MAHATMA GANDHI INSTITUTE OF TECHNOLOGY
(Autonomous)
B.Tech. III Semester End Examinations
(Model Question Paper)

MR-21

Course Title: Computational Statistics **Course Code: MA304BS**
Time: 3 hours Max. Marks: 70

Note: Answer ALL Questions
Part-A (10 x 2 = 20 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
1. a)	Solve the linear congruence $17x \equiv 14(mod 21)$	2	3	1	1
1. b)	Find the inverse of 4 $modulo$ 17 ie $4^{-1}(mod 17)$.	2	1	1	2
	Unit-II				
1. c)	Find the correlation coefficient r when $b_{xy} = 3.52$ and $b_{yx} = 4.23$,	2	1	2	1
1.d)	Find the regression equation X on Y is if $\bar{X} = 32, \bar{Y} = 42, b_{xy} = 0.5$.	2	1	2	2
	Unit-III				
1. e)	If a random variable has a poisson distribution such that P(x=1) = P(x=2) find the Mean of the distribution.	2	1	3	2
1.f)	If a random variable X has the following probability function X = x: 1, 2, 3, 4, 5 P(X): 2k, 3k, 4k, 5k, 6k Find i) k ii) Mean	2	1	3	2
	Unit-IV				
1. g)	Define degree of freedom.	2	1	4	1
1.h)	If we can assert with 95% that the maximum error is 0.05 and P =0.2, find the size of the sample.	2	1	4	
	Unit-V				
1. i)	What is transition probability matrix.	2	1	5	1
1.j)	Is the matrix $A = \begin{bmatrix} 1 & 0 \\ \frac{1}{2} & \frac{1}{2} \end{bmatrix}$ a stochastic matrix or not.	2	1	5	1

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
2.a)	Solve : $3x + 4y \equiv 5(mod 13)$ $2x + 5y \equiv 7(mod\ 13$	5	3	1	2
2.b)	Solve the system of linear congruences $2x + 3y + z \equiv 3(mod\ 5)$ $x + 2y + 3z \equiv 1(mod\ 5)$ $2x + z \equiv 1(mod\ 5)$.	5	3	1	2
	OR				
2. c)	Factorize the number 23449 using Fermat factorization.	5	3	1	2
2.d)	Solve the system of linear congruences $x \equiv 1\ (mod\ 3),\ \ x \equiv 2\ (mod\ 5), x \equiv 3(mod 7)$.	5	3	1	2
	Unit-II				
3. a)	Fit a second degree polynomial of the form $y = a + bx + cx^2$ to the following data x: 1, 2, 3, 4, 5, 6, 7 y: 2.3, 5.2, 9.7, 16.5, 29.4, 35.5, 54.4	5	3	2	2
3. b)	Find the regression equation of Y on X and estimate Y when X=55 from the following x: 40, 50, 38, 60, 65, 50, 35 y: 38, 60, 55, 70, 60, 48, 30	5	1	2	2
	OR				
3. c)	Psychological tests of intelligence and of engineering ability were applied to 10 students. Here is a record of ungrouped data showing intelligence ratio(I.R.) and engineering ratio(E.R.) . Calculate the coefficient of correlation . Student: A, B, C, D, E, F, G, H, I, J I.R.: 105, 104, 102, 101, 100, 99, 98, 96, 93, 92 E.R.: 101, 103, 100, 98, 95, 96, 104, 92, 97, 94	5	3	2	2

3.d)	Find the equation of the regression line of X on Y for the following data: x: 1, 2, 3, 4, 5, 6, 7, 8, 9 y: 4, 8, 2, 12, 10, 14, 16, 6, 18	5	1	2	1
Unit-III					
4. a)	Suppose a continuous random variable X has the probability density function $f(x) = k(1-x^2) for\ 0 < x < 1$ and $f(x) = 0\ other\ wise$. Find (i) K (ii) Mean (iii) Variance.	5	1	3	2
4. b)	A manufacturer of Cotter pins knows that 5% of his product is defective. Pins are sold in a boxes of 100. He guarantees that not more than 10 pens will be defective. What is the approximate probability that a box will fail to meet the guaranteed quality.	5	3	3	2
OR					
4. c)	A player tosses 3 fair coins. He wins Rs.500 if 3 heads appear, Rs.300 if 2 heads appear, Rs100 if 1 head occurs. On the other hand, he loses Rs.1500 if 3 tails occur. Find the expected gain of the player.	5	1	3	2
4.d)	Out of 800 families with 5 children each, how many would you expect to have i) 3 boys ii) At least one boy iii) No girls	5	1	3	2
Unit-IV					
5. a)	Determine a 95% confidence interval for the mean of a normal distribution with various 0.25, using a sample of n =100 values with mean to 212.3.	5	5	4	1
5. b)	The mean life of a sample of 10 electric bulbs was found to be 1456 hours with a standard deviation of 432 hours. A second sample of 17 bulbs chosen from a different batch showed a mean life of 1280 hours with a standard deviation of 398 hours. Is there a significant difference between the means of two batches?	5	2	4	2
OR					
5. c)	Among 900 people in a state 90 are found to be chapati eaters. Construct 99% confidence interval for the true proportion.	5	6	4	1
5.d)	A random sample of 10 boys had the following I.Q's : 70, 120, 110, 101, 88, 83,95, 98 107 and 100. Does this data support the assumption that the population mean IQ of 100?	5	2	4	2
Unit-V					
6. a)	Find whether the following is a regular transition matrix $\begin{bmatrix} 0 & 0.5 & 0.5 \\ 0.5 & 0 & 0.5 \\ 0.5 & 0.5 & 0 \end{bmatrix}$	5	1	5	1
6. b)	Three boys A, B, C are throwing a ball to each others. A always throws the ball to B and B always throws the ball to C. But C is just as likely to throw the ball to B as to A. If C was the 1st person to throw the ball. Find the probability that (i) A has the ball (ii) B has the ball (iii) C has the ball after three throws.	5	1	5	1
OR					
6. c)	Define (i) Stochastic Matrix (ii)Regular Stochastic Matrix (iii)Steady state condition.	5	1	5	1
6.d)	A professor has three pet questions, one of which occurs on every test he gives. He never uses the same question twice in successive examinations. If he uses question number 1, he tosses a coin and uses question number 2,if he gets a head. If he uses question number 2, he tosses 2 coins and uses question number 3, if both are heads. If he uses question number 3, he tosses 3 coins and uses question number 1, if all are heads. In the long run, which question does he use most often and with how much frequency is it used.	5	1	5	2

M: Marks; L: Bloom's Taxonomy Level; CO: Course Outcome; PO: Programme Outcome

MAHATMA GANDHI INSTITUTE OF TECHNOLOGY
(Autonomous)
B.Tech. III Semester End Examinations
(Model Question Paper)

MR-21

Course Title: Business Economics and Financial Analysis **Course Code: MS301HS**
Time: 3 hours Max. Marks : 70

Note: Answer ALL Questions
Part-A (10 x 2 = 20 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
1. a)	Define Business	2	1	1	1
1. b)	What is meant by National Income?	2	1	1	7
	Unit-II				
1. c)	Describe Law of Demand	2	2	2	12
1. d)	What are the Determinants of supply?	2	1	2	7
	Unit-III				
1. e)	Explain Monopoly	2	2	3	7
1. f)	What is meant by Sunk Cost?	2	1	3	11
	Unit-IV				
1. g)	Describe Accounting Equation	2	2	4	11
1. h)	What is meant by Conservatism?	2	1	4	8
	Unit-V				
1. i)	Explain Liquidity	2	2	5	11
1. j)	List Solvency ratios	2	1	5	11
	Part-B (5 x 10=50 Marks)				
Q. No.	**Stem of the Question**	**M**	**L**	**CO**	**PO**
	Unit-I				
2. a)	Explain different sources of capital.	5	2	1	1
2. b)	Describe the advantages and disadvantages of sole trading business.	5	2	1	7
	OR				
2. c)	Explain the nature of Business Economics.	5	2	1	7
2. d)	Differentiate between Private Limited Companies and Public Limited Companies	5	4	1	7
	Unit-II				
3. a)	Describe Law of Demand	5	2	2	11
3. b)	Explain the Determinants of Supply.	5	2	2	7
	OR				
3. c)	Compute Elasticity of demand. The quantity demand for the product X is 30 units, when the price is Rs.15. The quantity demanded increased to 40 units, as price decreased to Rs. 10. Calculate arc elasticity of demand.	5	3	2	2
3. d)	Explain different methods of Demand Forecasting	5	2	2	12
	Unit-III				
4. a)	How can a producer determine the least-cost combination of inputs?	5	1	3	3
4. b)	Differentiate between perfect competition and monopoly competition.	5	4	3	8
	OR				
4. c)	Explain Law of Diminishing Marginal Returns.	5	2	3	7
4. d)	Describe various Pricing strategies used by modern business organizations.	5	2	3	5
	Unit-IV				
5. a)	Classify the following accounts into various (Personal, Real or Nominal) types of accounts. i) Salary account ii) Outstanding wages account iii) Rent account iv) Bank account v) Insurance prepaid vi) Drawings account vii) Bad debts account	5	2	4	11

<table>
<tr><td></td><td>viii) Machinery account
ix) Furniture account
Patents account</td><td></td><td></td><td></td><td></td></tr>
<tr><td>5. b)</td><td>Journalise the following transactions:
Jan 1, 2021 Commenced with Cash Rs. 8,00,000
Jan 3, 2021 Purchased Goods worth Rs. 1,50,000
Jan 8, 2021 Sold Goods to Mr. Ramu Rs. 1,10,000
Jan 30, 2021 Salaries paid Rs. 40,000
Jan 30, 2021 Rent paid Rs. 20,000</td><td>5</td><td>3</td><td>4</td><td>11</td></tr>
<tr><td></td><td>OR</td><td></td><td></td><td></td><td></td></tr>
<tr><td>5. c)</td><td>Explain how a ledger account can be maintained?</td><td>5</td><td>2</td><td>4</td><td>11</td></tr>
<tr><td>5. d)</td><td>Prepare Trading and Profit and Loss account from the following information.
<table>
<tr><th colspan="3">Trial Balance as on 31.03.2021</th></tr>
<tr><th>Particulars</th><th>Debit(₹)</th><th>Credit(₹)</th></tr>
<tr><td>Capital</td><td></td><td>1,00,000</td></tr>
<tr><td>Purchases</td><td>40,000</td><td></td></tr>
<tr><td>Furniture</td><td>30,000</td><td></td></tr>
<tr><td>Interest received</td><td></td><td>3,000</td></tr>
<tr><td>Cash</td><td>15,000</td><td></td></tr>
<tr><td>Debtors</td><td>27,000</td><td></td></tr>
<tr><td>Office Stationery</td><td>3,000</td><td></td></tr>
<tr><td>Machinery</td><td>70,000</td><td></td></tr>
<tr><td>Bank Loan</td><td></td><td>5,000</td></tr>
<tr><td>Bills Payable</td><td></td><td>2,000</td></tr>
<tr><td>Opening Stock</td><td>10,000</td><td></td></tr>
<tr><td>Sales</td><td></td><td>90,000</td></tr>
<tr><td>Wages paid</td><td>600</td><td></td></tr>
<tr><td>Salaries paid</td><td>2,500</td><td></td></tr>
<tr><td>Electricity charges</td><td>1,200</td><td></td></tr>
<tr><td>Insurance paid</td><td>700</td><td></td></tr>
<tr><td>Total</td><td>2,00,000</td><td>2,00,000</td></tr>
</table>
Adjustments:
i) Closing Stock ₹ 12,000
ii) Depreciate Machinery @10% p.a.
Salaries outstanding ₹ 500</td><td>5</td><td>3</td><td>4</td><td>11</td></tr>
<tr><td></td><td>Unit-V</td><td></td><td></td><td></td><td></td></tr>
<tr><td>6. a)</td><td>How accounting ratios are useful in the inter-firm comparison.</td><td>5</td><td>1</td><td>5</td><td>10</td></tr>
<tr><td>6. b)</td><td>From the given Balance Sheet calculate:
a) Debt-equity ratio
b) Liquidity ratio
c) Fixed assets to current assets ratio and
d) Fixed assets to Net worth ratio.
<table>
<tr><th colspan="4">Balance Sheet</th></tr>
<tr><td>Liabilities</td><td>Rs.</td><td>Assets</td><td>Rs.</td></tr>
<tr><td>Share Capital</td><td>1,00,000</td><td>Goodwill</td><td>60,000</td></tr>
<tr><td>Retained Earnings</td><td>10,000</td><td>Machinery</td><td>1.00,000</td></tr>
<tr><td>Profit and loss a/c</td><td>40,000</td><td>Stock</td><td>30,000</td></tr>
<tr><td>Secured loans</td><td>80,000</td><td>Debtors</td><td>70,000</td></tr>
<tr><td>Creditors</td><td>40,000</td><td>Furniture</td><td>10,000</td></tr>
<tr><td>Provision for taxation</td><td>30,000</td><td>Cash</td><td>30,000</td></tr>
<tr><td></td><td>3,00,000</td><td></td><td>3,00,000</td></tr>
</table></td><td>5</td><td>3</td><td>5</td><td>10</td></tr>
<tr><td></td><td>OR</td><td></td><td></td><td></td><td></td></tr>
</table>

<table>
<tr><td>6. c)</td><td>Differentiate Liquidity ratios and leverage ratios.</td><td>5</td><td>4</td><td>5</td><td>11</td></tr>
<tr><td>6. d)</td><td>The Balance Sheet of ABC Limited as on 31-03-2018 was as follows:
<table>
<tr><th>Liabilities</th><th>Amount (₹)</th><th>Assets</th><th>Amount (₹)</th></tr>
<tr><td>Equity Share Capital</td><td>1,40,000</td><td>Plant and</td><td>1,24,000</td></tr>
<tr><td>Reserves and Surplus</td><td>1,28,000</td><td>Machinery</td><td>1,30,000</td></tr>
<tr><td>Debentures</td><td>1,32,000</td><td>Land and</td><td>26,000</td></tr>
<tr><td>Creditors</td><td>26,000</td><td>Buildings</td><td>2,000</td></tr>
<tr><td>Bank overdraft</td><td>4,000</td><td>Furniture &</td><td>22,000</td></tr>
<tr><td>Provision for Taxation:</td><td>6,000</td><td>Fixtures</td><td>4,000</td></tr>
<tr><td>Outstanding Expenses</td><td>2,000</td><td>Stock</td><td>12,000</td></tr>
<tr><td>Bills payable</td><td>2,000</td><td>Debtors</td><td>65,000</td></tr>
<tr><td></td><td></td><td>Investments</td><td>55,000</td></tr>
<tr><td></td><td>440,000</td><td>(Short-term)</td><td>440,000</td></tr>
<tr><td></td><td></td><td>Cash</td><td></td></tr>
<tr><td></td><td></td><td>Cash at Bank</td><td></td></tr>
</table>
From the above, compute and interpret
a) Current Ratio b) Quick Ratio c) Absolute Liquid Ratio d) Debt-Equity Ratio e) Proprietary Ratio.</td><td>5</td><td>3</td><td>5</td><td>11</td></tr>
</table>

M: Marks; L: Bloom’s Taxonomy Level; CO: Course Outcome; PO: Programme Outcome

MAHATMA GANDHI INSTITUTE OF TECHNOLOGY
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(Model Question Paper)

MR-21

Course Title: **FUNDAMENTALS OF DATA STRUCTURES** **Course Code: CS302PC**
Time: 3 hours Max. Marks : 70

Note: Answer ALL Questions
Part-A (10 x 2 = 20 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
1. a)	Define a Data Structure. What are the different types of Data Structures?	2	1	1	1, 2
1. b)	List out the advantages and disadvantages of using a linked list	2	1	1	1, 2
	Unit-II				
1. c)	Define Hashing. Write the importance of hashing.	2	2	2	1, 2
1. d)	What are the different collision resolution techniques?	2	1	2	1, 2
	Unit-III				
1. e)	Define binary tree. State the properties of a binary tree	2	2	3	1, 2
1. f)	What is mean by balanced trees? What are the categories of AVL rotations?	2	2	3	1, 2
	Unit-IV				
1. g)	What do you mean by internal and external sorting?	2	1	4	1, 2
1. h)	Define a Graph. What are different Graph traversals?	2	1	4	1, 2
	Unit-V				
1. i)	What is Pattern matching. List the Pattern matching Algorithms	2	1	5	1, 2
1. j)	Differentiate Compressed Tries and Suffix Tries	2	1	5	1, 2

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
2. a)	What is stack? Write an algorithm for the basic operations of stack?	5	1	1	1, 2
2. b)	Write a C program for Queues using arrays.	5	3	1	3, 12
	OR				
2. c)	Convert following arithmetic infix expression into postfix by using stack : A*(B+ C) + (D/E) * F + H - I	5	2	1	3, 12
2. d)	Explain evaluation of postfix expression with an example	5	2	1	1, 2
	Unit-II				
3. a)	What is skip list. Explain the operations of the skip list representation with suitable examples.	5	2	2	1
3. b)	Write about Double Hashing and Rehashing with examples	5	1	2	1, 2
	OR				
3. c)	What is collision? Explain Quadratic probing with example	5	2	2	1, 2
3. d)	What is Hashing? Explain Extendable hashing technique with example.	5	1	2	1, 2
	Unit-III				
4. a)	Construct a Binary Search tree using the elements 43, 10, 79, 90, 12, 54, 11, 9, 50, 85, 100, 62	4	4	3	1, 2
4. b)	Construct a binary tree having the following traversal sequences: Preorder traversal: A B C D E F G H I Inorder traversal: B C A E D G H F I	6	4	3	1, 2
	OR				
4. c)	What is AVL Tree. Write the sequence of steps to construct AVL tree.	5	1	3	1, 2
4. d)	Construct AVL tree for the following data 21,26,30,9,4,14,28,18,15,10,2,3,7	5	2	3	3
	Unit-IV				
5. a)	Define a Graph. Explain Adjacency matrix representation of a Graph with an example.	4	1	4	1, 2
5. b)	What are the different graph traversing techniques explain with example.	6	3	4	3, 12
	OR				
5. c)	Write an algorithm for Heap sort.	4	2	4	3
5. d)	Write a C program for Merge Sort	6	2	4	3
	Unit-V				
6. a)	Write a Brute force pattern matching algorithm	5	1	5	1, 2
6. b)	What are tries and briefly explain their types.	5	2	5	1, 2
	OR				
6. c)	Explain Knuth-Morris-Pratt Algorithm with example.	6	1	5	1, 2
6. d)	Explain in detail about standard tries	4	2	5	1, 2

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MAHATMA GANDHI INSTITUTE OF TECHNOLOGY
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MR-21

Course Title: Introduction to Python programming **Course Code: CS304PC**
Time: 3 hours Max. Marks : 70

Note: Answer ALL Questions
Part-A (10 x 2 = 20 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
1. a)	What is a variable? Write the rules for naming a variable.	2	1	1	2
1. b)	Differentiate between break and continue.	2	3	2	2
	Unit-II				
1. c)	Discuss Built-in functions and Methods in list with examples.	2	2	2	3
1. d)	What is a Dictionary? Demonstrate various Built-in functions and Methods in Dictionary.	2	3	2	3
	Unit-III				
1. e)	What is Exception handling? Tabulate Built-in Exceptions.	2	1	3	4
1. f)	Interpret a recursive function for finding factorial of a number in python.	2	2	2	
	Unit-IV				
1. g)	Summarize any 4 File module attributes	2	2	2	2
1. h)	Illustrate constructor.	2	2	2	2
	Unit-V				
1. i)	What is the purpose of Geometry method in python GUI.	2	1	5	5
1. j)	Demonstrate any 3 methods that can be used for arranging the widgets on window.	2	1	4	2

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
2. a)	Explain various Data Types in Python with examples.	5	2	1	1
2. b)	Build a Python program that reads four integers from user, prints them with a single print statement, without any space or newline between/after the values.	5	4	2	5
	OR				
2. c)	Illustrate the different types of Repetition Structures / control flow statements available in Python with flowcharts.	5	2	2	5
2. d)	Build a python script to print the following pattern. * * * * * * * * * *	5	4	2	5
	Unit-II				
3. a)	Classify between lists and tuples in Python.	5	2	2	2
3. b)	Illustrate Python script to find the square root of a number without using built-in functions.	5	2	3	5
	OR				
3. c)	Demonstrate Python sets.	5	1	2	2
3. d)	Explain about Python Dictionaries.	5	2	2	2
	Unit-III				
4. a)	Outline how to create, raise and handle user defined exceptions in python.	5	2	2	2
4. b)	What happens if except clause is written without any Exception type? Explain with an example.	5	1	3	5
	OR				
4. c)	What is Module in Python? Explain, how can you use Modules in your program explain with an example code.	5	1	2	2
4. d)	Explain different function prototypes with suitable examples.	5	2	3	5
	Unit-IV				
5. a)	Discuss the following methods associated with the file object a. read() b. readline() c. readlines() d. tell() e. seek()	5	4	2	5
5. b)	Discuss a program to demonstrate the Overriding of the Base Class method in the Derived Class.	5	4	4	2
	OR				
5. c)	Demonstrate implementation of hierarchical inheritance in Python, with a program.	5	2	4	2
5. d)	Outline Multiple Inheritance with Method Overriding with an example.	5	2	4	5
	Unit-V				
6. a)	How to use tkinter module? Write a python program to create a window with title	5	1	5	2
6. b)	Build a python program to display Tkinter Widgets Button and Label	5	4	5	2
	OR				
6. c)	Build a python program that creates a GUI with a text box, OK Button and QUIT button. On clicking OK the text entered in text box is to be printed in python shell, on clicking QUIT the program should terminate.	5	4	2	5
6. d)	Create a Calculator program in python for performing addition using tkinter widgets	5	6	5	2

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MR-21

Course Title: Discrete Structures **Course Code: CS307PC**
Time: 3 hours Max. Marks: 70

Note: Answer ALL Questions
Part-A (10 x 2 = 20 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
1. a)	Explain about the connectives?	2	4	1	1,2
1. b)	What are the two types of Quantifiers?	2	2	1	1
	Unit-II				
1. c)	Illustrate Union an intersection of sets with suitable example.	2	3	2	1,2
1.d)	What are the properties of Binary Relation?	2	1	2	1
	Unit-III				
1. e)	What is Mathematical Induction?	2	2	3	1,2
1.f)	In how many ways can the letters of the word 'LEADER' be arranged?	2	1	3	1
	Unit-IV				
1. g)	What is the probability that when two dice are rolled, the sum of the numbers on the two dice is 7?	2	1	3	1,2
1.h)	What is Bayes theorem?	2	1	4	1
	Unit-V				
1. i)	What is a Bipartite Graph?	2	1	5	1
1.j)	What is Eulers circuit?	2	1	5	1

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
2.a)	Use truth table to show that (⅂P∧ (⅂Q∧ R)∨ (Q∧ R) ∨ (P∧ R) ⇔R	5	2	1	1
2.b)	Show that ~p follows from the set of premises (r→~q), r V s, s→~q, p → q using indirect method of proof	5	3	1	1,2
	OR				
2. c)	Construct the truth table of compound preposition (p v ⅂q) —>(p ∧ q)	5	2	1	1
2.d)	Show that the following implication without constructing truth table (p → q) →q ⇒(p V q)	5	2	1	1
	Unit-II				
3. a)	A relation R on A is reflexive if and only if R^{-1} is reflexive.	5	2	2	1
3. b)	Show that congruence modulo m is an equivalence relation on integers..	5	4	2	1
	OR				
3. c)	What is Equivalence Relation? Explain with example?	5	1	2	1
3.d)	Draw the Hasse diagram for X={2,3,6,24,36,48} and relation ≤ be such that x≤y, if x divides y.	5	3	2	1,2
	Unit-III				
4. a)	Prove by Mathematical induction that $6^{n+2} + 7^{2n+1}$ is divisible by 43 for each positive integer n.	5	4	3	1,2
4. b)	Obtain recurrence relation for towers of Hanoi problem?	5	3	3	1,2
	OR				
4. c)	Prove that $1^2 + 2^2 + 3^2 + ... + n^2 = n (n + 1) (2n + 1)/ 6$ .For all positive integers n.	5	4	3	1,2
4.d)	Consider the function defined recursively as follows: f (0) = 1, f (n) = f (n − 1) + 3 Prove that f (n) = 3n + 1	5	3	3	1
	Unit-IV				
5. a)	Find the number of arrangements of letters “MISSISSIPPI”.	5	3	4	1,2
5. b)	Solve the recurrence relation $a_n - 9a_{n-1} + 20a_{n-2} = 0$ with $a_0 = -3, a_1 = -10$ using generating functions	5	4	4	1,2,3
	OR				
5. c)	Solve the recurrence relation $a_n-7a_{n-1}+12a_{n-2}=0$ for n≥2 where $a_0=1$, $a_1=2$.	5	4	4	1
5.d)	Find the general expression for a solution to the recurrence relation an-5an-1+6an-2 =n(n-1) forn≥2	5	3	4	1
	Unit-V				
6. a)	State and prove fundamental theorem of graph theory.	5	4	5	1,2
6. b)	Explain Breadth First Search Algorithm with an example	5	4	5	1,2
	OR				
6. c)	Prove that a complete graph K_n is planar if and only if $n \leq 4$.	5	3	5	1
6.d)	Explain the following with examples (a) Isomorphism and sub graphs (b) Planar Graph	5	4	5	1,2

M: Marks; L: Bloom’s Taxonomy Level; CO: Course Outcome; PO: Programme Outcome

MAHATMA GANDHI INSTITUTE OF TECHNOLOGY
(Autonomous)
B.Tech. III Semester End Examinations
(Model Question Paper)

MR-21

Course Title: Computer Organization and Architecture **Course Code: CS308PC**
Time: 3 hours Max. Marks : 70

Note: Answer ALL Questions
Part-A (10 x 2 = 20 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
1. a)	Define computer organization and architecture.	2	1	2	1
1. b)	List out the logical micro-operation along with example.	2	1	1	1
	Unit-II				
1. c)	"Microprogrammed control unit organization slower the operation of computer" Justify	2	2	2	2
1. d)	Differentiate between ADD and ADDC instructions in computer.	2	2	1	2
	Unit-III				
1. e)	Convert $(235)_{10}$ = ($)_2$	2	3	5	2
1. f)	Write the steps in floating point addition.	2	2	5	1
	Unit-IV				
1. g)	Classify the modes of data transfer.	2	1	3	1
1. h)	Give the role of associative memory in computer.	2	1	3	1
	Unit-V				
1. i)	Explain the significance of pipelining.	2	2	4	2
1. j)	What are the characteristics of multiprocessors.	2	1	4	1

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
	Unit-I				
2. a)	Explain the basic functional parts of the digital computer.	5	1	2	1
2. b)	Discuss about the common bus system configuration using multiplexer approach.	5	2	2	1
	OR				
2. c)	Differentiate between computer organization and architecture.	5	2	2	1
2. d)	Explain the memory-reference instruction with some RTL statements.	5	2	2	1
	Unit-II				
3. a)	With neat diagram, explain the operation of address sequencing in microprogram control organization.	5	1	1	3
3. b)	Explain the general register organization in digital computer.	5	1	1	1
	OR				
3. c)	Explain the basic blocks in micro programmed control organization.	5	1	1	1
3. d)	Discuss the various addressing modes in digital computer architecture.	5	1	1	1
	Unit-III				
4. a)	Perform X – Y when X = 1010101 and Y = 110011 using 2's complement approach.	5	3	5	2
4. b)	With neat diagram, explain the decimal arithmetic unit.	5	2	5	2
	OR				
4. c)	With the help example, explain the classification of fixed-point representation.	5	2	5	1
4. d)	Draw and explain the basic steps in Booth's multiplication algorithm.	5	3	5	3
	Unit-IV				
5. a)	With neat diagram, explain the role DMA in digital computer organization.	5	1	3	1
5. b)	Describe the various cache mapping techniques in cache memory organization.	5	1	3	2
	OR				
5. c)	Explain about input-out interfaces in digital computer.	5	1	3	1
5. d)	Draw and explain the memory hierarchy.	5	1	3	1
	Unit-V				
6. a)	Compare and contrast RISC versus CISC architectures.	5	2	4	5
6. b)	How to avoid the cache coherence problem in multiprocessor organization. Explain.	5	4	4	5
	OR				
6. c)	Explain about instruction pipelining.	5	1	4	12
6. d)	Give the significance of Array processors along with its applications.	5	2	4	12

M: Marks; L: Bloom's Taxonomy Level; CO: Course Outcome; PO: Programme Outcome