



B.Tech. V Semester End Examinations

(Common to CSE & CSD)

(Model Question Paper)

Subject Title: Algorithm Design and Analysis

Time: 3 hours

Subject Code: CS501PC

Max. Marks: 60

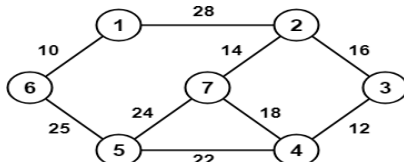
Note: Answer ALL Questions

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



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

MR-22

Subject Title: DevOps
Time: 3 hours

Subject Code: CS503PC
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)	List ITIL service life cycle stages.	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-III1					
1. e)	Explain Source code management system?	1	1	3	1
1. f)	Discuss about pull request model.	1	1	3	1
Unit-IV					
1. g)	Explain about Jenkins build server?	1	1	4	1
1. h)	How do you manage build dependencies? Explain.	1	1	4	1
Unit-V					
1. i)	Discuss about pros and cons of automation testing	1	1	5	1
1. j)	What are known as Deployment systems?	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)	Describe DevOps delivery pipeline in detail with neat sketch	5	1	1	2
2. b)	Explain in detail about Agile Development model.	5	1	1	1
OR					
2. c)	How to identify the bottlenecks? Explain with suitable examples.	5	3	1	1
2. d)	Explain about Scrum and Kanban.	5	1	1	1
Unit-II					
3. a)	Discuss the 7 C's of DevOps life cycle for Business Agility.	5	2	2	2
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	1
3. d)	Describe DevOps architecture and resilience in detail.	5	2	2	1
Unit-III					
4. a)	Explain Hosted Git servers and different Git server implementations.	5	1	3	2
4. b)	What is the need of Source code control? Explain.	5	1	3	1
OR					
4. c)	Write about Roles and code in Source code management.	5	1	3	2
4. d)	Compare SCM and DVCM?	5	2	3	2
Unit-IV					
5. a)	What are triggers? Explain about job chaining and build pipelines.	5	1	4	1
5. b)	Describe the Jenkins file system layout with an example.	5	2	4	1
OR					
5. c)	Describe the host server and build slaves in detail.	5	2	4	2
5. d)	Explain about Jenkins build servers in detail.	5	1	4	2
Unit-V					
6. a)	Explain Selenium testing tool with various features and JavaScript testing.	5	1	5	2

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6. b)	Explain REPL driven development?	5	1	5	1
OR					
6. c)	Explain the feayures of Ansible, Chef and Salt Stack	5	1	5	1
6. d)	Write short notes on Visualization stacks	5	1	5	1

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

*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)	List out language categories.	1	1	1	3
1. b)	Define syntax and semantics.	1	1	1	2
Unit-II					
1. c)	What is type checking?	1	1	2	1
1. d)	What is scope and life time of variable?	1	1	1	2
Unit-III					
1. e)	What are the characteristics of subprograms?	1	2	1	1
1. f)	What is meant by encapsulation?	1	1	1	2
Unit-IV					
1. g)	What is semaphore?	1	1	1	2
1. h)	What is meant by exception?	1	1	1	2
Unit-V					
1. i)	What are the applications of Logic programming?	1	3	1	1
1. j)	What is data abstraction?	1	1	1	2

Part-B (5 x 10=50 Marks)

Q. No.	Stem of the Question	M	L	CO	PO
Unit-I					
2. a)	Describe the steps involved in the language evaluation criteria.	5	5	1	2
2. b)	Describe the basic concept of axiomatic semantics.	5	2	2	1
OR					
2. c)	Discuss various programming domains and their associated languages.	5	1	2	3
2. d)	Discuss about language recognizers and language generators.	5	1	2	3
Unit-II					
3. a)	What is type checking? Differentiate between static and dynamic type checking and give their relative advantages.	5	1	1	2
3. b)	Explain about the control structures with an example.	5	3	1	1
OR					
3. c)	What do you mean by binding? Give examples of some of the bindings and their binding times.	5	1	2	1
3. d)	Explain associative arrays, their structure and operations.	5	3	1	3
Unit-III					
4. a)	Explain about the semantic models of parameter passing.	5	3	1	1
4. b)	Explain about generic sub-programs with examples.	5	3	2	2
OR					
4. c)	Define sub program. What are the distinct categories of subprograms?	5	1	1	1
4. d)	How co-routines are different from conventional subprograms?	5	1	3	1
Unit-IV					
5. a)	What are the various methods of exception handling? Discuss.	5	2	1	1
5. b)	What is monitors? Explain in detail.	5	2	1	2
OR					
5. c)	Explain how to handle the exceptions in C++.	5	3	1	2
5. d)	Write a brief note on C# threads.	5	1	1	1
Unit-V					
6. a)	Explain about the internal representation of two LISP lists.	5	3	1	2

6. b)	Describe about the basic elements of prolog.	5	2	1	2
OR					
6. c)	Explain about the fundamentals of functional programming languages.	5	3	1	1
6. d)	Differentiate functional and imperative languages	5	4	2	3

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
(Common to CSE & IT)
(Model Question Paper)

MR-22

Subject Title: Data Science
Time: 3 hours

Subject Code: CS523PE
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 BigData.	1	1	1	1
1. b)	What is Datafication?	1	1	1	1
Unit-II					
1. c)	List out Statistical summary functions.	1	2	2	1
1. d)	What is Linear regression?	1	1	2	1
Unit-III					
1. e)	Differentiate between Supervised and Unsupervised Learning.	1	2	3	1
1. f)	Mention applications of Naive Bayes Algorithm.	1	2	3	1
Unit-IV					
1. g)	Define Data Wrangling.	1	1	4	1
1. h)	List out R packages for Web Scrapping.	1	2	4	1
Unit-V					
1. i)	What is Data Security?	1	1	5	1
1. j)	Mention the features of Boxplot.	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)	Explain in detail about data types in R language.	5	2	1	1
2. b)	What is meant by modelling? Explain how to build a statistical model.	5	1,2	1	1
OR					
2. c)	What is operator? Explain different types of operators in R Programming.	5	1	1	1
2. d)	Write about Model Fitting with an example.	5	4	1	2
Unit-II					
3. a)	Briefly explain about the activities or lifecycle of Data science with neat diagram.	5	2	2	1
3. b)	Frame out the differences between KNN and K-Mean models?	5	4	2	2
OR					
3. c)	What is EDA? Explain the basic visualization graphs.	5	2	2	1
3. d)	Illustrate the Linear Regression? Apply this technique for House price prediction	5	3,4	2	2
Unit-III					
4. a)	In detail, Write about the demerits of Linear Regression and KNN algorithms.	5	2	3	1
4. b)	How does the Naive Bayes algorithm work in the context of spam filtering?	5	4	3	2
OR					
4. c)	What is Motivation behind using Naive Bayes algorithm in Filtering Applications?	5	3	3	1
4. d)	Explain in detail about the Mathematical Working Principle of Naive Bayes algorithm.	5	2	3	2
Unit-IV					

P.T.O.

5. a)	Explain the differences between filter, wrapper, and Embedded methods for feature selection.	5	2	4	1
5. b)	What is feature selection? Illustrate decision tree algorithm.	5	4	4	1
OR					
5. c)	What are the primary differences between Web Scraping and using APIs for data collection?	5	2	4	1
5. d)	What role does creativity play in feature generation? Why it is important in Data Science?	5	1	4	1
Unit-V					
6. a)	Define Data Visualization? Explain Basic Principles of Data Visualization?	5	1,2	5	1
6. b)	Describe a Case Study on iris Dataset using Visualization Techniques.	5	6	5	3
OR					
6. c)	Deduce the steps to create your own Visualization of a Complex Dataset.	5	6	5	3
6. d)	List out some key ethical considerations in Data Science, particularly in relation to Privacy and Security?	5	2	5	1

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