARKS	100
NAME OF FACULTY	Dr. Prashant Bhardwaj	NAME OF COURSE COORDINATOR	Dr. Prashant Bhardwaj



Q.NO.	QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL
PART-A	1(a) Explain the product cycle and CAD/CAM product cycle?	5	CO1	BT2
	1(b) What are the benefits of CAD?	5	CO1	BT1
	1(c) Discuss job shop production and mass production.	5	CO1	BT2
PART-B	2(a) Explain about boundary representation approach.	5	CO2	BT2
	2(b) What are the advantages of wireframe modelling over other techniques?	5	CO2	BT1
	2(c) What are the requirements of geometric models and explain the need of geometric modeling	5	CO2	BT2
PART-C	3(a) Explain the APT statements: i) GOTO and GO/TO ii) GODLTA and GOBACK and iii) INTOL and OUTTOL	9	CO3	BT2
	3(b) Differentiate between NC, CNC and DNC machines	9	CO3	BT2
	3(c) Write a short note on NC coordinate system.	8	CO3	BT2
	3(d) Write a manual part program for finishing a component as shown in figure below. Assume suitable feed, speed and other required parameters.	9	CO3	BT6



PART-D	4(a)	What is group technology? Explain its advantages and disadvantages.	9	CO4	BT2
	4(b)	What are the Advantages of CIM?	8	CO4	BT1
	4(c)	Explain about MICLASS and CODE system in group technology.	9	CO4	BT2
	4(d)	Give the form code for the part family using any one coding system.	9	CO4	BT4

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

DEPARTMENT OF MECHANICAL ENGINEERING

"End Term Examination, July-Dec 2023"

SEMESTER	5 th	DATE OF EXAM	12/12/2023
SUBJECT NAME	Internal Combustion Engine & Gas Turbines	SUBJECT CODE	MEH304B-T
BRANCH	ME	SESSION	I
TIME	08:30 AM to 11:30 AM	MAX. MARKS	100
PROGRAM	B.TECH	CREDITS	4
NAME OF FACULTY	Mr. Piyush Mahendru	NAME OF COURSE COORDINATOR	Mr. Piyush Mahendru

Note: All questions are compulsory.



Q.NO.	QUESTIONS	MARKS	CO ADDRESSE D	BLOOM'S LEVEL
PART-A	Q1(A) With neat sketches explain the working principle of four stroke spark ignition engine.	08	CO1	BT2
	Q1(B) Compare Otto, Diesel and Dual cycles for the (i) same compression ratio and heat input (ii) same maximum pressure and heat input (iii) same maximum pressure and temperature (iv) same maximum pressure and work output	07	CO1	BT4
PART-B	Q2(A) Explain the phenomenon of knock in CI engines and compare it with SI engine knock.	08	CO2	BT2
	Q2(B) Briefly explain the stages of combustion in SI engines elaborating the flame front propagation.	07	CO2	BT2
PART-C	Q3(A) Find the air-fuel ratio of a four stroke, single cylinder, air cooled engine with fuel consumption time for 10 cc is 20.4 seconds and air consumption time for 0.1 m ³ is 16.3 seconds. The load is 17 kg at a speed of 3000 rpm. Find also brake specific fuel consumption in g/kW.h and brake thermal efficiency. Assume the density of air as 1.175 kg/m ³ and specific gravity of fuel to be 0.7. The lower heating value of fuel is 43 MJ/kg and the dynamometer constant is 5000.	12	CO3	BT4

	Q3(B)	A six cylinder four stroke gasoline engine having a bore of 90 mm and stroke of 100 mm has a compression ratio 7. The relative efficiency is 55% when the indicated specific fuel consumption is 300 gm/kW h. Estimate (i) the calorific value of the fuel and (ii) corresponding fuel consumption, given that imep is 8.5 bar and speed is 2500 rpm.	08	C03	BT4
	Q3(C)	Briefly discuss the various efficiency terms associated with an engine	07	C03	BT2
	Q3(D)	What are the methods of Lubrication? Explain in detail	08	C03	BT3
PART-D	Q4(A)	Discuss the means of improving the efficiency of a gas turbine working on a simple Brayton cycle.	15	C04	BT3
	Q4(B)	Prove that the output of a simple gas turbine plant is positive only when the product of compressor and turbine efficiency is greater than $(T_1/T_3)^{\gamma(\gamma-1)/\gamma}$	12	C04	BT4
	Q4(C)	A simple constant pressure gas turbine operates at a pressure ratio of 5:1 and the turbine inlet temperature is 580°C. The air inlet temperature is 15°C and the pressure atmospheric and the compressor has isentropic efficiency 0.80. What must be the isentropic efficiency of the turbine in order that the overall cycle efficiency may be 18 percent? Assume C_p for air to be 1.000 and C_p for combustion gases 1.096. Take R to be 0.287 kJ/kg K for both air and combustion gases.	08	C04	BT4

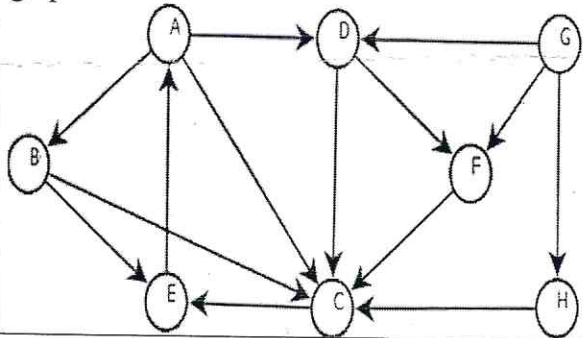
MANAV RACHNA UNIVERSITY
SCHOOL OF ENGINEERING
DEPARTMENT OF MECHANICAL ENGINEERING
"End Semester Examination, Dec-2023"

SEMESTER.	SMA 5	DATE OF EXAM	13.12.2023 (I)
COURSE NAME	DATA STRUCTURES	COURSE CODE	CSH217B-T
PROGRAM	B.TECH. - SMA	CREDITS	2
TIME DURATION	180 MINUTES	MAX. MARKS	100
NAME OF FACULTY	Dr. Urmila Pilania	NAME OF COURSE COORDINATOR	Dr. Urmila Pilania

Note: All Questions are compulsory.

Manoj kumar

Q.NO.	QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART-A	Q1(A) Using insertion sort, sort the given list in ascending order: 14, 3, 56, 27, 7, 10, 0, 44	8	CO3	L3	1.2.2
	Q1(B) What are the various operations that can be performed on different Data Structures?	3	CO1	L3	1.2.2
	Q1(C) An array X [-15.....10, 15.....40] requires one byte of storage. If beginning location is 1500 determine the location of X [15][20].	4	CO3	L2	1.1.2
PART-B	Q2(A) Write a program to insert an item in singly link list.	6	CO4	L4	1.2.2
	Q2(B) Write a program to swap two numbers using call by value and call by reference.	9	CO4	L3	1.2.4
PART-C	Q3(A) The following postfix expression with single digit operands is evaluated using a stack: 8 2 3 ^ / 2 3 * + 5 1 * -	5	CO4	L4	1.2.4
	Q3(B) Convert the following infix expression into its equivalent post fix expression (A + B^D-H+I) / (E - F) + G	5	CO3	L3	1.1.3

PART-D	Q3(C)	Write an algorithm to delete and insert an element in doubly queue.	10	CO2	L2	1.1.3	
	Q3(D)	The five items: A, B, C, D, and E are pushed in a stack, one after other starting from A. The stack is popped four items and each element is inserted in a queue. The two elements are deleted from the queue and pushed back on the stack. Now one item is popped from the stack. The popped item is	8	CO3	L3	1.2.1	
	Q3(E)	How circular queue overcome the limitations of simple queue. Write the merits and demerits of circular queue.	7	CO3	L3	1.1.3	
	Q4(A)	The postorder traversal of a binary tree is 8, 9, 6, 7, 4, 5, 2, 3, 1. The inorder traversal of the same tree is 8, 6, 9, 4, 7, 2, 5, 1, 3. The height of a tree is the length of the longest path from the root to any leaf. The height of the binary tree above is	8	CO3	L3	1.1.3	
	Q4(B)	Write an algorithm for insertion in binary search tree.	6	CO3	L3	1.1.2	
	Q4(C)	Find the BFS traversing for the following graph: 	8	CO3	L3	1.1.2	
	Q4(D)	Suppose the numbers 7, 5, 1, 8, 3, 6, 0, 9, 4, 2 are inserted in that order into an initially empty binary search tree. The binary search tree uses the usual ordering on natural numbers. What is the in-order traversal sequence of the resultant tree?	8	CO3	L3	1.1.2	
	Q4(E)	Write a program for DFS traversing in the given graph.	5	CO2	L2	1.1.2	
	***** END *****						

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

SEMESTER	5th	DATE OF EXAM/SESSION	14-12-2023
COURSE NAME	Advance Manufacturing	COURSE CODE	MEH212B-T
PROGRAM	B.Tech ME	CREDITS	04
TIME DURATION	8:30AM-11:30AM	MAX. MARKS	100
NAME OF FACULTY	Dr. ZEBA NAAZ	NAME OF COURSE COORDINATOR	Dr. ZEBA NAAZ

(Handwritten signature)

Q.NO.	QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART-A	Q.1	05	C01	BT2	
	Q.2	05		BT4	
	Q.3	05		BT1	
PART-B	Q.4	07	C02	BT1	
	Q.5	08		BT2	
PART-C	Q.6	05	C03	BT2	
	Q.7	08		BT2	
	Q.8	08		BT6	

	Q.9	Explain briefly the types of magnetic sensors and actuators.	08		BT2	
	Q.10	Discuss, why is silicon used as substrate material for MEMS?	06		BT6	
PART-D	Q.11	Define 3D printer technology used in additive manufacturing?	06	CO4	BT1	
	Q.12	How additive manufacturing helps in aerospace and biomedical applications?	08		BT1	
	Q.13	Explain the working principle of Direct Energy Deposition (DED) processes with neat sketch. What are the process parameters of DED?	08		BT2	
	Q.14	With an example, discuss the type of materials available for additive manufacturing and their suitability in product development.	08		BT3	
	Q.15	Compose a short note on the STL file.	05		BT6	
***** END *****						

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

SEMESTER	5th	DATE OF EXAM/SESSION	18.12.2023
COURSE NAME	Heat Transfer	COURSE CODE	MEH303B-T/MORNING
PROGRAM	B.Tech ME & 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	MAR KS	CO ADDR ESSED	BLOO M'S LEVEL	PI
PART (A)	1(A) Define black body, opaque body, white body and grey body also.	05	CO1	BT2	
	1(B) Define the overall heat transfer coefficient? Also define thermal diffusivity.	05	CO1	BT2	
	1(C) How heat exchangers are classified with examples?	05	CO1	BT2	
PART (B)	2(A) What is the difference between thermodynamics and heat transfer with examples?	05	CO2	BT1	
	2(B) What do you mean by Prandtl No. and thermal conductivity? Name the materials which have higher thermal conductivity.	05	CO2	BT2	
	2(C) Explain briefly the Free and Forced convection with practical application.	05	CO2	BT2	
PART (C)	3(A) Write explanatory notes on any two: a) The Stefan-Boltzmann law b) Wein's Displacement Law	07	CO3	BT2	

	3(B)	Derive an expression for the log mean temperature difference of counter flow heat exchanger.	07	CO3	BT5	
	3(C)	In a condenser, water enters at 30°C and flows at the rate of 1500 Kg/hr. The condensing stream is at a temperature of 120°C and cooling water leaves the condenser at 80°C. Specific heat of water is 4.187KJ/Kg-K. If the overall heat transfer coefficient is 2000 W/m ² k, calculate the heat transfer area?	07	CO3	BT4	
	3(D)	It is proposed to coat a 1 mm diameter wire with enamel paint (k=0.1 W/m-K) to increase heat transfer with air. If the air side heat transfer coefficient is 100 W/m ² K, calculate the optimum thickness of enamel paint should be?	07	CO3	BT4	
	3(E)	What is meant by critical thickness of insulation? How it is calculated in case of sphere?	07	CO3	BT4	
PART (D)	4(A)	Write short notes on: (a) Emissivity and monochromatic emissivity (b) 1-d Spherical equation	07	CO4	BT2	
	4(B)	Write a short note on: (a) Physical significance of Biot and Fourier No. (b) Steady state and unsteady state conduction	07	CO4	BT2	
	4(C)	Define the effectiveness of heat exchanger. Derive the equation for parallel flow heat exchanger using NTU method.	07	CO4	BT1,5	
	4(D)	Write a short note on: (a) Physical significance of Reynold and Grashoff No. (b) Mode of heat transfer	07	CO4	BT1	
	4(E)	Derive a general expression for three-dimensional heat transfer equation in cartesian coordinate system.	07	CO4	BT5	

***** END *****

	3(B)	Derive an expression for the log mean temperature difference of counter flow heat exchanger.	07	CO3	BT5	
	3(C)	In a condenser, water enters at 30°C and flows at the rate of 1500 Kg/hr. The condensing stream is at a temperature of 120°C and cooling water leaves the condenser at 80°C. Specific heat of water is 4.187KJ/Kg-K. If the overall heat transfer coefficient is 2000 W/m ² k, calculate the heat transfer area?	07	CO3	BT4	
	3(D)	It is proposed to coat a 1 mm diameter wire with enamel paint (k=0.1 W/m-K) to increase heat transfer with air. If the air side heat transfer coefficient is 100 W/m ² K, calculate the optimum thickness of enamel paint should be?	07	CO3	BT4	
	3(E)	What is meant by critical thickness of insulation? How it is calculated in case of sphere?	07	CO3	BT4	
PART (D)	4(A)	Write short notes on: (a) Emissivity and monochromatic emissivity (b) 1-d Spherical equation	07	CO4	BT2	
	4(B)	Write a short note on: (a) Physical significance of Biot and Fourier No. (b) Steady state and unsteady state conduction	07	CO4	BT2	
	4(C)	Define the effectiveness of heat exchanger. Derive the equation for parallel flow heat exchanger using NTU method.	07	CO4	BT1,5	
	4(D)	Write a short note on: (a) Physical significance of Reynold and Grashoff No. (b) Mode of heat transfer	07	CO4	BT1	
	4(E)	Derive a general expression for three-dimensional heat transfer equation in cartesian coordinate system.	07	CO4	BT5	

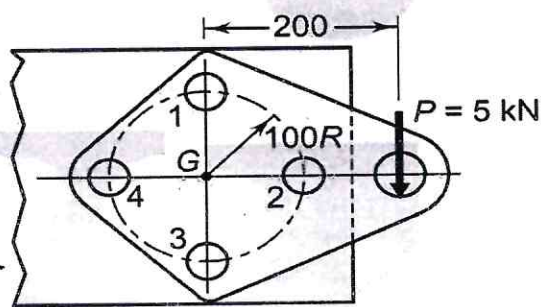
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MANAV RACHNA UNIVERSITY
SCHOOL OF ENGINEERING
DEPARTMENT OF MECHANICAL ENGINEERING
"End Semester Examination, Dec-2023"

SEMESTER.	5	DATE OF EXAM/SESSION	20.12.2023/M
COURSE NAME	MACHINE DESIGN-I	COURSE CODE	MEH302B-T
PROGRAM	B.TECH (SMA)	CREDITS	4
TIME DURATION	08.30AM - 11.30AM	MAX. MARKS	100
NAME OF FACULTY	Mr. Nazish Ahmad Shamsi	NAME OF COURSE COORDINATOR	Mr. Nazish Ahmad Shamsi

Note: All Questions are compulsory. Assume missing data if any.

Q.NO.	QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART-A	Q1(A) Explain the Steps involved in the Design Process of a Mechanical Component.	7	CO1	BT2	
	Q1(B) A forged steel bar, 50 mm in diameter, is subjected to a reversed bending stress of 250 N/mm ² . The bar is made of steel having $S_{ut} = 600$ N/mm ² . Calculate the life of the bar for a reliability of 90%.	8		BT4	
PART-B	Q2(A) Explain the function of the couplings used in shafts. Also Classify the different types of couplings used.	7	CO2	BT2	
	Q2(B) A propeller shaft is required to transmit 50 kW power at 600 rpm. It is a hollow shaft, having an inside diameter 0.8 times of the outside diameter. It is made of steel ($S_{yt} = 380$ N/mm ²) and the factor of safety is 4. Solve for the inside and outside diameters of the shaft. Assume ($S_{sy} = 0.5S_{yt}$).	8		BT3	
PART-C	Q3(A) A riveted joint, consisting of four identical rivets, is subjected to an eccentric force of 5 kN as shown in Fig. The permissible shear stress is 60N/mm ² .		CO3	BT4	



Calculate:

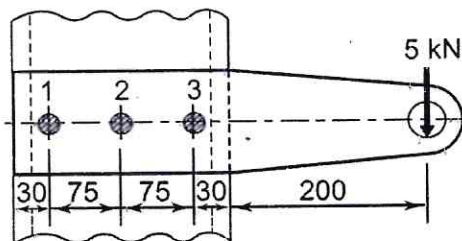
- Which rivet is subjected to maximum shear force?
- What is the magnitude of maximum force?
- Determine the diameter of rivet.

9

A steel plate subjected to a force of 5 kN and fixed to a channel by means of three identical bolts is shown in Fig. The bolts are made from plain carbon steel ($S_{yt}=380\text{N/mm}^2$) and the factor of safety is 3. Specify :

- The magnitude of maximum force.
- The size of bolts.

Q3(B)



9

BT4

Q3(C)

Derive the relation for strength of transverse fillet welds using proper diagrams.

9

BT4

Q3(D)

Classify various types of joints used in welding of a component.

8

BT2

PART-D

Q4(A)

A plate clutch consists of one pair of contacting surfaces. The inner and outer diameters of the friction disk are 100 and 200 mm respectively. The coefficient of friction is 0.2 & the permissible intensity of pressure is 1 N/mm^2 . Calculate the power transmitting capacity of the clutch at 750 rpm based on Uniform wear theory.

9

CO4

BT4

Q4(B)	What are Flexible derives. Compare its advantages and disadvantages in industrial application.	9	BT2
Q4(C)	Summarize the desirable properties for the material of brakes.	8	BT2
Q4(D)	Explain the various classification of clutches.	9	BT1
***** END *****			



**MANAV RACHNA
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DEPARTMENT OF MECHANICAL ENGINEERING

"End Term Examination, Dec 2023"

SEMESTER	5 th	DATE OF EXAM	20.12.23
SUBJECT NAME	Product design and development	SUBJECT CODE	MEH308B-T
BRANCH	ME	SESSION	I
TIME	8:30 to 11:30	MAX. MARKS	100
PROGRAM	B.TECH	CREDITS	3
NAME OF FACULTY	Dr. J P SHARMA	NAME OF COURSE COORDINATOR	Dr. J P SHARMA

Note: Part A, B,C& D: All questions are compulsory.

Q.NO.	QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART-A	1(A) Define value Engineering. What are the steps to be followed in value Engineering? Explain each step in short.	5	C01	BT1	
	1(B) Define Ergonomics with their benefits. Explain with an example for design of ergonomically efficient office chair. .	5	C01	BT1	
PART-B	Q2(A) Discuss FAST technique with their type with an example through block diagram.	5	C02	BT1	
	2(B) Write steps for material selection for a product on the basis of its performance. Explain Ashby's method.	5	C02	BT1	
PART-C	Q3(A) Contrast the objectives of a product design? Explain features that are beneficial for good product design with step and its analysis.	8	C03	BT4	
	3(B) Explain in detail the various product policies which is to be followed while developing a policy.	7	C03	BT2	
	Q4(A) Write full form of DFMA and What identifies DFMA? Explain DFMA guidelines with example of components.	8	C03	BT2	

PART-D	4(B)	Explain the general guidelines for manual assembly. Also write steps for Rapid prototyping system with their advantages.	7	CO3	BT2	
	Q5(A)	Discuss three stage processes for performance and quality in products with an example.	8	CO4	BT2	
	5(B)	Define Design for manufacturing. What are the different manufacturing costs involved in manufacturing system. Also write different between DFA & DFM.	7	CO4	BT2	
	Q6(A)	Explain in brief stress strain curve in materials with diagram.	8	CO4	BT6	
	6(B)	Create a product-technology roadmap illustrating the availability of technologies for a class of products you understand well such as personal computers	7	CO4	BT4	

END

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

SEMESTER	V	DATE OF EXAM	21/12/2023 (II)
COURSE NAME	INTERNET OF THINGS	COURSE CODE	ECH305B-T
PROGRAM	B.TECH - ECE/VLSI/SM	CREDITS	2
TIME DURATION	1.5 HOURS	MAX. MARKS	50
NAME OF FACULTY	DR.K.DEEPA	NAME OF COURSE COORDINATOR	DR.K.DEEPA

Note: All questions are compulsory

Chauhan

Q.NO	QUESTIONS	MARKS	CO ADDRESSES	BLOOMS LEVEL
PART A	1(A) In IoT, what does M2M stand for? a) Machine to Man b) Man to Machine c) Machine to Machine d) Man to Man	5	CO1	BT1
	1(B) How does sensing contribute to the functionality of IoT applications? a) By providing power b) By collecting data c) By regulating temperature d) By controlling actuators		CO1	BT2
	1(C) ZigBee is commonly used for: a) Long-range communication b) High data rate applications c) Low-power, short-range communication d) Satellite communication		CO2	BT1
	1(D) Which version of Bluetooth is known for its low energy consumption? a) Bluetooth 1.0 b) Bluetooth 2.0 c) Bluetooth 4.0 d) Bluetooth 5.0		CO2	BT1
	1(E) What is the main advantage of using cloud storage for device data? a) Higher data transfer speeds b) Lower cost c) Limited accessibility d) Local storage only		CO3	BT2
	Q2 Demonstrate how the identified fundamental design principles can be applied to address challenges and optimize the functionality of the system.		5	CO1
PART B	Q3 Illustrate the concept of IoT based Smart Home	5	CO1	BT2
	Q4 Given a specific IoT scenario, demonstrate how the framework's components can be applied to address challenges and optimize the functionality of the system	5	CO2	BT3

PART C	Q5	Compare Bluetooth and Zigbee	5	CO3	BT4	1 2
	Q6	Explain how Z wave works	5	CO3	BT2	1 2
	Q7	Analyze how M2M technologies contribute to enhanced efficiency, decision-making, and automation in specific use cases	5	CO4	BT4	1 2
PART D	Q8	Construct a detailed plan outlining how specific features, such as analog and digital inputs, various communication interfaces, and programmability, can be synergistically utilized and explain how it can be used to address a real-world problem using Arduino	5,5	CO4	BT3	1 2
	Q9	Evaluate the application of Warehouse Automation with IoT	5	CO4	BT5	1 2

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

SEMESTER	7 TH	DATE OF EXAM/SESSION	14/12/2023(Evening)
COURSE NAME	STRENGTH OF MATERIALS II	COURSE CODE	MEH306B
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(a) Explain Maximum shear stress theory.	5	CO1	BT3
	Q: 1(b) Determine the diameter of a bolt which is subjected to an axial pull of 9KN together with a transverse shear force of 4.5 KN using (i) Max. Principal stress theory (ii) Max. Principal strain theory Given that elastic limit in tension =225 MPa, F.O.S =3 and Poisson ratio =0.3	10		BT4
PART-B	Q:2 (a) A cylindrical shell of 3 meters long which is closed as the ends has an internal diameter of 1 m and a wall thickness of 15 mm. Calculate the circumferential and longitudinal stresses induced and also changes in the dimensions of the shell, if it is subjected to an internal pressure of 1.5 MPa. Take E= 200 GPa and Poisson ratio =0.3	10	CO2	BT5
	Q: 2 (b) Calculate the hoop, longitudinal and volumetric strain in thin cylinder.	5		BT3

PART-C	Q3	<p>Q:3(a) Calculate the maximum tensile stress in I-section of a simply supported beam of span 3 m which carries a load of 7.5 kN at the center of the beam. The load-line is inclined at an angle of 30° with the vertical as shown in fig. and passes through the centroid of the section. The dimensions of the I-section are shown in fig.</p>	20	CO3	BT3
		Q:3(b) Drive Lamé's theorem.	15		BT4
PART-D	Q4	Q4(a) Drive the stresses in disc of uniform strength	10	CO4	BT4
		Q4(b) Calculate the radial and circumferential stresses in solid disc.	15		BT3
		Q4(c) Drive the bending formula.	10		BT4

MANAV RACHNA UNIVERSITY
SCHOOL OF EDUCATION AND HUMANITIES
DEPARTMENT OF EDUCATION AND HUMANITIES

End Semester Examination, Dec-2023

Set- II

SEMESTER	VII	DATE OF EXAM	15 th December 2023
COURSE NAME	Applied Philosophy	COURSE CODE	EDS288 (IL)
PROGRAM	ME SMA	CREDITS	2
TIME DURATION	1.30 hrs.	MAX. MARKS	50
NAME OF FACULTY	Dr. Savita Sharma	NAME OF COURSE COORDINATOR	Dr. Savita Sharma

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 and 3 marks. Internal choice will be there
Part D: Questions will be of 5 and 3 marks. Internal choice will be there.

Q.NO.	QUESTIONS	MARKS	CO ADDRESS ED	BLOOM'S LEVEL	PI
P A R T- A	Q.1 (a)	2	CO1	BT1	
	Q.1 (b)	2	CO1	BT3	
	Q.1 (c)	2	CO1	BT4	
	Q.1 (d)	2	CO1	BT1	
	Q.1 (e)	2	CO1	BT 5	
	Q.1 (f)	2	CO1	BT2	
P	Q.2 (a)	2	CO2	BT3	

A R T- B						
	Q.2 (b)	Critically reflect on the changes you require in personal philosophy of life in both positive and negative aspects.	2	CO2	BT4	
	Q.2 (c)	'Philosophers form an important part rich global traditional heritage'. Comment on the statement in modern scenario.	2	CO2	BT3	
	Q.2 (d)	How Indian philosopher's view of life is different from that of western philosophers?	2	CO2	BT4	
	Q.2 (e)	Elaborate in detail how philosophical ideas of great leaders provide a sense of order and harmony to the society?	2	CO2	BT2	
	Q.2 (f)	How do you consider Tagore's philosophical ideas as relevant in modern society?	2	CO2	BT2	
P A R T- C	Q.3 (a)	What is secularism? How Indian constitution forms the base for a strong secular philosophy in India? OR Reflect on the idea of National Integration and International Understanding.	2+3	CO3	BT4	
			5			
	Q.3 (b)	Which part of Indian culture you want to bring about a change in. Discuss in detail?	5	CO3	BT4	
	Q.3 (c)	Evaluate various challenges to Indian political system with reference to its unity of country.	3	CO3	BT5	
P A R T- D	Q.4 (a)	'A spiritual orientation helps a person in developing a healthy personal identity and effective social relations'. Justify the statement with suitable explanation. OR Which religious philosophy, you admire the most in context of its teachings and values? Defend your stand with suitable argument.	5	CO4	BT5	
			5			
	Q.4(b)	'Religion provides a sense of personal direction and social harmony'. Critically analyze the statement.	5	CO4	BT4	
	Q.4 (c)	'Universal Human Values form the common core of all the religions teachings'. Explain your argument taking any two values as example.	3	CO4	BT4	
***** END *****						

DEPARTMENT OF MECHANICAL ENGINEERING

"End Term Examination, July-Dec 2023"

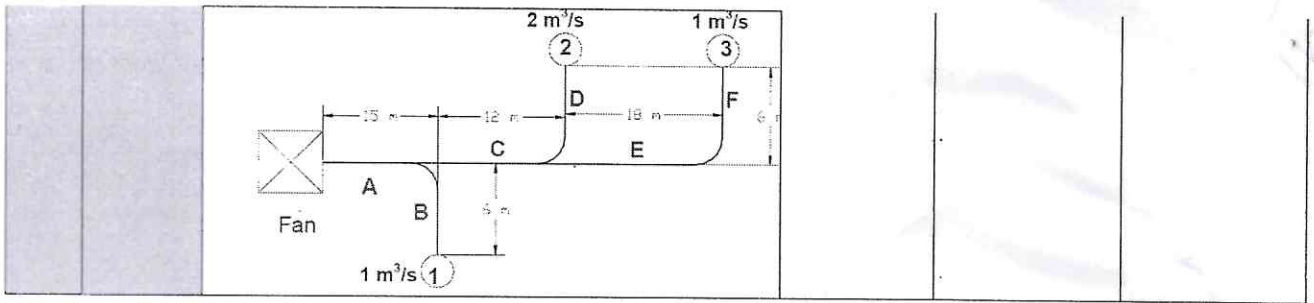
SEMESTER	7 th	DATE OF EXAM	18/12/2023
SUBJECT NAME	Heating, Ventilation & Air Conditioning	SUBJECT CODE	MEH409B-T
BRANCH	ME	SESSION	II
TIME	12:30 PM to 3:30 PM	MAX. MARKS	100
PROGRAM	B.TECH	CREDITS	4
NAME OF FACULTY	Mr. Piyush Mahendru	NAME OF COURSE COORDINATOR	Mr. Piyush Mahendru

Note: All questions are compulsory.



Q.NO.	QUESTIONS	MARKS	CO ADDRESSE D	BLOOM'S LEVEL
PART-A	Q1(A) Explain Summer and Winter Air Conditioning System Cycle.	08	CO1	BT2
	Q1(B) A building has to be maintained at 21o C(dry bulb) and 50% relative humidity when the outside conditions are -30 C(dry bulb) and 100% relative humidity. The inner and outer surface heat transfer coefficients are 8.3 W/m ² .K and 34.4 W/m ² .K, respectively. A designer chooses an insulated wall that has a thermal resistance (R-value) of 0.3 m ² .K/W. Find whether the wall insulation is sufficient to prevent condensation of moisture on the surface. If the chosen R-value of the wall can lead to condensation, what is the minimum thickness of additional insulation (thermal conductivity 0.036 W/m.K) required to prevent condensation? Take the barometric pressure as 101 kPa	07	CO1	BT4
PART-B	Q2(A) An air conditioned room that stands on a well ventilated basement measures 3 m wide, 3 m high and 6 m deep. One of the two 3 m walls faces west and contains a double-glazed glass window of size 1.5 m by 1.5 m, mounted flush with the wall with no external shading. There are no heat gains through the walls other than the one facing west. Calculate the sensible, latent and total heat gains on the	08	CO2	BT4

		<p>room, room sensible heat factor from the following information. What is the required cooling capacity?</p> <p>Inside conditions: 24°C dry bulb, 50 percent RH Outside conditions: 42°C dry bulb, 24°C wet bulb U-value for wall: 1.76 W/m².K U-value for roof: 1.32 W/m².K U-value for floor: 1.2 W/m².K Effective Temp. Difference (ETD) for wall: 22°C Effective Temp. Difference (ETD) for roof: 29°C U-value for glass; 3.12 W/m².K Solar Heat Gain (SHG) of glass; 298 W/m² Internal Shading Coefficient (SC) of glass: 0.86 Occupancy: 4 (90 W sensible heat/person) (40 W latent heat/person) Lighting load: 33 W/m² of floor area Appliance Load= 600 W (Sensible) + 300 W (Latent) Infiltration= 1 Air Changes per Hour Barometric Pressure- 101 KPa</p>			
	2(B)	Explain the following properties of refrigerants: i) Latent heat of vaporization ii) Boiling point iii) Miscibility. iv) Specific heat of vapour refrigerant v) Critical point	07	CO2	BT2
PART-C	Q3(A)	Explain in details the criteria to select the HVAC equipment.	12	CO3	BT2
	3(B)	Explain the working principle of Direct and Indirect Evaporative Cooling System.	08	CO3	BT2
	Q3(C)	Explain a two-stage vapour compression cycle with flash chamber for gas removal and intercooling with schematic and P-h diagram.	15	CO3	BT2
PART-D	Q4(A)	How duct design method is important for an HVAC system. Clarify it	15	CO4	BT2
	Q4(B)	Explain with schematic and p-h diagram CO ₂ -NH ₃ cascade refrigeration system.	12	CO4	BT2
	Q4(C)	The following figure shows a typical duct layout. Design the duct system using a) Velocity method. Take the velocity of air in the main duct (A) as 8 m/s. Assume a dynamic loss coefficient of 0.3 for upstream to downstream and 0.8 for upstream to branch and for the elbow. The dynamic loss coefficients for the outlets may be taken as 1.0. Find the FTP required for each case and the amount of dampening required.	08	CO4	BT4





DEPARTMENT OF MECHANICAL ENGINEERING
"End Term Examination, Dec-2023"

SEMESTER	1 st	DATE OF EXAM	12/12/2023
SUBJECT NAME	Work Measurement Techniques	SUBJECT CODE	MEH505B-T
BRANCH	Mechanical	SESSION	Morning
TIME	8:30 AM- 11:30 AM	MAX. MARKS	100
PROGRAM	M.Tech	CREDITS	3
NAME OF FACULTY	Dr. Ajit	NAME OF COURSE COORDINATOR	Dr. Ajit

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

Q.NO.	QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL
PART-A	1(A) Discuss the role of human factors consideration in the manufacturing industry.	5	C01	BT2
	1(B) What is meant by micro motion and memo motion study?	5	C01	BT1
	1(C) Describe the work study and motion study	5	C01	BT2
PART-B	2(A) Explain the breakeven point analysis and its important?	5	C02	BT2
	2(B) What are the recording techniques of method study?	5	C02	BT1
	2(C) Explain the effect of poor ergonomics conditions in the production plants.	5	C02	BT1
PART-C	3(A) Define: outline process chart, flow process chart - man type, material type, machine type, flow diagram, two handed operation chart, two hand process chart, multiple activity chart, man-machine chart?	9	C03	BT2
	3(B) The following table gives the operation times and due dates for five jobs which are to be processed on a machine. Assign the jobs according to the shortest operation time and calculate the mean flow time. JOB PROCESSING TIME DUE DATE(DAYS)	9	C03	BT4

	101	6days	5			
	102	7days	3			
	103	4 days	4			
	104	9days	7			
	105	5days	2			
	3(C)	Explain the role and responsibility of the management of an organization.		8	C04	BT2
	3(D)	Explain the material handling concept in production industry.		9	C04	BT2
PART-D	Q4(A)	Analyze the effects due to poor layout design and inadequate materials handling.		9	C03	BT4
	Q4(B)	Explore the reliability evaluation and availability concepts in Delhi Metro Rail Corporation and comment on its pattern?		9	C03	BT3
	Q4(C)	Explain the accidents and occupational hazards.		8	C04	BT2
	Q4(D)	What are the reliability evaluation and availability concepts? Explain them in details.		9	C04	BT2

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 "End Semester Examination, Dec-2023"

SEMESTER	1st	DATE OF EXAM/SESSION	14.12.2023/MORNING
COURSE NAME	Metal Forming Analysis	COURSE CODE	MEH503B-T
PROGRAM	M.Tech ME	CREDITS	03
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	MAR KS	CO ADDR ESSED	BLOO M'S LEVEL	PI
PART (A)	1(A) What do you understand by shear on punch and die? Discuss the relative advantages of providing shear on punch and die.	05	CO1	BT1,2	
	1(B) What is clearance? What is the effect of excessive and too small clearance?	05	CO1	BT1	
	1(C) Explain the true stress-strain curve for ductile material	05	CO1	BT1	
PART (B)	2(A) Explain various rolling defects with diagram.	05	CO2	BT2	
	2(B) A wide strip is rolled from 10 mm thickness to a final thickness of 5 mm. The roll radius is 450 mm, and the coefficient of friction is 0.3, determine the location of neutral plane.	05	CO2	BT5	
	2(C) Why is friction measurement necessary in the forming process?	05	CO2	BT2	
PART (C)	3(A) Distinguish between open and closed die-forging processes.	07	CO3	BT4	

	3(B)	Sketch the hydrostatic extrusion process. Compare it with the direct extrusion process. Support your answer with reasons.	07	CO3	BT3,4		
	3(C)	Draw and explain typical stress-strain diagram for ductile material. Also, explain springback effect in bending process.	07	CO3	BT2		
	3(D)	Elaborate the process of heat generation and heat transfer in metal forming processes.	07	CO3	BT2		
	3(E)	Explain the process of sheet metal shearing operation done with a punch and die. What is the importance of giving proper clearance between the punch and the die? Also, explain with the help of suitable sketches the difference between punching and perforating operations. Give application of the two operations.	07	CO3	BT2		
PART (D)	4(A)	Explain the following: (i) Stretch forming (ii) Deep drawing	07	CO4	BT2		
	4(B)	Compare drop forging and press forging w.r.t. their principle of operation, working and the range of products for which they are suitable.	07	CO4	BT4		
	4(C)	State and explain the basic theory of wire drawing, deep drawing of circular blanks. Give simple sketch in support of your answer.	07	CO4	BT2		
	4(D)	Name any five forging defects. Also, give their causes and remedies.	07	CO4	BT2		
	4(E)	State the difference between hot working and cold working process. Also, explain need of metal forming processes in industries	07	Co4	BT4		

***** END *****

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"End Semester Examination, Dec-2023"

SEMESTER	1	DATE OF EXAM	16/12/2023, 8:30-11:30
COURSE NAME	Production System and Management	COURSE CODE	MEH502B-T
PROGRAM	M.Tech ME	CREDITS	3
TIME DURATION	3 Hours	MAX. MARKS	100
NAME OF FACULTY	Prof. (Dr.) Joginder Singh	NAME OF COURSE COORDINATOR	Prof. (Dr.) Joginder Singh

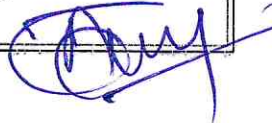
Note: All questions are compulsory.

Q.NO.	QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
Part-A	1 Recall the Jidoka?	5	CO1	BT1	
	2 Rephrase the Measurement System Analysis (MSA)?	5	CO1	BT2	
	3 Demonstrate the Quality Function Deployment (QFD)?	5	CO1	BT2	
Part-B	4 Recall the SIX SIGMA?	5	CO1	BT1	
	5 Create and Compose the Poka Yoke?	5	CO4	BT6	
	6 Construct the Design For Manufacturing (DFM)?	5	CO2	BT3	
Part-C	7 Contrast the Toyota Production System?	7	CO2	BT4	
	8 Conclude that inventory hides the problem?	7	CO3	BT5	
	9 Examine the Design For Assembly (DFA)?	7	CO2	BT4	
	10 Inspect the importance of Advanced Product Quality Planning (APQP) in Production Company?	7	CO3	BT4	
	11 Just in Time (JIT) is an inventory management method whereby materials, goods and labor are scheduled to arrive or to be replenished exactly when needed in the production process. Elaborate with examples?	7	CO4	BT6	
Part-D	12 A job is performed on the milling machine. The following details are given below: (i) Standard time for job = 7 minutes (ii) Number of Jobs to be produced = 80,000 (iii) Machine Capacity = 2000 Hours/Month (iv) Machine Utilization = 85% Solve the number of machine required?	7	CO2	BT3	
	13 Appraise the importance of KAIZEN in a production company?	7	CO3	BT5	
	14 Model the structure of 5S?	7	CO2	BT3	
	15 Compare between the Design For Assembly (DFA) and Design For Manufacturing (DFM)?	7	CO1	BT2	
	16 Compose the different types of wastes (MUDA) in a Mass Production System?	7	CO4	BT6	
***** END *****					

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

SEMESTER	1	DATE OF EXAM/SESSION	18.12.2023/M
COURSE NAME	MODERN MANUFACTURING PROCESSES	COURSE CODE	MEH501B-T
PROGRAM	M.TECH ME	CREDITS	3
TIME DURATION	08.30AM - 11.30AM	MAX. MARKS	100
NAME OF FACULTY	Mr. Nazish Ahmad Shamsi	NAME OF COURSE COORDINATOR	Mr. Nazish Ahmad Shamsi

Note: All Questions are compulsory. Assume missing data if any.



Q.NO.	QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL	PI
PART-A	Q1(A) Illustrate the principle of operation of Laser beam machining with neat sketch. Also mention its advantages and disadvantages.	8	CO1	BT2	
	Q1(B) Compare the traditional with the non-traditional processes used in manufacturing products.	7		BT4	
PART-B	Q2(A) Explain the factors affecting Casting process?	7	CO2	BT2	
	Q2(B) Illustrate various types of casting defects and their remedies.	8		BT2	
PART-C	Q3(A) Show the working principle of electron beam welding with neat sketch.	9	CO3	BT2	
	Q3(B) Mention the advantages and disadvantages of EBM?	8		BT2	
	Q3(C) Categorize various applications of modern welding techniques in industry with suitable example of your own.	9		BT4	

PART-D	Q3(D)	Demonstrate the working principle of Laser beam welding along its process parameters.	9		BT2	
	Q4(A)	Compare the factors affecting the high energy rate forming processes.	9		BT4	
	Q4(B)	Explain the Explosive forming processes considering the role in manufacturing with proper examples.	9		BT2	
	Q4(C)	Classify the merits and demerits of HERP processes used in industrial application along with suitable example.	8		BT4	
	Q4(D)	Explain the Stretch forming processes with proper examples.	9	CO4	BT2	

 END

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"End Semester Examination, Dec-2023"

SEMESTER	1 st	DATE OF EXAM/SESSION	20 th Dec. 2023 (I)
COURSE NAME	Research Methodology	COURSE CODE	MES506B
PROGRAM	M.Tech.	CREDITS	2
TIME DURATION	8.30AM to 10.30AM	MAX. MARKS	40
NAME OF FACULTY	Dr. Prashant Bhardwaj	NAME OF COURSE COORDINATOR	Dr. Prashant Bhardwaj



Q.NO.	QUESTIONS	MARKS	CO ADDRESS	BLOOM'S LEVEL																							
PART-A	1(a) Prepare detailed research proposal on your proposed research topic.	5	CO1	BT6																							
	1(b) Explain the significance of Literature review and Bibliography in a research report.	5	CO1	BT2																							
PART-B	2(a) What is hypothesis? Discuss the formulation of hypothesis of your research topic.	5	CO2	BT2																							
	2(b) Classify and explain the different types of Sampling used in research?	5	CO2	BT3																							
PART-C	3(a) Calculate the standard deviation and variance of the given data <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td>X</td> <td>10</td> <td>20</td> <td>30</td> <td>40</td> <td>50</td> <td>60</td> <td>70</td> <td>80</td> <td>90</td> <td>100</td> </tr> <tr> <td>Y</td> <td>12</td> <td>19</td> <td>31</td> <td>38</td> <td>46</td> <td>44</td> <td>37</td> <td>23</td> <td>13</td> <td>7</td> </tr> </table>	X	10	20	30	40	50	60	70	80	90	100	Y	12	19	31	38	46	44	37	23	13	7	8	CO3	BT4	
	X	10	20	30	40	50	60	70	80	90	100																
Y	12	19	31	38	46	44	37	23	13	7																	
3(b) When would you use median rather than mean to describe the central tendency of a distribution?	2	CO3	BT2																								
PART-D	4(a) What is the significance of negative correlation factor?	2	CO4	BT1																							
	4(b) The following data represents the demand (x) and supply (y) both in thousands of units of a certain commodity during first seven months on 2023. <table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td>Months</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> </tr> <tr> <td>Demand (x)</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> <td>7</td> </tr> <tr> <td>Supply (y)</td> <td>2</td> <td>7</td> <td>4</td> <td>6</td> <td>5</td> <td>6</td> <td>5</td> </tr> </table> Evaluate the regression equation and hence the correlation coefficient.	Months	1	2	3	4	5	6	7	Demand (x)	1	2	3	4	5	6	7	Supply (y)	2	7	4	6	5	6	5	8	CO4
Months	1	2	3	4	5	6	7																				
Demand (x)	1	2	3	4	5	6	7																				
Supply (y)	2	7	4	6	5	6	5																				

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

SEMESTER	3 rd	DATE OF EXAM/SESSION	12.12.2023/EVENING
COURSE NAME	Theory of Metal Cutting	COURSE CODE	MEH601B
PROGRAM	M.Tech ME	CREDITS	03
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	MAR KS	CO ADDR ESSED	BLOO M'S LEVEL	PI
PART (A)	1(A) Describe nomenclature of single point cutting tool.	05	CO1	BT2	
	1(B) What are the differences between capstan and turret lathe?	05	CO1	BT1	
	1(C) What is the function of chip breakers? State the important functions of cutting fluids.	05	CO1	BT1	
PART (B)	2(A) Explain the difference between conventional and non-conventional machining process.	05	CO2	BT2	
	2(B) Briefly, differentiate between orthogonal cutting and oblique cutting?	05	CO2	BT2	
	2(C) The useful tool life of an HSS tool, machining mild steel at 25m/min is 5 hours. Calculate the tool life when tool operates at 40m/min	05	CO2	BT4	
PART (C)	3(A) What are the sources of heat generation in machining? Also state the important functions of cutting fluids.	07	CO3	BT3	

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SEMESTER	III	DATE OF EXAM	14/12/2023 (E)
COURSE NAME	GLOBAL LOGISTIC SYSTEM	COURSE CODE	MEH605B
PROGRAM	M.TECH	CREDITS	3
TIME DURATION	3 HOURS	MAX. MARKS	80
NAME OF FACULTY	MANDEEP BHADANA	NAME OF COURSE COORDINATOR	MANDEEP BHADANA



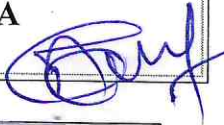
Note: All questions are compulsory.

Q.NO.	QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL
PART-A	Q1(A) Explain the need of logistics and supply chain management for any industry.	5	C01	BT2
	Q1(B) Analyze logistics metrics to measure supply chain efficiency in warehouse.	5	C01	BT4
	Q2(A) Explain economic lot size model with suitable example.	5	C02	BT2
	Q2(B) Differentiate between inventory under certainty and uncertainty.	5	C02	BT4
PART-B	Q3(A) Analyze in details the Porter's industry analysis by giving suitable examples.	8	C03	BT4
	Q3(B) Identify the cost estimation and control strategies in logistics management.	7	C03	BT3
	Q4(A) Explain supply stream strategies also write its classification and development guidelines.	8	C03	BT2
	Q4(B) Identify the role of logistics in design and development phase.	7	C03	BT3
	Q5(A) Examine the Coordination and technology in E-business and SCM.	8	C04	BT4
Q5(B) Explore the effect of lack of co-ordination and obstacles in supply chain.	7	C04	BT5	

Q6(A)	Evaluate Operations Research Models for operational and strategic issues in supply chain management.	8	CO4	BT5
Q6(B)	Determine the Metrics for supply chain performance.	7	CO4	BT5

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"End Semester Examination, Dec-2023"

SEMESTER	3 rd	DATE OF EXAM/SESSION	16/12/2023 (Evening)
COURSE NAME	Adv. Optimization Techniques	COURSE CODE	MES602B
PROGRAM	M.TECH ME	CREDITS	1
TIME DURATION	1.5 HOURS	MAX. MARKS	40
NAME OF FACULTY	PRADEEP KR. MOURIA	NAME OF COURSE COORDINATOR	PRADEEP KR. MOURIA



Q.NO.		QUESTIONS	MARKS	CO ADDRESSED	BLOOM'S LEVEL
PART-A	Q1	Q:1 Find out the maximum objective of the assignment problem.	5	CO1	BT4
		62 78 50 101 82			
		71 84 55 73 59			
		87 92 111 71 81			
		48 64 87 77 80			
PART-B	Q2	Q:2 Define optimization and design constrained.	5	CO2	BT 2
PART-C	Q3	Q:3(a) Explain different steps involved in Genetic Algorithm with an example.	8	CO3	BT2
		Q:3(b) Discuss the application of optimization in industries.	7		
PART-D	Q4	Q:4 Use the Kuhn-Tucker condition to solve the following NLPP: Minimize $Z=2X_1+3X_2-X_1^2-2X_2^2$ Subject to constraints $X_1+3X_2 \leq 6$ $5X_1+2X_2 \leq 10$ $X_1, X_2 \geq 0$	15	CO4	BT4
