



B.Tech. V Semester End Examinations

(Common to CSE & CSD)

(Model Question Paper)

Subject Title: Algorithm Design and Analysis

Subject Code: CS501PC

Time: 3 hours

Max. Marks: 60

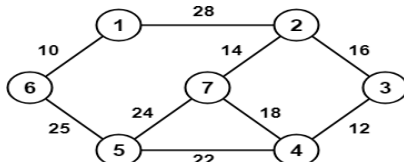
Note: Answer ALL Questions

Part-A (10 x 1 =10 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
1. a)	In what way a time complexity differs from space complexity.	1	1	1	1
1. b)	Define θ -notation? Give one Example.	1	1	1	1
Unit-II					
1. c)	Define Find Operation.	1	2	2	1
1. d)	Write Control Abstraction of Greedy method?	1	3	2	1
Unit-III					
1. e)	Define Optimal binary search.	1	2	3	1
1. f)	Define All pairs shortest path problem.	1	3	3	1
Unit-IV					
1. g)	List the applications of Backtracking?	1	2	4	1
1. h)	Write the Control Abstraction of Least – Cost Branch and Bound.	1	2	4	1
Unit-V					
1. i)	Define NP-Complete	1	4	5	1
1. j)	What is the relation between NP-hard and NP-complete?	1	4	5	1

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
2. a)	$f(n)=O(g(n))$, $f(n)=\Omega(g(n))$ and $f(n)=\Theta(g(n))$, illustrate these relations in estimating the time complexities with suitable examples	5	1	1	1
2. b)	Apply divide and conquer to search an element 'k' in an array a[1:n] using binary search and explain the algorithm.	5	1	1	1
OR					
2. c)	Solve using Masters theorem i) $T(n)=2T(n/4)+\sqrt{n}$ ii) $T(n)=7T(n/2)+n^2$	5	1	1	1
2. d)	$L=\{2,12,18,3,34, 27, 56, 4, 8, 3, 10\}$ write and explain the merge sort algorithm that outputs the sorted list of elements.	5	1	1	1
Unit-II					
3. a)	Discuss about Set representations? Write Algorithms for Union and Find in Set?	5	2	2	1
3. b)	State the Job – Sequencing with deadlines problem. Find an optimal sequence to the $n = 5$ Jobs where profits $(P_1, P_2, P_3, P_4, P_5) = (20, 15, 10, 5, 1)$ and deadlines $(d_1, d_2, d_3, d_4, d_5) = (2, 2, 1, 3, 3)$.	5	3	2	1
OR					
3. c)	Solve 0/1 Knapsack instance: $n = 5$, $(p_1, p_2, \dots, p_5) = (10,15,6,8,4)$, $(w_1, w_2, \dots, w_5) = (4,6,3,4,2)$ and $m=12$. And find an optimal solution of the same.	5	2	2	1
3. d)	Write down Kruskal's Algorithm for finding the Minimum Spanning Tree of a connected graph. Execute your algorithm on the following graph.	5	3	2	1



Unit-III					
4. a)	Draw an Optimal Binary Search Tree for n=4 identifiers (a1,a2,a3,a4)=(do,if,read, while) P(1:4)=(3,3,1,1) and Q(0:4)=(2,3,1,1,1)	5	2	3	1
4. b)	Formulate the Knapsack problem with greedy method and find the optimal solution for n=7, m=15, (p1-p7)=(10,5,15,7,6,18,3), (w1-w7)=(2,3,5,7,1,4,1)	5	3	3	1
OR					
4. c)	Solve Travelling Salesperson Problem $\begin{bmatrix} \infty & 5 & 1 & 10 & 6 \\ 1 & \infty & 4 & 12 & 7 \\ 3 & 6 & \infty & 4 & 16 \\ 7 & 1 & 3 & \infty & 9 \\ 16 & 12 & 7 & 6 & \infty \end{bmatrix}$	5	2	3	1
4. d)	Construct a system with multiple devices connected parallel in three stages. The costs of the devices are 25, 10 and 15 respectively. The cost of the system is to be no more than 100. The reliability of each device type is 0.8, 0.7 and 0.4 respectively.	5	3	3	1
Unit-IV					
5. a)	Given a set of non-negative integers {10, 7, 5, 18, 12, 20, 15}, and a value sum 35, determine if there is a subset of the given set with sum equal to given sum.	5	2	4	1
5. b)	Explain the FIFO BB 0/1 Knapsack problem procedure with the knapsack instance for n=4, m=15,(p1,p2,p3,p4)=(10,10,12,18), (w1,w2,w3,w4) = (2, 4, 6, 9). Draw the portion of the state space tree and find optimal solution.	5	2	4	1
OR					
5. c)	Write and explain the iterative back tracking algorithm. Draw the state space tree for 4-queens problem and give the solution tuples	5	2	4	1
5. d)	Draw the portion of state space tree generated by LCBB for the 0/1 Knapsack instance: n = 5, (p1, p2,.. p5) = (10,15,6,8,4), (w1,w2,..,w5) = (4,6,3,4,2) and m=12. And find an optimal solution of the same.	5	2	4	1
Unit-V					
6. a)	Prove, if any NP-complete problem belongs to class P, then is P = NP?	5	4	5	1
6. b)	Write a non-deterministic algorithm of sorting the list of elements	5	4	5	1
OR					
6. c)	Define NP- Hard and NP – Complete Problems.	5	4	5	1
6. d)	What are the steps used to show a given problem is NP-Complete?	5	4	5	1

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



Subject Title: Computer Networks

Time: 3 hours

Subject Code: CS502PC

Max. Marks : 60

Note: Answer ALL Questions

Part-A (10 x 1 = 10 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
1. a)	Contrast between Connection oriented and Connection less service?	1	2	1	1
1. b)	List the names of the layers of OSI / ISO Model?	1	1	1	1
Unit-II					
1. c)	Define Bit stuffing?	1	1	2	1
1. d)	List the carrier sense multiple access protocols?	1	1	2	1
Unit-III					
1. e)	Define congestion?	1	1	3	1
1. f)	State the differences between IPV4 and IPV6?	1	1	3	1
Unit-IV					
1. g)	List the Transport Service primitives?	1	1	4	1
1. h)	Sketch the UDP header?	1	2	4	2
Unit-V					
1. i)	Demonstrate about DNS?	1	2	5	1
1. j)	Compare FTP and TFTP?	1	2	5	1

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
2. a)	Compare LAN, MAN and WAN?	5	2	1	1
2. b)	Explain in detail about the OSI Model with a neat sketch?	5	2	1	2
OR					
2. c)	Compare and contrast the OSI and TCP/IP reference models.	5	2	1	1
2. d)	Summarize about twisted pair cables and coaxial cables with neat diagram.	5	2	1	2
Unit-II					
3. a)	What is framing? Explain various framing techniques of Data Link Layer	5	1	2	1
3. b)	Explain the CRC error detection technique using generator polynomial x^4+x^3+1 and data 11100011.	5	2	2	2
OR					
3. c)	Explain about GBN Sliding Window Protocol.	5	2	2	1
3. d)	Compare and contrast Pure ALOHA and Slotted ALOHA channel allocation Methods.	5	2	2	1
Unit-III					
4. a)	What are the design issues of Network Layer? Explain in detail.	5	1	3	1
4. b)	Define congestion. Write about congestion control policies	5	1	3	1
OR					
4. c)	Demonstrate how to make routing table using distance vector routing and list down the limitations.	5	2	3	2
4. d)	Given a network address of 192.168.100.0 and a subnet mask of 255.255.255.192. a) How many subnets are created? b) How many hosts are there per subnet?	5	1	3	1
Unit-IV					

5. a)	Illustrate the connection establishment and release in transport layer.	5	2	4	2
5. b)	How crash recovery is managed at the transport layer?	5	1	4	1
OR					
5. c)	What are the services provided by transport layer to the upper layers?	5	2	4	1
5. d)	Describe in brief about TCP segment Header	5	2	4	1
Unit-V					
6. a)	What is DNS? What are the services provided by DNS?	5	1	5	1
6. b)	Write notes on SMTP?	5	3	5	1
OR					
6. c)	How would you summarize the concepts of E-mail, its architecture and services?	5	2	5	1
6. d)	Elaborate on SNMP with an example.	5	4	5	1

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



B.Tech. V Semester End Examinations
(Computer Science and Engineering (Data Science))
(Model Question Paper)

Subject Title: Introduction to Data Science
Time: 3 hours

Subject Code: CD501PC
Max. Marks : 60

Note: Answer ALL Questions
Part-A (10 x 1 = 10 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
1. a)	What is Big Data?	1	1	1	1
1. b)	Define Overfitting of model in Data Science?	1	1	1	1
Unit-II					
1. c)	What is the draw back of “Mean” in Central Tendency?	1	1	2	1
1. d)	Compare Attribute and Measurement.	1	2	2	2
Unit-III					
1. e)	Apply Logical operators on two vectors.	1	3	4	2
1. f)	Write an R Code to get structure of data frame?	1	1	4	2
Unit-IV					
1. g)	Compare Relational operator and logical operator in R language	1	2	4	2
1. h)	What is function scoping in R language	1	1	4	1
Unit-V					
1. i)	Explain Pie Charts & Histograms.	1	1	5	1
1. j)	What is data reduction? List out different data reduction strategies.	1	3	5	1

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO																																																	
Unit-I																																																						
2. a)	Explain Data science life Cycle with neat diagram.	5	1	1	1																																																	
2. b)	Identify the Current landscape of perspective in Data Science.	5	3	1	1																																																	
OR																																																						
2. c)	What is operator? Explain different operators in R-Programming.	5	2	1	1																																																	
2. d)	Explain in detail about Statistical Inference in R language.	5	2	1	1																																																	
Unit-II																																																						
3. a)	Illustrate Matrix Sub-setting and operations in R-Programming	5	1	2	1																																																	
3. b)	Explain how to estimate the central tendency of the data using mean, mode and median with example.	5	1	2	1																																																	
OR																																																						
3. c)	Below is the Student Data set.	5	5	2	2																																																	
	<table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th>Student Name</th> <th>Gender</th> <th>Age</th> <th>Marks (Math)</th> <th>Marks (Science)</th> <th>Marks (English)</th> <th>Marks (History)</th> <th>Marks (Geography)</th> <th>Total Marks (out of 500)</th> </tr> </thead> <tbody> <tr> <td>John</td> <td>Male</td> <td>16</td> <td>78</td> <td>85</td> <td>90</td> <td>75</td> <td>80</td> <td>408</td> </tr> <tr> <td>Sarah</td> <td>Female</td> <td>15</td> <td>88</td> <td>92</td> <td>80</td> <td>85</td> <td>90</td> <td>435</td> </tr> <tr> <td>Mike</td> <td>Male</td> <td>16</td> <td>65</td> <td>70</td> <td>75</td> <td>60</td> <td>68</td> <td>338</td> </tr> <tr> <td>Emily</td> <td>Female</td> <td>17</td> <td>95</td> <td>98</td> <td>85</td> <td>90</td> <td>92</td> <td>460</td> </tr> <tr> <td>David</td> <td>Male</td> <td>16</td> <td>72</td> <td>80</td> <td>78</td> <td>70</td> <td>75</td> <td>375</td> </tr> </tbody> </table> <p>(a) Calculate the mean, median and standard deviation of Total marks and Draw the boxplot for Marks (Math)</p>					Student Name	Gender	Age	Marks (Math)	Marks (Science)	Marks (English)	Marks (History)	Marks (Geography)	Total Marks (out of 500)	John	Male	16	78	85	90	75	80	408	Sarah	Female	15	88	92	80	85	90	435	Mike	Male	16	65	70	75	60	68	338	Emily	Female	17	95	98	85	90	92	460	David	Male	16	72
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David	Male	16	72	80	78	70	75	375																																														
3. d)	What is the importance of basic statistical description of the data.	5	1	2	2																																																	
Unit-III																																																						

4. a)	Analyze different ways to create vector and access the elements of vector along with R Code.	5	3	3	2
4. b)	What is data frame? Explain sub setting of data frames and extending data frames with R Code.	5	1	3	1
OR					
4. c)	Explain different ways to create list and access the elements of list along with R Code.	5	1	3	2
4. d)	List out the applications of vectors, matrix, data frame and factors	5	3	3	1
Unit-IV					
5. a)	Compare logical and relational operators in R-language.	5	3	4	1
5. b)	Develop a program in R language for Calculator program.	5	3	4	1
OR					
5. c)	Co-relate R language functions with Data Analytics	5	3	4	1
5. d)	Illustrate mathematical operations in R-language	5	3	4	2
Unit-V					
6. a)	Illustrate different types of attributes with operations and transformations that can be applied.	5	3	5	2
6. b)	Distinguish between Histograms and Scatter plots in visualizing the data distribution.	5	4	5	2
OR					
6. c)	Explain Principle Component Analysis and its role in Data Science.	5	1	5	1
6. d)	Distinguish between Pixel Oriented Visualization and Icon based Visualization technique.	5	3	5	2

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



MAHATMA GANDHI INSTITUTE OF TECHNOLOGY (Autonomous)
B.Tech. V Semester End Examinations
(Computer Science & Engineering (Data Science))
(Model Question Paper)

MR-22

Subject Title: Web Programming
Time: 3 hours

Subject Code: CM512PE
Max. Marks: 60

Note: Answer ALL Questions
Part-A (10 x 1 = 10 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
1. a)	Give example of HTML form elements.	1	1	1	1
1. b)	State the advantage of CSS language.	1	1	1	1
Unit-II					
1. c)	What is a package in java?	1	1	2	1
1. d)	Specify any two string handling functions.	1	1	2	1
Unit-III					
1. e)	What are JDBC drivers?	1	1	3	1
1. f)	State the difference between TCP and UDP sockets.	1	2	3	2
Unit-IV					
1. g)	What is a java applet?	1	1	4	1
1. h)	What is Java RMI?	1	1	4	1
Unit-V					
1. i)	What is the purpose of XSL and XSLT in XML document processing?	1	2	5	2
1. j)	What is a web service?	1	1	5	1

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
2. a)	Explain different HTML form elements.	5	1	1	1
2. b)	Explain the objects in Browser Object Model?	5	1	1	2
OR					
2. c)	Compare and contrast inline, internal and external cascading style sheet specifications.	5	3	1	2
2. d)	Demonstrate the usage of JavaScript arrays with suitable examples.	5	2	1	2
Unit-II					
3. a)	Analyze the characteristics of object oriented programming concepts with suitable examples?	5	4	2	2
3. b)	Explain the characteristics of an interface.	5	1	2	1
OR					
3. c)	Illustrate exception handling in java with suitable examples.	5	3	2	2
3. d)	Develop a multithreaded program that creates three threads where the first thread prints numbers from 1 to 10, second thread prints numbers from 11 to 20, third thread prints from 21 to 30.	5	4	2	3
Unit-III					
4. a)	Summarize the 4 types of JDBC drivers characteristics and limitations.	5	1	3	1
4. b)	Explain the client-server programming using socket API?	5	2	3	2
OR					
4. c)	Illustrate the steps involved in connecting a java program to database.	5	2	3	2
4. d)	Describe java API classes for Internet Programming.	5	1	3	2
Unit-IV					

P.T.O.

5. a)	Explain the life cycle of an applet with a neat sketch.	5	2	4	1
5. b)	Demonstrate event handling in java with example programs.	5	3	4	2
OR					
5. c)	Illustrate parameter passing to an applet with suitable example.	5	2	4	2
5. d)	Elucidate the life cycle of a servlet.	5	1	4	1
Unit-V					
6. a)	Illustrate XML document styling using XSLT.	5	2	5	2
6. b)	Explain the significance of WSDL and UDDI in web services.	5	2	5	3
OR					
6. c)	Explain form navigation in XML document.	5	2	5	1
6. d)	Discuss the implementation of web services.	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. V Semester End Examinations
(Computer Science & Engineering (Data Science))
(Model Question Paper)

MR-22

Subject Title: DevOps and Its Applications

Time: 3 hours

Subject Code: IT521PE

Max. Marks: 60

Note: Answer ALL Questions

Part-A (10 x 1 = 10 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
1. a)	Define DevOps?	1	1	1	1
1. b)	What is ITL?	1	1	1	1
Unit-II					
1. c)	What is continuous Testing?	1	1	2	1
1. d)	What are Microservices?	1	1	2	1
Unit-III					
1. e)	Explain Pull request model?	1	1	3	1
1. f)	Discuss about shared authentication?	1	1	3	1
Unit-IV					
1. g)	List out Jenkins plugins.	1	1	4	5
1. h)	What is Jenkins file system layout?	1	1	4	5
Unit-V					
1. i)	What is Javascript testing?	1	1	5	1
1. j)	Why are there so many deployment systems? Explain.	1	1	5	1

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
2. a)	Compare DevOps and ITIL?	5	2	1	2
2. b)	Describe DevOps delivery pipeline in detail	5	1	1	1
OR					
2. c)	Explain about Scrum and Kanban?	5	1	1	1
2. d)	Sketch Agile Delivery phases and explain	5	3	1	1
Unit-II					
3. a)	Describe DevOps architecture and resilience in detail.	5	1	2	1
3. b)	Articulate Monolithic scenario step by step with an example?	5	3	2	2
OR					
3. c)	How to handle Database Migrations? Explain.	5	2	2	2
3. d)	Explain DevOps Lifecycle for Business Agility?	5	1	2	1
Unit-III					
4. a)	Explain about different Git server implementations and Docker intermission.	5	1	3	5
4. b)	Discuss about host Git servers and the pull request model.	5	2	3	5
OR					
4. c)	Explain SCM and DVCM?	5	1	3	1
4. d)	What is the need of Source code control? Explain.	5	1	3	1
Unit-IV					
5. a)	Describe the host server and build slaves in detail.	5	1	4	1
5. b)	What are triggers? Explain about job chaining and build pipelines.	5	1	4	1
OR					
5. c)	Explain collating quality measures?	5	1	4	1
5. d)	Describe the steps to install Jenkins.	5	1	4	5
Unit-V					

P.T.O.

6. a)	Explain Deploying with SaltStack?	5	1	5	5
6. b)	Why do we need to test back end? Describe the components for backend integration testing.	5	3	5	5
OR					
6. c)	Write short notes on Visualization stacks	5	1	5	1
6. d)	Demonstrate with a neat sketch the REPL driven development?	5	3	5	1

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