

**MODEL INSTITUTE OF ENGINEERING &
TECHNOLOGY (AUTONOMOUS)**
BSC-102 (Set 1) MSE

Computer Science and Engineering (Artificial Intelligence & Machine Learning)

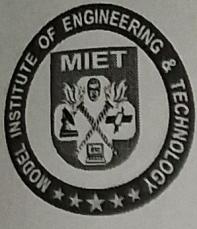
Admission No.:
Sem: SEM -I
Date: 19-12-2023
Time: 1.30 hrs

Course: BSC - 102- Engineering Physics

Mark(s):20

Q.No	Question	CO1	[4] [K3]
1	Define the term divergence of a vector field. Give its physical significance. Evaluate Divergence of the given field, $\vec{F} = 2x^2\hat{i} + (4y^2 + z^2)\hat{j} - 3yz\hat{k}$	CO1	[4] [K3]
2	Prove that $\text{Div}(\vec{A} \times \vec{B}) = \vec{B} \cdot \text{Curl} \vec{A} - \vec{A} \cdot \text{Curl} \vec{B}$	CO1	[4] [K3]
3.1	What is displacement current? Establish that $(\nabla \times \vec{B}) = \mu_0 (\vec{J} + \epsilon_0 \frac{\partial \vec{E}}{\partial t})$ (or)	CO2	[4] [K3]
3.2	Deduce the Faraday's law of electromagnetic induction in differential form. Write Maxwell's equations in vacuum and non-conducting medium. $J=0$ $E=0$ $H=0$ $B=0$	CO2	[4] [K4]
4	Explain Heisenberg's uncertainty principle. Derive its mathematical proof.	CO3	[4] [K2]
5.1	Define phase velocity and group velocity. Show that phase velocity is equal to group velocity in non-dispersive medium. (or)	CO3	[4] [K2]
5.2	Applying Schrodinger's equation to get energy eigen values and eigen functions of a particle in a box with perfectly rigid walls.	CO3	[4] [K2]

Level	Competence level under revised Bloom's Taxonomy	Question Number	Marks Allotted	% of Marks
1	Understanding(K2)	4, 5	8	40
2	Applying(K3)	1, 2, 3	12	60
3	Analysing(K4)		0	0



**MODEL INSTITUTE OF ENGINEERING &
TECHNOLOGY (AUTONOMOUS)**
BSC-101 (Regular) MSE
Computer Science and Engineering
(Artificial Intelligence & Machine Learning)

Course: BSC-101- Engineering Mathematics-I

Admission No.:
Sem: SEM -I
Date:18-12-2023
Time:1.30 hrs

Mark(s):20

PART A

[3*4=12]

Q.No	Question	CO1	[4] [K4]
1	<p>Find the position and nature of the double points on the following curve:</p> $- \left(\frac{8b^2}{27} \right) + b \left(\frac{9b^2}{a} \right) ay^2 - x^3 + bx^2 = 0 \quad = \text{Eqn}$ <p style="text-align: right;"><i>dt/dt</i> <i>dx/dy</i> <i>0 0</i></p>	CO1	[4] [K5]
2	<p>Find all the asymptotes of the following curve:</p> $(x + 9y + 2)(x + y)^2 = x + 3y - 1$ <p style="text-align: center;"><i>q3, q2</i></p>		
3.1	<p>Using Lebnitz theorem and Maclurian series, show that</p> $\log(x + \sqrt{1 + x^2}) = x - \frac{1}{2} \frac{x^3}{3} + \frac{1}{2} \frac{3}{4} \frac{x^5}{5} \dots$ <p style="text-align: center;">(or)</p>	CO2	[4] [K3]
3.2	<p>Examine the maxima or minima of the function</p> $\sin x \sin y \sin z$ <p>where x, y, z are interior angles of a triangle.</p>	CO2	[4] [K3]

PART B

[2*4=8]

Q.No	Question
4	

Q.No	Question	CO3 [4] [K4]		
4	Find the values of a and b so that $\lim_{x \rightarrow 0} \frac{x(1 - a \cos x) + b \sin x}{x^3}$ exists and equals to $\frac{1}{3}$			
5.1	Find the eigen values and eigen vectors of the following matrix $\begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix}$	CO3 [4] [K3]		
5.2	Using elementary row operations, find the inverse of the following matrix: $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 5 & 7 \\ -2 & -4 & -5 \end{bmatrix}$	CO3 [4] [K3]		
Level	Competence level under revised Bloom's Taxonomy	Question Number	Marks Allotted	% of Marks
1	Applying(K3)	3, 5	8	40
2	Analysing(K4)	1, 4	8	40
3	Evaluating(K5)	2	4	20



**MODEL INSTITUTE OF ENGINEERING &
TECHNOLOGY (AUTONOMOUS)**
MCC-102 (Set-1) MSE

Admission No.:
Sem: SEM -I
Date:23-12-2023
Time:1.30 hrs

Computer Science and Engineering
(Artificial Intelligence & Machine Learning)

Mark(s):20

Course: MCC-102- Indian Constitution

PART A

[3*4=12]

Q.No	Question	CO1	[4] [K2]
1	Discuss the salient features of the Constitution.	CO1	[4] [K2]
2	What are the fundamental rights? How are they different from the Directive Principles of State Policy?	CO2	[4] [K3]
3.1	What is the Preamble of the Constitution? Explain its significance. (or)	CO2	[4] [K4]
3.2	Explain the role of B.R Ambedkar in the framing of the constitution.	CO2	[4] [K5]

PART B

[2*4=8]

Q.No	Question	CO3	[4] [K3]
4	What is quasi-federalism? Examine the federal system in India.	CO3	[4] [K3]
5.1	What is Panchayati Raj and how does it function in India? (or)	CO3	[4] [K4]
5.2	While the Central and State Governments both derive their authority from the Constitution, Indian Constitution provides for a federal system with a unitary bias. Explain.	CO3	[4] [K5]

conflict

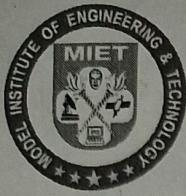
UB

Funds.

Unitary

Bias

Level	Competence level under revised Bloom's Taxonomy	Question Number	Marks Allotted	% of Marks
1	Understanding(K2)	1	4	20
2	Applying(K3)	2, 4	8	40
3	Analysing(K4)	3, 5	8	40
4	Evaluating(K5)		0	0



2023A6R022

**MODEL INSTITUTE OF ENGINEERING &
TECHNOLOGY (AUTONOMOUS)**
Final Examination ESC-201 Set B
(Regular/Private)
Computer Science and Engineering (AI & ML)

BE-II/6/22244

Admission No.:

Sem: SEM-II

Date: 15-06-2024

Time: 3 hrs

Course: ESC - 201- Basic Electrical and Electronics Engineering

Mark(s):100

PART A

[1*20=20]

Q.No	Question		
1	<p>Compulsory question, attempt all. (4 Marks each)</p> <p>a) State and explain Kirchoff's Voltage and current laws.</p> <p>b) For an AC voltage waveform represented by $V(t)=10\sin(2\pi ft)$ volts, where $f=50$ Hz. Calculate the RMS value of the voltage</p> <p>c) Discuss the regulation and efficiency of a transformer.</p> <p>d) Explain the color coding scheme for resistors and its significance.</p> <p>e) Compare and contrast BJT and FET</p>	CO1	[20] [K2]

PART B

[2*20=40]

Q.No	Question		
2.1	<p>Using Mesh analysis find the value of the currents flowing in the first, second and third mesh respectively</p> <p>$5 = 3I_1 - 2I_2$</p> <p>$-2I_1 + 7I_2 - 4I_3$</p> <p>$5 = -9I_3 + 4I_2$</p> <p>$I_1 = 1.795$</p> <p>$I_2 = 0.1925$</p> <p>$I_3 = 0.47$</p> <p>Ans: 1.795 0.1925 0.47</p>	CO2	[20] [K2]

2.2	<p>(a) Discuss the different types of power present in AC Circuits and the relationship between them.</p> <p>(b) Analyze the significance of power factor in AC Circuits.</p>	CO2	[20] [K3]
3.1	<p>(a) Discuss the construction and working of a transformer.</p> <p>(b) Apply the concept of the transformation ratio in transformers to solve for the secondary</p>	CO3	[20] [K4]

$$\frac{E_s}{E_p} = \frac{n_s}{n_p} = \frac{i_p}{i_s} = \frac{V_s}{V_p}$$

$$i_s = 2A$$

$$V_s = 200V$$

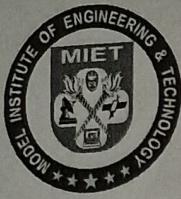
Q.No	Question		
	voltage and current given a primary voltage of 240V, a primary current of 10A, and a turns ratio of 5:1.		
3.2	(a) Explain how DC machines convert electrical energy into mechanical energy, and vice versa? (b) Explain the operation of induction motor AC machine in terms of magnetic fields and rotating machinery principles.	CO3	[20] [K3]

Part C

Q.No	Question		
4.1	(a) Explain Zener diode with its symbol and VI characteristics in forward and reverse bias. Also discuss Zener's breakdown process? (b) Explain Zener diode as voltage regulator with example.	CO4	[20] [K4]
4.2	(a) Discuss the need of filters in signal processing. Elaborate the different types of filters. (b) Explain the construction and working of LED. Why Silicon and Germanium cannot be used in the fabrication of LED.	CO4	[20] [K5]
5.1	(a) Explain the working of MOSFET and justify why it is preferred over JFET. (b) Derive the expression for h-parameters for transistors.	CO5	[20] [K6]
5.2	Analyze the principle of operation and characteristics of an NPN transistor for a CB configuration. Also derive the expressions for current gain and voltage gain.	CO5	[20] [K5]

Level	Competence level under revised Bloom's Taxonomy	Question Number	Marks Allotted	% of Marks
1	Understanding(K2)	1, 2	40	40
2	Applying(K3)		0	0
3	Analysing(K4)	3, 4	40	40
4	Evaluating(K5)		0	0
5	Creating(K6)	5	20	20

2023A6R022



**MODEL INSTITUTE OF ENGINEERING &
TECHNOLOGY (AUTONOMOUS)**
Final Examination HSMC-201 Set B
(Regular/Private)
Computer Science and Engineering (AI & ML)

Course: HSMC-201- Technical Communication

BE-II/6/22264

Admission No.:

Sem: SEM-II

Date: 22-06-2024

Time: 3 hrs

Mark(s):100

[1*20=20]

PART A

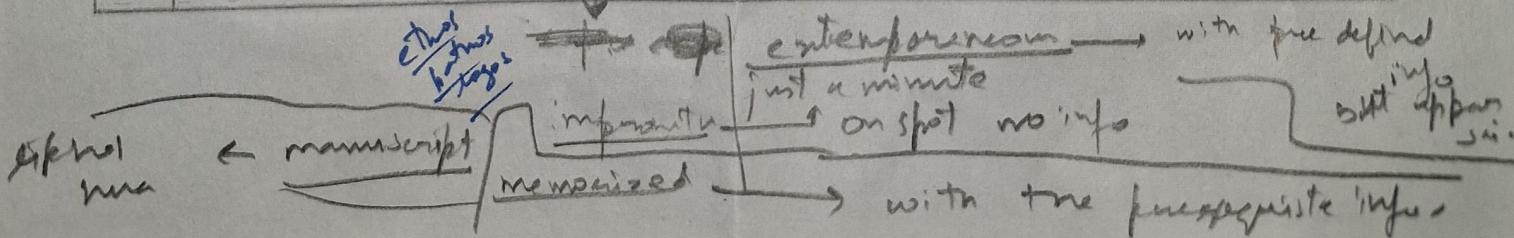
Q.No	Question	CO1	[20] [K2]
1	<p>Compulsory question, attempt all (4 marks each).</p> <p>(a) Which are the major techniques for writing precisely?</p> <p>(b) Write a short note on creative writing skills.</p> <p>(c) How listening is different from hearing?</p> <p>(d) What are the key principles for improving pronunciation? <i>STT WHM PS</i></p> <p>(e) What are the essential strategies for crafting a persuasive speech?</p>		

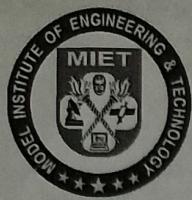
PART B

[2*20=40]

Q.No	Question	CO2	[20] [K3]
2.1	Identify the most effective strategies for building a successful blog in 2024, including tips for choosing a profitable niche.		
2.2	Articulate the structure and format of a professional letter with suitable examples.	CO2	[20] [K3]
3.1	<p>Correlate the following:</p> <p>(a) Reading and Note-Making</p> <p>(b) Reading and Interpretation</p>	CO3	[20] [K4]
3.2	Illustrate the concept of effective listening and analyze the various techniques of effectiveness of listening.	CO3	[20] [K4]

Q.No	Question	CO4	[20] [K4]
4.1	Examine the flow of communication in an organisation. Provide examples to support your answer. <i>Idea → sender → manager → employee</i>		
4.2	Examine the key principles and subdisciplines of phonetics, and how do they contribute to understanding the physical properties and perception of speech sounds in different languages? <i>feedback research</i>	CO4	[20] [K4]
5.1	Measure the prerequisites and stages of <u>public speaking</u> . Also provide examples. <i>(or)</i>	CO5	[20] [K5]
5.2	Evaluate the communication at work place. Evaluate the various types of communication at workplace.	CO5	[20] [K5]





**MODEL INSTITUTE OF ENGINEERING &
TECHNOLOGY (AUTONOMOUS)**
Final Examination BSC-201 Set A
(Regular/Private)
Computer Science and Engineering

BE-II/6/22234

Admission No.:

Sem: SEM-II

2023A6P022

Date: 12-06-2024

Time: 3 hrs

Course: BSC-201- Engineering Mathematics-II

Mark(s): 100

PART A

[1*20=20]

Q.No	Question	CO1	[20] [K2]
1	<p>Compulsory question, attempt all (4 marks each)</p> <p>a) In a lot of 200 articles 10 are defective, find the probability of (i) no defective (ii) at least one defective article, in a random sample of 20 article.</p> <p>b) Define Gamma distribution. Find the mean and variance of Gamma distribution .</p> <p>c) Calculate moments about mean, if the first four moments of origin are 4, 12, 17 and 56.</p> <p>d) A certain stimulus when administered to each of 12 patients resulted in the following increase of blood pressure: 5, 2, 8, -1, 3, 0, -2, 1, 5, 0, 4, 6. Can it be concluded that the stimulus when will, in general, be accompanied by an increase in blood pressure (Critical value = 2.20, corresponding to degree of freedom).</p> <p>e). In a sample of 1000 people, 540 are rice eaters and the rest are wheat eaters. Can we assume that rice and wheat eater are equally popular at 5% level of significance.</p>		

PART B

[2*20=40]

Q.No	Question	CO2	[20] [K2]																																						
2.1	<p>(a). Six dice are thrown together at a time, the process is repeated 729 times. How many times do you expect at least three dice to have 4 or 6.</p> <p>(b). If the probability density function $f(x)=k \exp(-x)$, $x>0$, find the value of K.</p> <p>(or)</p>	value $\rightarrow 4$	12 70 82 10																																						
2.2	<p>a). Define Gamma distribution. Obtain its mean and variance. In a certain city, the daily consumption of electric power in millions of Kilowatt-hours can be treated as a random variable having a gamma distribution with $\lambda=3$, $\alpha=1/2$. If the power plant of this city has a daily consumption of 12 million Kilowatt-hours, what is the probability that this power supply will be inadequate on any given day.</p> <p>b). Show that in a normal distribution, the mean deviation about mean is $4/5$ times the standard deviation.</p>	CO2	[20] [K3]																																						
3.1	<p>(a) Find the line of regression of y on x for the following data</p> <table border="1"> <tr> <td>x</td> <td>10</td> <td>9</td> <td>8</td> <td>7</td> <td>6</td> <td>4</td> <td>3</td> </tr> <tr> <td>y</td> <td>8</td> <td>12</td> <td>7</td> <td>10</td> <td>8</td> <td>9</td> <td>6</td> </tr> </table> <p>(b) From the following table, calculate the rank correlation coefficient;</p> <table border="1"> <tr> <td>C</td> <td>48</td> <td>40</td> <td>40</td> <td>9</td> <td>16</td> <td>16</td> <td>65</td> <td>24</td> <td>16</td> <td>24</td> </tr> <tr> <td>D</td> <td>13</td> <td>13</td> <td>24</td> <td>6</td> <td>15</td> <td>4</td> <td>20</td> <td>9</td> <td>6</td> <td>19</td> </tr> </table>	x	10	9	8	7	6	4	3	y	8	12	7	10	8	9	6	C	48	40	40	9	16	16	65	24	16	24	D	13	13	24	6	15	4	20	9	6	19	CO3	[20] [K4]
x	10	9	8	7	6	4	3																																		
y	8	12	7	10	8	9	6																																		
C	48	40	40	9	16	16	65	24	16	24																															
D	13	13	24	6	15	4	20	9	6	19																															

$$\frac{1 - \sum_{i=1}^n r_i^2}{n(n^2 - 1)}$$

Q.No Question

(or)

CO3

[20] [K3]

3.2

(a). Calculate quartile coefficient of skewness from the following data:

Variable	1-5	6-10	11-15	16-20	21-25	26-30	31-35
Frequency	3	4	68	30	10	6	2

(b) Find out the Kurtosis of the following distribution:

Marks	0-10	10-20	20-30	30-40	40-50
No. of students	10	20	40	20	10

Part C

[2*20=40]

Q.No Question

4.1

a) A machine produces 16 defective bolts in a batch of 500 bolts. After the machine is overhauled, it produces 3 defective bolts in a batch of 100 bolts. Has the machine improved? [20] [K4]

b) A coin was tossed 400 times and the head turned up 216 times. Test the hypothesis that the coin is unbiased at 5% level of significance.

(or)

$$\frac{p_1 - p_2}{\sqrt{\mu \left(\frac{1}{n_1} + \frac{1}{n_2} \right)}}$$

$$\rho = \frac{y_1 + y_2}{m+2}$$

$$z = \frac{H_p - H_0}{\sigma_{H_p}}$$

4.2

4.2(a) The time taken by the workers in performing a job by method I and method II are as follows:

Method I	20	16	26	27	23	22	
Method II	27	33	42	35	32	34	38

Do these data show that the variances of time distribution in a population from which these samples are drawn do not differ significantly? (degree of freedom F(6,5)=4.95)

(b). The life time of electric bulbs for a random sample of 10 from a large consignment gave the following data:

Life in hours	4.2	4.6	3.9	4.1	5.2	3.8	3.9	4.3	4.4	5.6
---------------	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

Can we accept the hypothesis that the average lifetime of bulb is 4 hours? (Critical value of distribution is 2.26)

5.1

CO5

[20] [K6]

2023 AGP 22

Q.No	Question																																
	<p>(a) The theory predicts that the proportion of beans in the four groups A, B, C, D should be in 11 : 4 : 3 : 2. In an experiment it was observed that the number of four groups A, B, C, D are 1070, 430, 330, 170. Does the experiment support the theory? (χ^2 for 3 degree of freedom is 7.815 at 5 % level of significance)</p> <p>(b). In an experiment on immunization of cattle from tuberculosis the following results were obtained:</p> <table border="1"> <tr> <td></td> <td>Affected</td> <td>Unaffected</td> </tr> <tr> <td>Inoculated</td> <td>12</td> <td>28</td> </tr> <tr> <td>Not Inoculated</td> <td>13</td> <td>7</td> </tr> </table> <p>Examined the effect of vaccine in controlling the incidence of the disease. (The value of χ^2 corresponding to degree of freedom is 3.84)</p>		Affected	Unaffected	Inoculated	12	28	Not Inoculated	13	7																							
	Affected	Unaffected																															
Inoculated	12	28																															
Not Inoculated	13	7																															
5.2	<p>(a). The following is the distribution of the hourly number of trucks arriving at a company's warehouse. [20] [K5]</p> <table border="1"> <tr> <td>Trucks arriving per hour</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>Frequency:</td> <td>58</td> <td>151</td> <td>130</td> <td>102</td> <td>45</td> <td>12</td> <td>5</td> <td>1</td> <td>2</td> </tr> </table> <p>(b). A certain drug is claimed to be effective in curing colds. In an experiment on 164 people with colds, half of them were given the drug and half given sugar pills. The patients reactions to the treatment are recorded in the following table. Test the hypothesis that the drug is no better than sugar pills for curing colds.</p> <table border="1"> <tr> <td></td> <td>Helped</td> <td>Harmed</td> <td>No effect</td> </tr> <tr> <td>Drug</td> <td>104</td> <td>20</td> <td>40</td> </tr> <tr> <td>Sugar Pills</td> <td>88</td> <td>24</td> <td>52</td> </tr> </table>	Trucks arriving per hour	0	1	2	3	4	5	6	7	8	Frequency:	58	151	130	102	45	12	5	1	2		Helped	Harmed	No effect	Drug	104	20	40	Sugar Pills	88	24	52
Trucks arriving per hour	0	1	2	3	4	5	6	7	8																								
Frequency:	58	151	130	102	45	12	5	1	2																								
	Helped	Harmed	No effect																														
Drug	104	20	40																														
Sugar Pills	88	24	52																														

Level	Competence level under revised Bloom's Taxonomy	Question Number	Marks Allotted	% of Marks
1	Understanding(K2)	1, 2	40	40
2	Applying(K3)		0	0
3	Analysing(K4)	3, 4	40	40
4	Evaluating(K5)		0	0
5	Creating(K6)	5	20	20



**MODEL INSTITUTE OF ENGINEERING &
TECHNOLOGY (AUTONOMOUS)**

BSC-102 (Set - 2)

Computer Science and Engineering (Artificial
Intelligence & Machine Learning)

BE-I/12/22653

Admission No.:

Sem: SEM -I

Date: 25-01-2024

Time: 3 hrs

Course: BSC - 102- Engineering Physics

$$\textcircled{1} \quad \nabla \cdot \vec{A} = 0 \quad \text{Mark(s): 100}$$

PART A

$$\textcircled{2} \quad \nabla \times \vec{A} = 0$$

[1*20=20]

Q.No	Question	CO1	[20] [K2]
1	<p>Compulsory questions, attempt all</p> <p>a. Find the value of a constant 'b' so that the vector field $\vec{A} = x^2\hat{i} + (y - 2xy)\hat{j} + (x + bz)\hat{k}$ is a solenoidal. 4 Marks</p> <p>b. Show that in free space, electromagnetic waves travel with the velocity of light. 4 Marks</p> <p>c. Derive uncertainty principle in case of diffraction of beam of electron from a single slit. 4 Marks</p> <p>d. What are quarter wave and half wave plates? Write an expression for their thickness. 4 Marks</p> <p>e. What are the advantages of an optical fibre communication system over the conventional ones? Explain some of the applications of optical fibres. 4 Marks</p> <p><u>Advantages</u> _____ <u>Applications</u> _____</p>		$2n - (1 - 2n)$ + (1)

PART B

[2*20=40]

Q.No	Question	CO2	[20] [K2]
2.1	<p>State and prove Gauss divergence theorem. If $\vec{A} = \hat{i}x^2y - \hat{j}2xz + \hat{k}2yz$, find the Curl Curl \vec{A}</p> <p>$\nabla \times (\nabla \times \vec{A})$</p> <p>(or)</p>		20
2.2	Using Maxwell's equation, derive wave equation satisfied by \vec{E} and \vec{B} in vacuum.	CO2	[20] [K3]
3.1	What do you understand by wave function? What is physical significance of wavefunction? State conditions, which a well behaved wave function is expected to satisfy.	CO3	[20] [K4]
3.2	Write Schrodinger's equation for a particle in a box and obtain an expression for energy eigen values and eigen functions.	CO3	[20] [K3]

Part C

[2*20=40]

Q.No	Question	CO4	[20] [K4]
4.1	<p>Explain the phenomenon of interference in thin films in reflected system. Obtain the conditions for maxima and minima.</p> <p>$\mu_n = \mu(A\delta + BC) - AE$</p> <p>(or)</p>		

10⁶ 10⁸ 10³

Q.No	Question			
4.2	Explain the term polarization of light. Describe the construction, working and uses of Nicol prism.	CO4	[20] [K5]	
5.1	Discuss Einstein's co-efficients. Derive relation between them. BAB (or)	CO5	[20] [K6]	
5.2	What is an optical fibre? Explain the terms critical angle, angle of acceptance and acceptance cone. Discuss various types of optical fibres.	CO5	[20] [K5]	

Level	Competence level under revised Bloom's Taxonomy	Question Number	Marks Allotted	% of Marks
1	Understanding(K2)	1, 2	40	40
2	Applying(K3)		0	0
3	Analysing(K4)	3, 4	40	40
4	Evaluating(K5)		0	0
5	Creating(K6)	5	20	20

$$B_{21} \quad \mu(v) \left(N_1 B_{12} - N_2 B_{21} \right)$$

$$\frac{N_1}{N_2} \left(\frac{B_{12}}{B_{21}} - 1 \right) = N_1 A_{21}$$

$$\frac{N_1 A_{21}}{N_2 B_{21} \left(\frac{N_1}{N_2} \frac{B_{12}}{B_{21}} - 1 \right)}$$

$$\mu(v) = \frac{8\pi h v^3}{c^5 (e^h)} \quad \frac{A_{21}}{B_{21}} \doteq$$



**MODEL INSTITUTE OF ENGINEERING &
TECHNOLOGY (AUTONOMOUS)**
BSC-101 (Set 1)
**Computer Science and Engineering (Artificial
Intelligence & Machine Learning)**

BE-I/12/22613
Admission No.:
Sem: SEM -I
Date:22-01-2024
Time:3 hrs

Course: BSC-101- Engineering Mathematics-I

Mark(s):100

2023A6
2022

PART A

[1*20=20]

Q.No	Question	CO1	[20] [K2]
1	<p>Compulsory question, attempt all.</p> <p>(a). State and prove Euler's theorem for homogenous function. 4 Marks</p> <p>(b) State Leibnitz theorem and hence find the n-th order derivative of $x \cos(ax+b)$. 4 Marks</p> <p>(c) State Taylor's and Maclaurian series for function of single variable and hence evaluate $\sin x$ about $x=\pi/4$. 4 Marks</p> <p>(d) Define Symmetric and Skew Symmetric matrix. Prove that if A and B are skew symmetric matrix then $AB+BA$ is a symmetric matrix. 4 Marks</p> <p>(e) Define Linearly dependent and Linearly independent set of vectors. Give an example of each. 4 Marks</p>		

PART B

[2*20=40]

Q.No	Question	CO2	[20] [K2]
2.1	<p>(a). Find all the asymptotes of the following curve:</p> $(x+y)^2(x^2+xy+y^2) = a^2x^2 + a^3(y-x)$ <p>(b). Find the position and nature of the double points of curve:</p> $ay^2 = (x-a)^2(x-b)$ <p style="text-align: center;">(or)</p>	(15) (12)	
2.2	<p>(a). Find all the extremal values of: $\cos(x)+\cos(y)+\cos(x+y)$</p> <p>(b). Using Leibnitz's theorem and Maclaurian Series, show that</p> $\sin(m \sin^{-1} x) = mx + \frac{m(1^2-m^2)x^3}{3!} + \frac{m(1^2-m^2)(3^2-m^2)x^5}{5!} + \dots$	CO2	[20] [K3]
3.1	<p>(a). Evaluate the following integral using beta and gamma function:</p> <p>(a) $\int_0^1 x^{m-1} \left(\log \frac{1}{x} \right)^{n-1} dx$ for $m > 0$ (b) $\int_0^{\frac{\pi}{2}} \sin^3 x \cos^4 x dx$</p> <p>(b). Prove that:</p> $\int_0^{\frac{\pi}{2}} \sin^{2m} \theta d\theta = \frac{(2m-1)(2m-3)\dots3.1}{2m(2m-2)\dots4.2} \frac{\pi}{2}.$ <p style="text-align: center;">(or)</p>	CO3	[20] [K4]

Q.No	Question		
3.2	<p>(a). Evaluate the following integrals:</p> <p>(i) $\int_0^1 \int_0^{1-x} \int_0^{1-x-y} xyz dz dy dx$ (ii) $\int_0^3 \int_0^{4-y} (x+y) dy dx$</p> <p>(b) Evaluate the given integral over the cardioid $r = a(1 + \cos \theta)$ above the initial line,</p> $\int \int r \sin \theta dr d\theta$	CO3	[20] [K3]

Part C

[2*20=40]

Q.No	Question		
4.1	<p>(a). Determine the inverse of the following matrix using simple row operations:</p> $\begin{bmatrix} 0 & 1 & 2 \\ 1 & 2 & 3 \\ 3 & 1 & 1 \end{bmatrix}$ <p style="margin-left: 150px;"><i>Recheck</i></p>	CO4	[20] [K4]
	<p>(b). Solve the following system of equations using Cramer's rule. $3x+4y+z=17$, $2x+3y+2z=15$, $x+y=4$</p>		
	(or)		
4.2	<p>(a). Using Gauss Jordan method, solve the following system of equations: $x + 2y + 6z = 22$, $3x + 4y + z = 26$, $6x - y - z = 19$. (b). Find the rank of matrix of order 3×3 whose elements of first row, second and third row are $(1, 2, 3)$, $(1, 3, 4)$ and $(5, 4, 2)$ respectively, by using Elementary row operations.</p>	CO4	[20] [K5]
5.1	<p>(a). Find the characteristics values and characteristics vector of the following matrix:</p> $\begin{bmatrix} 2 & 1 & 1 \\ 1 & 2 & 1 \\ 0 & 0 & 1 \end{bmatrix}$	CO5	[20] [K6]
	<p>(b). State Cayley–Hamilton theorem. Using Cayley–Hamilton theorem prove that $A^3 - 4A^2 - 3A + 11 = 0$, given that</p> $A = \begin{bmatrix} 1 & 3 & 2 \\ 2 & 0 & -1 \\ 1 & 2 & 3 \end{bmatrix}$		
	(or)		
5.2	<p>(a). Show that although the union of two subspaces need not be a subspace, the intersection of two subspaces is again a subspace of a vector space. Provide examples to support the union's position.</p> <p>(b). State Rank- Nullity theorem. find a basis for nullspace(A) and verify Rank- Nullity theorem for</p> $A = \begin{bmatrix} 1 & 1 & 2 & 3 \\ 3 & 4 & 1 & 2 \\ 1 & 2 & 5 & 4 \end{bmatrix}$	CO5	[20] [K5]

13
27

42

27



**MODEL INSTITUTE OF ENGINEERING &
TECHNOLOGY (AUTONOMOUS)**
Final Examination BSC-102 (Set -2)
Computer Science Engineering

BE-I/12/22232

Admission No.:

Sem: SEM -I

Date:13-03-2023

Time:3 hrs

IS9

Course: BSC-102- Engineering Physics

Mark(s):100

PART A

[1*20=20]

Q.No	Question		
1	<p>Compulsory questions, attempt all</p> <p>(a). If \vec{r} is a position vector and $\vec{r} = \hat{i}x + \hat{j}y + \hat{k}z$ evaluate $\text{grad} \frac{1}{ \vec{r} ^2}$. 4 Marks</p> <p>(b). Write Maxwell's equations in vacuum and non-conducting medium. 4 Marks</p> <p>(c). Define wave function give its physical interpretation. 4 Marks</p> <p>(d). What are quarter wave and half wave plates? 4 Marks</p> <p>(e). Explain the following terms:-</p> <p>(i). Spontaneous emission</p> <p>(ii). Optical pumping</p>	CO5, CO4, CO3, CO2, CO1	[20] [K2]

PART B

[2*20=40]

Q.No	Question		
2.1	<p>Define divergence of a vector field and give its physical meaning.</p> <p>Show that $\nabla \cdot \left(\frac{\vec{r}}{ \vec{r} ^3} \right) = 0$, where $\vec{r} = \hat{i}x + \hat{j}y + \hat{k}z$</p>	CO1	[20] [K2]
2.2	<p>Define curl of a vector field. Show that $r ^n \vec{r}$ is an irrotational for any value of n, but it is solenoidal for $n=-3$, given $\vec{r} = \hat{i}x + \hat{j}y + \hat{k}z$</p>	CO1	[20] [K2]
3.1	<p>Explain Heisenberg's uncertainty principle. Derive its mathematical proof.</p>	CO3	[20] [K1]
3.2	<p>Write Schrodinger's equation for a particle in a box and obtain an expression for energy eigen values and eigen functions.</p>	CO3	[20] [K1]

Part C

[2*20=40]

Q.No	Question		
4.1	<p>Polarization / thin films) Newton ring</p> <p>Explain the phenomenon of interference in thin films in reflected system. Obtain the conditions for maxima and minima.</p>	CO4	[20] [K2]
4.2	<p>(or)</p> <p>What is plane transmission grating and describe how it can be used to determine the wavelength of light used.</p>	CO4	[20] [K2]

Q.No Question

5.1	Discuss Einstein's co-efficients. Derive relation between them. In a Ruby laser, the energy difference between the two laser levels is 0.117eV. Determine the frequency and wavelength of the radiation.	CO5 [20]	
5.2	(or) Explain the terms critical angle, angle of acceptance and numerical aperture of an optical fibre. The core of an optical fibre is made of silica with refractive index 1.45 and refractive index of cladding is 1.435. Calculate the critical angle and numerical aperture.	CO5 [20] [K3]	

Level	Competence level under revised Bloom's Taxonomy	Question Number	Marks Allotted	% of Marks
1	Remembering(K1)	3	20	20
2	Understanding(K2)	1, 2, 4	60	60
3	Applying(K3)	5	20	20

$$E_2 - E_1 = h\nu$$

$$0.117\text{eV} = \nu$$

$$\lambda = \frac{c}{\nu}$$

$$6.626 \times 10^{-34} \text{ J/s}$$

$$6.6 \times 10^{-19}$$
~~10^30~~

$$2\pi A V$$

$$V_g = \frac{\Delta w}{\Delta k}$$

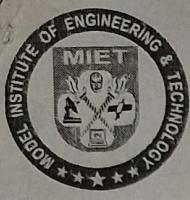
$$= \frac{2\pi A V}{2\pi \Delta P R}$$

$$\sim \frac{\Delta V}{\Delta P} R$$

$$\text{But } V_g = \frac{\Delta x}{\Delta t}$$

$$\frac{\Delta V}{\Delta P} = \frac{\Delta x}{\Delta t}$$

$$\Delta x, \Delta t \gg 1$$



**MODEL INSTITUTE OF ENGINEERING &
TECHNOLOGY (AUTONOMOUS)**
**COM-101 Introduction to Computer
Programming 1st Sessional Test**
Computer Science Engineering

Admission No.:

Sem: SEM -I

Date: 25-01-2023

Time: 1.30 hrs

Mark(s):50

Course: COM-101- Introduction to C Programming

PART A

[3*10=30]

Q.No	Question		
1	What do you understand by a flowchart? Explain the symbols involved in creating a flowchart.	CO1	[10] [K2]
2	Discuss the basic structure of a C program. Write a program to demonstrate the use of "+", "-", "*", "/", "%" operators.	CO2	[10] [K3]
3.1	Differentiate between while and do- while loop. Write a program in C to find sum of digits of a number. (or)	CO4, CO2	[10] [K3]
3.2	What are the different types of "if" statements that are used in C. Write a program to find greatest of three numbers	CO4, CO2	[10] [K3]

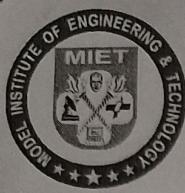
PART B

[2*10=20]

Q.No	Question		
4	What are tokens? Explain all the categories with examples of each.	CO2	[10] [K2]
5.1	You have recharged your mobile for a given amount. The service provider offers the following facilities. Write a program to read the initial recharged amount, number of calls made within same provider, number of calls made with different provider, number of STD calls and the number of SMS sent. Depending upon the facilities provided by the service provider, also calculate and display the remaining balance. (or)	CO4	[10] [K3]
5.2	Write a C Program to determine the maximum number of circular stampings of a specific size that can be cut in a rectangular metallic sheet. Find the amount of metallic sheet wasted.	CO4	[10] [K3]

Level	Competence level under revised Bloom's Taxonomy	Question Number	Marks Allotted	% of Marks
1	Understanding(K2)	1	10	20
2	Applying(K3)	2, 3, 5	30	60

159



**MODEL INSTITUTE OF ENGINEERING &
TECHNOLOGY (AUTONOMOUS)**
BSC-102-Sessional-1 (Set-B)
Computer Science Engineering

Admission No.:

Sem: SEM -I

Date: 24-01-2023

Time: 1.30 hrs

Course: BSC-102- Engineering Physics

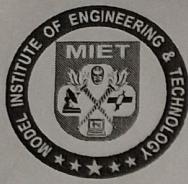
Mark(s):50

Q.No	Question	CO	[Marks]
1	Define curl of a vector field. Give its physical significance. If $\vec{A} = i x^2 y - j 2xz + k 2yz$, find the Curl Curl \vec{A} .	CO 1	[10] [K2]
2.1	A rigid body is rotating with a uniform angular velocity $\vec{\omega}$, about its axis passing through it. Show that $\text{Curl } \vec{V} = 2\vec{\omega}$, where \vec{V} is the linear velocity.	CO 1	[10] [K3]
2.2	(or) If $\vec{E} = -yi + xf$ then calculate the line integral $\oint \vec{E} \cdot d\vec{l}$ for a closed curve. $x^2 + y^2 = r^2$, $z = 0$ Hence verify the Stokes theorem.	CO 1	[10] [K3]
3	Show that $ r ^n \vec{r}$ is an irrotational for any value of n	CO 1	[10] [K2]
4.1	Deduce the Faraday's law of electromagnetic induction in differential form.	CO 2	[10] [K3]
4.2	(or) What is displacement current? Establish that $(\vec{\nabla} \times \vec{B}) = \mu_0 \left(\vec{j} + \epsilon_0 \frac{\partial \vec{E}}{\partial t} \right)$	CO 2	[10] [K3]
5	Explain Heisenberg's uncertainty principle. Derive its mathematical proof.	CO 3	[10] [K2]

Level	Competence level under revised Bloom's Taxonomy	Question Number	Marks Allotted	% of Marks
1	Understanding(K2)	1, 3, 5	30	60
2	Applying(K3)	2, 4	20	40

Y

28 65 96 0700



MODEL INSTITUTE OF ENGINEERING &
TECHNOLOGY (AUTONOMOUS)
**HSMC-101 Design Thinking 1st
Sessional Test**
Computer Science Engineering

Course: HSMC-101- Design Thinking

Admission No.:

Sem: SEM -I

Date: 27-01-2023

Time: 1.30 hrs

Mark(s):50

PART A

[3*10=30]

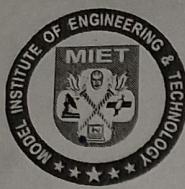
Q.No	Question		
1	Explain the essentials of Empathy phase. Explain the 4 W's in design thinking?	CO2	[10] [K2]
2	What is design thinking? Discuss any four methods used in empathy.	CO1	[10] [K2]
3.1	What are the main components of design thinking? Explain briefly about all 5 phases? (or)	CO1	[10] [K2]
3.2	Explain the importance of define phase. Discuss how to define a problem statement with the help of example.	CO1	[10] [K3]

PART B

[2*10=20]

Q.No	Question		
4	What is ideate phase? Explain the Characteristics Required for Successful completion of Ideation.	CO3, CO1	[10] [K2]
5.1	Explain empathy. Mention and discuss about 4 phases of research of the empathy phase? (or)	CO2	[10] [K2]
5.2	Explain any three methods in the define phase? What are the essentials of a good Problem statement?	CO2	[10] [K2]

Level	Competence level under revised Bloom's Taxonomy	Question Number	Marks Allotted	% of Marks
1	Understanding(K2)	1, 2, 3, 4, 5	50	100
2	Applying(K3)		0	0



MODEL INSTITUTE OF ENGINEERING &
TECHNOLOGY (AUTONOMOUS)
BSC-101 ENGINEERING MATHEMATICS
Sessional Test 1 (SET A)
Computer Science Engineering (AI & ML)

Admission No.:

Sem: SEM -I

Date: 23-01-2023

Time: 1.30 hrs

Mark(s): 50

Course: BSC-101- Engineering Mathematics-I

(27) 159

Q.No	Question	CO-I	CO-II	[10] [K2]
1	a) If $u = t^n e^{-r^2/4t}$ then what value of n will make $\frac{1}{r^2} \frac{\partial}{\partial r} (r^2 \frac{\partial u}{\partial r}) = \frac{\partial u}{\partial t}$? Partial b) Find the value of y_n where $y = [\log(x + \sqrt{1 + x^2})]^2$?			
2	Find all the asymptotes of the curve $(2x - 3y + 1)^2(x + y) = 8x - 2y + 9$?	CO-2		[10] [K3]
3.1	Prove that $(a, 4a)$ is a double point on the curve $y(x - a)^2 = x(y - 4a)^2$. Also find the equation of tangents there? (or)	CO-I		[10] [K2]
3.2	Examine the following functions for extreme values $\cos x \cos y \cos z$ when $x + y + z = \pi$?	CO-I		[10] [K2]
4	Show that the radius of curvature at any point of the curve $r^m = a^m \cos m\theta$ is given by $\frac{a^m}{(m+1)r^{m-1}}$.	CO-2		[10] [K3]
5.1	Show that for any positive integer n , $1, 3, 5, 7, \dots, (2n-1) = 2^n \Gamma(n + \frac{1}{2})$. (or)	CO-3		[10] [K2]
5.2	Prove the following $\int_0^\infty \frac{dx}{(e^x + e^{-x})^n} = \frac{1}{4} \beta(\frac{n}{2}, \frac{n}{2})$ and hence evaluate $\int_0^\infty \operatorname{sech}^8 x dx$.	CO-3		[10] [K3]

Level	Competence level under revised Bloom's Taxonomy	Question Number	Marks Allotted	% of Marks
1	Understanding(K2)	1, 3, 5	30	60
2	Applying(K3)	2, 4	20	40

10
2
12

10
2
12



**MODEL INSTITUTE OF ENGINEERING &
TECHNOLOGY (AUTONOMOUS)**
BSC-102, 2nd Sessional (Set B)

Computer Science Engineering

Course: BSC-102- Engineering Physics

Admission No.: 159

Sem: SEM -I

Date: 28-02-2023

Time: 1.30 hrs

Mark(s): 50

Q.No	Question	CO 4	[10] [K2]
1	Show that the results of reflected and transmitted systems of thin film for maxima and minima are complementary to each other.	CO 4	[10] [K2]
2.1	Find the thickness of a quarter wave plate when the wavelength of light is 5890 Angstrom is used, given refractive index for ordinary ray is 1.55 and refractive index for extraordinary ray is 1.54.	CO 4	[10] [K3]
2.2	(or) In a Newton's rings experiment, the diameter of 15 th ring was 0.590 cm and that of 5 th ring was 0.336 cm. If the radius of plano-convex lens is 100 cm, calculate the wavelength of light used.	CO 4	[10] [K3]
3	Define circularly and elliptically polarized light. Explain mathematically the production of circularly and elliptically polarized light.	CO 4	[10] [K2]
4.1	Discuss Einstein's co-efficients. Derive relationship between them.	CO 5	[10] [K3]
4.2	(or) Explain the construction and working of Ruby laser.	CO 5	[10] [K3]
5	What is an optical fibre? Explain the terms critical angle, angle of acceptance and numerical aperture of an optical fibre.	CO 5	[10] [K2]

Level	Competence level under revised Bloom's Taxonomy	Question Number	Marks Allotted	% of Marks
1	Understanding(K2)	1, 3, 5	30	60
2	Applying(K3)	2, 4	20	40



MODEL INSTITUTE OF ENGINEERING &
TECHNOLOGY (AUTONOMOUS)
BSC-101 ,2nd Sessional (Set 1)

Admission No.:
Sem: SEM -I
Date:27-02-2023
Time:1.30 hrs

159

Computer Science Engineering (Artificial Intelligence
& Machine Learning)

Course: BSC-101- Engineering Mathematics-I

Mark(s):50

Q.No	Question			
1	<p>Q1 a) Verify Cayley Hamilton theorem for the matrix b) Using Cayley Hamilton theorem, find the inverse of the matrix</p>	$\begin{bmatrix} 7 & -1 & 3 \\ 6 & 1 & 4 \\ 2 & 4 & 8 \end{bmatrix}$	CO-4	[10] [K5]
2	<p>Find the eigen values and eigen vectors of the matrix</p>	$\begin{bmatrix} 2 & 2 & 1 \\ 1 & 3 & 1 \\ 1 & 2 & 2 \end{bmatrix}$	CO-4	[10] [K5]
3.1	<p>Find the rank of the matrix</p>	$\begin{bmatrix} 1 & 1 & 2 \\ 1 & 2 & 1 \\ 3 & 2 & 3 \end{bmatrix}$	CO-5	[10] [K5]
	(or)			
3.2	<p>Verify that the vectors $(1, 1, 1), (1, 0, -1), (1, -1, -1)$ of R^3 forms a basis of R^3. Also express the vector $(-2, 3, 5)$ as a linear combination of these vectors.</p>		CO-5	[10] [K3]
4	<p>Test the consistency and hence solve the following set of equations.</p>		CO-5	[10] [K3]
	$x + y + z = 6$ $5x + 2y + z = 12$ $2x + y + 3z = 13$			
5.1	<p>Prove that nonempty subset W of a vector space is a subspace of V iff.</p>		CO-4	[10] [K3]
	i) $\forall x, y \in W, we\ have\ x - y \in W$ ii) $\forall \alpha \in F, x \in W\ we\ have\ \alpha x \in W$			
	(or)			
5.2				

1130

Q.No **Question**

CO-4

. Find the inverse of the matrix using elementary transformation

$$\begin{bmatrix} 7 & -3 & -3 \\ -1 & 1 & 0 \\ -1 & 0 & 1 \end{bmatrix}$$



Level	Competence level under revised Bloom's Taxonomy	Question Number	Marks Allotted	% of Marks
1	Applying(K3)	4, 5	20	40
2	Evaluating(K5)	1, 2, 3	30	60



**MODEL INSTITUTE OF ENGINEERING &
TECHNOLOGY (AUTONOMOUS)**
Final Examination COM-101(SET-2)
Computer Science Engineering

BE-I/12/22262
Admission No.:
Sem: SEM -I
Date:16-03-2023
Time:3 hrs

Course: COM-101- Introduction to C Programming

Mark(s):100

PART A

[1*20=20]

Q.No	Question		
1	<p>Q.1) Compulsory questions, attempt all.</p> <p>a) Write a short note on the evolution of programming languages</p> <p>b.1) What is the output?</p> <pre>void main() { int k = 0; int x = 0 = 1 && k++; printf("%d%d\n", x, k);}</pre> <p>b.2) What is the output?</p> <pre>int main() { int a = 20, b = 15, c = 5; int d; d = a == (b + c); printf("%d", d);}</pre> <p>c) Differentiate between break and continue with examples.</p> <p>d) What is recursion? Explain with the help of an example.</p> <p>e) What will be the output of the given code?</p> <pre>#include<stdio.h> #define print(x) printf("%d", x) int x; void q(int x) {x += x; print(x);} void p(int *y) {int x= *y+2; q(x); *y=x-1; print(x);} main(void) {x=5; p(&x); print(x);}</pre>	4 Marks	CO5, CO4, CO3, CO2, CO1

PART B

[2*20=40]

Q.No	Question		
2.1	<p>What is the need and process of compilation in C? Explain in detail with the help of a diagram and an example.</p> <p>20 Marks</p> <p>(or)</p>	CO2	[20] [K3]
2.2	Explain the evolution of programming languages along with the need and types of translators. 20 Marks	CO2	[20] [K2]
3.1	<p>What is the importance of C programming language?</p> <p>20 Marks</p> <p>(or)</p>	CO3	[20] [K3]

Q.No	Question		CO3
3.2	What are the rules for naming the identifiers? Categorize operators and explain each with one example. 20 Marks		

Part C

Q.No	Question		CO4	[20] [K3]
4.1	<p>Q.6) a) Explain different types of conditional statements available in C. 7 marks</p> <p>b) Program to check if a number is armstrong or not using a while loop. 7 marks</p> <p>c) When "a<=b" will be printed in the following case? Explain. 3 marks</p> <pre>if(a>b) printf("a>b"); else printf("elsepart"); printf("a<=b");</pre> <p>d) What will be the output? Explain. 3 marks</p> <pre>for(i=3;i<15;i=i+3); printf("%d", i);</pre> <p style="text-align: center;">(or)</p>			
4.2	<p>Q.7) How does a for loop differ from a nested for loop? Write down the program to print the following (5*4) Marks CO4 [20] [K3]</p> <p>a) 1 2 3 4 5 6 7 8 9 10</p> <p>b) 1 2 3 4 5 1 2 3 4 1 2 3 1 2 1</p> <p>c) ***** ***** ***** ***** *****</p>			
5.1	Explain the difference between call by value and call by reference with the help of example. Write a program to calculate factorial of a number with and without using recursion. 20 Marks CO5 [20] [K3]			
5.2	(or)			
5.2	Explain the difference between void and dangling pointer. Also, write a program for reading and writing the student marks data to files. 20 Marks CO5 [20] [K3]			

Level	Competence level under revised Bloom's Taxonomy	Question Number	Marks Allotted	% of Marks
1	Understanding(K2)		0	0
2	Applying(K3)	1, 2, 3, 4, 5	100	100



**MODEL INSTITUTE OF ENGINEERING &
TECHNOLOGY (AUTONOMOUS)**
Final Examination HSMC-101 (Set A)
Computer Science Engineering

Course: HSMC-101- Design Thinking

BE -M2/22282 (A)

Admission No.:

Sem: SEM -I

Date: 20-03-2022

Time: 3 hrs

Mark(s):100

PART A

Q.No	Question	[1*20=20]
1	<p>Compulsory question, attempt all.</p> <p>(a) What do you mean by design thinking? 4 Marks (b) Define the term "Innovation" 4 Marks (c) What do you mean by empathy? 4 Marks (d) How design thinking is beneficial in digital age? 4 Marks (e) How can you represent your brand using design thinking? 4 Marks</p>	CO5, CO4, CO3, CO2, CO1 [20] [K2]

PART B

[2*20=40]

Q.No	Question		
2.1	<p>(a) "Innovation is the basis of all competition advantages". Comment. (b) What are the major obstacles of design thinking these days? Discuss.</p>	CO2	[20] [K1]
2.2	<p>(or)</p> <p>(a) Creative thinking and problem solving are essential skills of professional development". Illustrate. (b) How design thinking works within a product development process? Explain</p>	CO2	[20] [K2]
3.1	<p>(a) Briefly explain all the phases of design thinking process. (b) Discuss the role of design thinking in healthcare sector.</p>	CO3	[20] [K1]
3.2	<p>(or)</p> <p>(a) Evaluate the factors that determine the level of innovation in an industry. (b) How pharmaceutical sector solve the problems by using design thinking? Explain.</p>	CO3	[20] [K2]

Part C

[2*20=40]

Q.No	Question		
4.1	<p>(a) Briefly explain the role of design thinking in banking sector. (b) Discuss the various benefits of design thinking .</p>	CO4	[20] [K2]
4.2	<p>(or)</p> <p>(a) "Design thinking is human centric". Discuss. (b) Differentiate between creativity and innovation.</p>	CO4	[20] [K3]
5.1	<p>(a) Draw a mind-map of Career planning of yourself after completion of the B.E. (CSE) course.</p>	CO5	[20] [K3]
5.2	<p>(or)</p> <p>(a) How design thinking helped financial sector to gain the consumers' trust? Discuss. (b) Infer the need of brainstorming in design thinking.</p>	CO5	[20] [K3]

Do trace the curve

MODEL INSTITUTE OF ENGINEERING &
TECHNOLOGY (AUTONOMOUS)
Final Examination BSC-101 (SET-1)
Computer Science Engineering

BE-I/12/22222
Admission No.:
Sem: SEM-I
Date: 10-03-2023
Time: 3 hrs

159

Course: BSC-101- Engineering Mathematics-I

Mark(s): 100

PART A

[1*20=20]

Q.No	Question		
1	Compulsory questions, attempt all.		[20] [K2]
	a) State and Prove Euler's theorem for homogeneous functions.	1	
	b) Evaluate the limit $\lim_{n \rightarrow \infty} \frac{\tan x - x}{x^2 \tan x}$	2	
	c) Evaluate $\iint xy \, dx \, dy$ over the positive quadrant of the circle $x^2 + y^2 = a^2$.	6	
	d) Define rank and find rank of unit matrix of order 3.	2	
	e) Find the linear transformation $T: R^3 \rightarrow R^3$ whose range is generated by $(1,0,-1)$ and $(1,2,2)$.	10	
		8	

PART B

[2*20=40]

Q.No	Question		
2.1	(a) If $u = \tan^{-1}\left(\frac{x^3 + y^3}{x - y}\right)$, prove that $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y} = \sin 2u$ and $x^2 \frac{\partial^2 u}{\partial x^2} + 2xy \frac{\partial^2 u}{\partial x \partial y} + y^2 \frac{\partial^2 u}{\partial y^2} = 2 \cos 3u \sin u$.	3	[20] [K1]
	(b) Trace the curve $y^2(a-x) = x^2(a+x)$	10 10 20	
2.2	(a) If $z = \psi\left(\frac{y}{x}\right) + \varphi\left(\frac{y}{x}\right)$ then prove that $x^2 \frac{\partial^2 z}{\partial x^2} + 2xy \frac{\partial^2 z}{\partial x \partial y} + y^2 \frac{\partial^2 z}{\partial y^2} = 0$	CO2	[20] [K2]
	(b) Trace the curve $r = a \sin 3\theta$	$z = x f(n) + g(n) x^2$	
3.1	(a) Verify Rolle's theorem for $f(x) = (x+2)^3((x-3)^4)$ in $(-2, 3)$.	CO3	[20] [K2]
	(b) Given $x+y+z=a$, find the maximum value of $x^m y^n z^p$.		
		(or)	

Part C

[3*20=60]

Q.No Question

3.2

(a) Find the Taylor's series for $\log \cos x$ about the point $\pi/3$

CO3

[20] [K2]

(b) Divide 24 into three parts such that the continued product of the first, square of the second and cube of the third may be maximum.

24 $x_1 x_2^2 x_3^3$

\Rightarrow

1
1
24

4.1

(a) Evaluate $\int_0^\pi \frac{\log(1 + \alpha x)}{1+x^2} dx$ and hence show that $\int_0^1 \frac{\log(1+x)}{1+x^2} dx = \frac{\pi}{8} \log_e 2$.

CO4

[20] [K3]

(b) Find the surface of the solid formed by revolving the cardioid $r = a(1 + \cos \theta)$ about the initial line.

1
1
24

(or)

4.2

(a) Evaluate $\int_0^\pi \frac{\log(1 + \sin \alpha \cos x)}{\cos x} dx = \pi\alpha$.

CO4

[20] [K3]

(b) Find the volume formed by the revolution of loop of the curve $y^2(a+x) = x^2(3a-x)$ about the x -axis.

5.1

(a) Find the value of a and b for which the equations $x + ay + z = 3, x + 2y + 2z = b, x + 5y + 3z = 9$ are consistent.

or answer is unique

CO5 [20] [K3]

When will these equations have unique solution?

(b) Solve these equations by determinant method $x + y + z = 6.6, x - y + z = 2.2, x + 2y + 3z = 15.2$.

? 29

5.2

(a) Find eigen values and eigen vectors of the matrix

$$\begin{bmatrix} 6 & -2 & 2 \\ -2 & 3 & -1 \\ 2 & -1 & 3 \end{bmatrix} \xrightarrow{\begin{array}{l} R_1 \leftrightarrow R_2 \\ R_2 \rightarrow R_2 - R_1 \\ R_3 \rightarrow R_3 - R_1 \end{array}} \begin{bmatrix} -2 & 2 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix} \xrightarrow{\begin{array}{l} R_1 \rightarrow R_1 + R_2 \\ R_2 \rightarrow R_2 + R_3 \\ R_1 \rightarrow R_1 + R_3 \end{array}} \begin{bmatrix} 0 & 0 & 1 \\ 0 & 1 & 1 \\ 0 & 1 & 1 \end{bmatrix}$$

CO5 [20] [K3]

(b) Show that $\{(2, 1, 4), (1, -1, 2), (3, 1, -2)\}$ forms a basis of R^3 .

29
02 -1 -5

Level	Competence level under revised Bloom's Taxonomy	Question Number	Marks Allotted	% of Marks
1	Remembering(K1)	2	20	20
2	Understanding(K2)	1, 3	40	40
3	Applying(K3)	4, 5	40	40

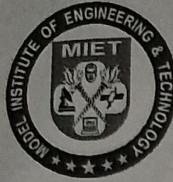
Ruby language
other RDBMS \rightarrow what ever short
New things

$(A \neq 0) ???$

(Ans)

$$\tan \left[m + \frac{1}{2} \right] = \frac{\sqrt{2m+1}}{2^{2m+1}}$$

$\tan^{-1} \frac{a_1}{a_2} = \frac{ab}{a_1^2 + a_2^2}$



**MODEL INSTITUTE OF ENGINEERING &
TECHNOLOGY (AUTONOMOUS)**
HSMC-201 SET-A
**Computer Science and Engineering (Artificial
Intelligence & Machine Learning)**

Admission No.:

Sem: SEM-II

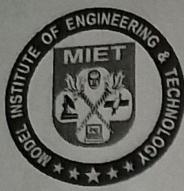
Date: 19-04-2024

Time: 1.30 hrs

Course: HSMC-201- Technical Communication

Mark(s):20

Q.No	Question		
1	<p>Read the sentences that follow and choose the correct option:</p> <p>1. Neither the students nor the teacher _____ aware that the assignment _____ due tomorrow.</p> <p>a. is, was b. are, were ✓ c. is, is d. are, are</p> <p>2. The cat, along with its kittens, _____ in the backyard, and they _____ playing happily.</p> <p>✓ a. is, are b. are, is c. is, is d. are, are</p> <p>3. Each of the participants _____ their experiences during the workshop, and some _____ eager to share more.</p> <p>a. share, is b. shares, is ✓ c. share, are d. shares, are</p> <p>4. Not only the cake but also the cookies _____ delicious, and everyone _____ enjoying the treats.</p> <p>a. is, is b. are, are c. is, are ✓ d. are, is</p>	C01	[4] [K2]
2	<p>As a student council representative at your college, you are passionate about environmental sustainability and see the need for a recycling program. Write a formal letter to the college administration proposing the initiative. In your letter, outline the specific goals and objectives of the recycling program and specify any necessary resources or support needed from the administration to implement the program effectively.</p>	C02	[4] [K3]
3.1	<p>Explain briefly the key elements of a well-structured report.</p>	C02	[4] [K3]
3.2	<p>(or)</p> <p>Differentiate between biography and autobiography.</p>	C02	[4] [K3]
4	<p>Discuss the common barriers to effective listening.</p>	C03	[4] [K2]
5.1	<p>Describe the four main types of reading.</p>	C03	[4] [K2]
5.2	<p>(or)</p> <p>Differentiate between listening and hearing.</p>	C03	[4] [K2]



**MODEL INSTITUTE OF ENGINEERING &
TECHNOLOGY (AUTONOMOUS)**
ESC-201_sess1_setA
Computer Science and Engineering (AI & ML)

Admission No.:

Sem: SEM-II

Date: 18-04-2024

Time: 1.30 hrs

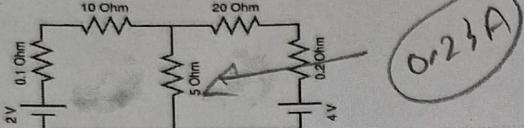
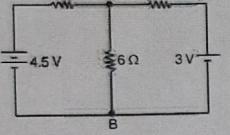
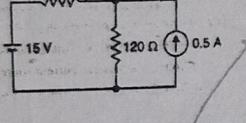
Mark(s): 20

0.5
gph +
18P
3
0.5
3

Course: ESC - 201- Basic Electrical and Electronics Engineering

PART A

[3*4=12]

Q.No	Question		
1	Define KCL & KVL. Find the current flowing through 5Ω resistor using KVL/Mesh analysis.	CO1	[4] [K3]
			0.2 A
2	What are Electrical Instruments. Explain in detail the classification of Instruments	CO2	[4] [K2]
3.1	Solve the given circuit to find the current through 6Ω using Thevenin's Theorem.	CO1	[4] [K5]
		$V_{TH} = 3.87$ $R_{TH} = 2.73$	0.67 A
	(or)		
3.2	Using Superposition theorem find current flowing through 120Ω resistor.	CO1	[4] [K5]
			

PART B

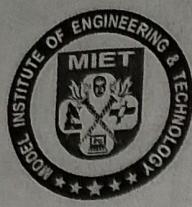
[2*4=8]

Q.No	Question		
4	Describe various losses associated with transformers. Also discuss the efficiency of a transformer.	CO3	[4] [K2]
5.1	Derive equation of current in RL single phase AC circuit. Also draw its phasor diagram and sinusoidal waveform	CO2	[4] [K4]
5.2	Define RMS value of sinusoidal current and derive its expression. Find RMS voltage of sinusoidal waveform with a peak value of 40V.	CO2	[4] [K4]

56.56

Level	Competence level under revised Bloom's Taxonomy	Question Number	Marks Allotted	% of Marks
1	Understanding(K2)	2, 4	8	40
2	Applying(K3)	1	4	20
3	Analysing(K4)	5	4	20
4	Evaluating(K5)	3	4	20

180
 $\frac{15}{180} = \frac{V}{V_0}$ $V = IR$
 $\frac{15}{180} = \frac{V}{40}$ $V = 0.83$
 $V = 0.83 \times 180$ $V = 150$
 $180 = 150$ $180 = 150$
 $180 = 150$ $180 = 150$



**MODEL INSTITUTE OF ENGINEERING &
TECHNOLOGY (AUTONOMOUS)**
NCC-201-2024
Computer Science and Engineering

Admission No.:

Sem: SEM-II

Date:

Time: 1.30 hrs

Course: NCC-201- Environment and Sustainability

Mark(s):20

Q.No	Question	CO1	[4] [K2]
1	Define the IPAT equation and its significance in understanding human impact on the environment. List the factors involved in the IPAT equation and explain how they interact to shape environmental sustainability.	CO1	[4] [K2]
2	Summarize the fundamental principles of sustainability and explain their relationship to the interconnectedness of humanity and the environment. Illustrate the concept of Milankovitch cycles and demonstrate how they contribute to climate variability over geological time scales, particularly in the Quaternary period.	CO1 <i>outstanding Final</i>	[4] [K3] <i>2.6 hrs</i>
3.1	Compare the major threats to soil sustainability and contrast how sustainable soil management practices can mitigate these threats.	CO2	[4] [K2]
	(or)		
3.2	Assess the importance of water in sustaining life on Earth, including its significance in various ecosystems, and critique the challenges associated with ensuring a reliable freshwater supply.	CO2	[4] [K2]
4	Design a model explaining how water pollution occurs, identifying the main sources and types of contaminants contributing to global water pollution.	CO2	[4] [K3]
5.1	Define the tragedy of the commons concept and identify examples of this phenomenon in modern environmental issues. Implement the main components of modern environmental management systems, particularly in waste management, and execute how they contribute to sustainability.	CO3	[4] [K2]
	(or)		
5.2	Explain the role of property rights in addressing environmental degradation and describe how they can be effectively utilized as a solution. Examine the effectiveness of Extended Producer Responsibility (EPR) using electronic waste as a case study, investigating its role in managing waste streams and promoting environmental sustainability. <i>EPR . Prod . Resp .</i>	CO3 <i>Env.友の Environ. and WEEE</i>	[4] [K2]

Level	Competence level under revised Bloom's Taxonomy	Question Number	Marks Allotted	% of Marks
1	Understanding(K2)	1, 3, 5	12	60
2	Applying(K3)	2, 4	8	40



MODEL INSTITUTE OF ENGINEERING &
TECHNOLOGY (AUTONOMOUS)
**BSC Engineering Mathematics-201 (SET
A))**
Computer Science and Engineering (AI & ML)

Admission No.:

Sem: SEM-II

Date: 16-04-2024

Time: 1.30 hrs

Course: BSC-201- Engineering Mathematics-II

Mark(s):20

Q.No	Question	CO1	[4] [K4]																		
1	Define Binomial and Poisson distribution. Show that Poisson distribution is a limiting case of Binomial distribution.	CO2	[4] [K5]																		
2	State Chebyshev's inequality. A discrete variate X can assume only the values $x = 1, 2, 3, \dots$ with probabilities 2^{-x} . Show that Chebyshev's inequality gives $P[X - 2 > \frac{1}{2}] > \frac{1}{2}$, while the actual probability is $\frac{15}{16}$.	$\frac{1}{2^x} \times \frac{1}{2^x}$	$Z \approx 3.5 = 0.07$																		
3.1	Define Normal distribution for continuous random variable. Write down five properties of Normal distribution. In a normal distribution exactly 7% of the items are under 35 and 89% are under 63. What are the mean and standard deviation of the distribution.	CO2	[4] [K5]																		
	(or)																				
3.2	Define joint probability mass function, marginal and conditional probability function. An urn contain four balls: Two of the balls are numbered with 1 and other two are numbered with 2. Two balls are drawn from the urn without replacement. Let X denote the smaller of the numbers on drawn balls and Y the larger. (a). Find the joint density of X and Y (b). Find the marginal distribution of X and Y (c). Find Cov (X, Y).	CO2	[4] [K5]																		
4	Show that for normal distribution all the moments of odd order about origin vanish while moments of even order is given by $\mu_{2n} = (2n - 1)\sigma^{2n}\mu_{2n-2}$.	CO3	[4] [K5]																		
5.1	Calculate the rank correlation coefficient from the following table.	CO3	[4] [K5]																		
	<table border="1"><tr><td>X</td><td>80</td><td>78</td><td>75</td><td>75</td><td>68</td><td>67</td><td>60</td><td>59</td></tr><tr><td>Y</td><td>12</td><td>13</td><td>14</td><td>14</td><td>14</td><td>16</td><td>15</td><td>17</td></tr></table>	X	80	78	75	75	68	67	60	59	Y	12	13	14	14	14	16	15	17		
X	80	78	75	75	68	67	60	59													
Y	12	13	14	14	14	16	15	17													
	(or)																				
5.2	Calculate the linear regression coefficients from the following	CO3	[4] [K5]																		
	<table border="1"><tr><td>X</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>Y</td><td>3</td><td>7</td><td>10</td><td>12</td><td>14</td><td>17</td><td>20</td><td>24</td></tr></table>	X	1	2	3	4	5	6	7	8	Y	3	7	10	12	14	17	20	24		
X	1	2	3	4	5	6	7	8													
Y	3	7	10	12	14	17	20	24													