Hall Ticket Number :										

R-20

Code: 20A305CT

III B.Tech. I Semester Regular & Supplementary Examinations December 2023

Optimization Techniques

(Artificial Intelligence & Data Science)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two marks.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

1. Answer ***all*** the following short answer questions (5 X 2 = 10M)		CO	BL
a)	What are the various applications of optimization problems?	CO1	BL1
b)	Define constraints	CO2	BL1
c)	Write a short note on Golden Section method.	CO3	BL1
d)	Explain about random search method.	CO4	BL2
e)	What are the limitations of dynamic programming?	CO5	BL1

PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

		Marks	CO	BL
	UNIT–I			
2.	Minimize $3x_1^2+4x_2^2+5x_3^2$ such that $x_1+x_2+x_3=10$ using Lagrange multiplier method.	12M	CO1	BL6
	OR			
3.	Minimize $f = x_1^2+2x_2^2+3x_3^2$ such that $g_1=x_1-x_2-2x_3 \leq 12$; $g_2 = x_1+2x_2-3x_3 \leq 8$ using Kuhn Tucker conditions.	12M	CO1	BL6
	UNIT–II			
4.	Consider the following L.P model and solve it by using graphical method. Minimize $Z = 2x_1+3x_2$ Subject to $x_1+x_2 \geq 6$; $7x_1+x_2 \geq 14$; and $x_1, x_2 \geq 0$	12M	CO2	BL6
	OR			
5.	Consider the following L.P model and solve it by using the **simplex** method. Maximize $Z = 6x_1+8x_2$ Subject to $5x_1+10x_2 \leq 60$; $4x_1+4x_2 \leq 40$; and x_1 and $x_2 \geq 0$	12M	CO2	BL6
	UNIT–III			
6.	Solve the following problem by Quadratic interpolation method. Minimize $f(\lambda) = \lambda^2-5\lambda^3-20\lambda+5$	12M	CO3	BL6
	OR			

7. Minimize $f(x) = x^2$ over (-5, 15) using Golden Section method. Take n=7. 12M CO3 BL6

UNIT–IV

8. Solve the following problem by using Rosen's Gradient Projection method. Minimize $f(x_1, x_2) = x_1^2+x_2^2-2x_1-4x_2$
Subject to $g_1(x_1, x_2) = x_1+4x_2-5 \le 0$; $g_2(x_1, x_2) = 2x_1+3x_2-6 \le 0$; $g_3(x_1, x_2) = -x_1 \le 0$; $g_4(x_1, x_2) = -x_2 \le 0$
Starting from the point $X1 = \begin{pmatrix} 1.0 \\ 1.0 \end{pmatrix}$ 12M CO4 BL6

OR

9. Solve the following problem by using pattern search method. Minimize $f(x_1, x_2) = x_1-x_2+2x_1^2+2x_1x_2+x_2^2$ starting from the point $X_1=\{0,0\}$ $\Delta x_1 = \Delta x_2 = 0.8$ and $\varepsilon=0.1$. 12M CO4 BL6

UNIT–V

10. a) What is the difference between an initial value problem and a final value problem? 6M CO5 BL1

    b) Explain the concept of Sub-optimization and principle of optimality with an example 6M CO5 BL2

OR

11. The owner of four fruit shops has purchased six boxes of apple. The quantity in demand and the profits are different at these stores. The following table gives the total profit at each store for various numbers of boxes allotted. Calculate the mode of allocations of the six boxes to the stores so as to maximize the profit.

Number of boxes	Stores			
	1	2	3	4
0	0	0	0	0
1	4	2	6	2
2	6	4	8	3
3	7	6	8	4
4	7	8	8	4
5	7	9	8	4
6	7	10	8	4

12M CO5 BL4

*** End ***

Hall Ticket Number :										

R-20

Code: 20A553T

III B.Tech. I Semester Regular & Supplementary Examinations December 2023

Software Engineering

(Common to CSE, AI&DS and AI&ML)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two marks.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A
(Compulsory question)

			CO	BL
1.	Answer ***all*** the following short answer questions	(5 X 2 = 10M)		
	a)	What is software engineering, and why is it essential in the field of computer science?	1	1
	b)	Discuss the main components of a use case diagram in UML	2	2
	c)	What is the component level design	3	1
	d)	What is debugging? Describe art of debugging.	4	1
	e)	How is staffing level estimation performed in software project management	5	2

PART-B
Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

			Marks	CO	BL
		UNIT-I			
2.	a)	How can personal and team process models be beneficial in a software development project?	6M	1	2
	b)	Explain the concept of process assessment and improvement.	6M	1	2
		OR			
3.		Briefly discuss about Prescriptive process models	12M	1	2
		UNIT-II			
4.	a)	Explain the significance of a Software Requirement Specification (SRS).	6M	2	2
	b)	Explain the concept of CRC cards and how they are used in software modeling.	6M	2	3
		OR			
5.	a)	What are some effective strategies for negotiating requirements with stakeholders?	6M	2	2
	b)	Demonstrate Scenario-Based Modeling.	6M	2	3

UNIT-III

6.		Describe the fundamental design concepts that guide the creation of software solutions.	12M	3	2

OR

7.		Explain the concept of architectural styles in software design.	12M	3	2

UNIT-IV

8.		What are the key steps involved in user interface design?	12M	4	4

OR

9.	a)	What is Black-Box Testing and White-Box Testing? Compare them.	6M	4	4
	b)	What are program analysis tools, and how can they aid in identifying software defects?	6M	4	4

UNIT-V

10.	a)	Describe different metrics used for project size estimation.	6M	5	2
	b)	Illustrate software quality and software reliability	6M	5	2

OR

11.		What is Capability Maturity Model explain different levels?	12M	5	2

*** End ***

Hall Ticket Number :										

R-20

Code: 20A552T

III B.Tech. I Semester Regular & Supplementary Examinations December 2023

Computer Networks

(Common to CSE, AI&DS and AI&ML)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two marks.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

			CO	BL
1.	Answer ***all*** the following short answer questions	(5 X 2 = 10M)		
a)	How many layers are present in OSI and TCP/IP reference models? Which of the layers in OSI are bundled together in TCP/IP reference stack?		CO1	L1
b)	What is meant by 'collision'? How does the DLL resolve this issue?		CO2	L1
c)	Among the IP addresses: 192.168.1.10 and 17.5.7.8, which of them is public/private? Justify your answer.		CO3	L5
d)	State a few example applications that would require TCP and few others that would require UDP protocols at transport layer with a logical reasoning.		CO4	L2
e)	What does the term TTL mean in the resource record field of DNS? How many bytes constitute this field?		CO5	L1

PART-B

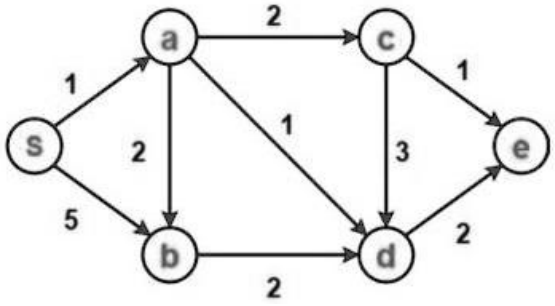
Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

			Marks	CO	BL
		UNIT–I			
2.	a)	List the layers of OSI reference model with description on the functionalities of each layer.	8M	CO1	L1
	b)	Among the wired and wireless channels, which one of them offers fast communication? Justify your answer.	4M	CO1	L2
		OR			
3.	a)	Classify the types of network in terms of their size. Apart from the end point devices that constitute computer networks, what are the other devices that help internetworking?	6M	CO1	L1
	b)	Compare and contrast between the twisted pair wires and optical fiber cable as guided media for computer communications.	6M	CO1	L2
		UNIT–II			
4.	a)	What are the sources of errors on the communication channels? Mention any two standard techniques by which bit errors can be detected or corrected.	6M	CO2	L1
	b)	Specify the objectives of Go-Back-N protocol and illustrate the functioning of this protocol with a neat sketch of a timing diagram.	6M	CO2	L2
		OR			
5.	a)	Distinguish between collision detection and collision avoidance techniques.	6M	CO2	L1
	b)	Explain the functioning of IEEE 802.x protocols for various network topologies.	6M	CO2	L2

UNIT–III

6. a) What are the objectives of the network layer? Mention any three widely used shortest path algorithms. 4M CO3 L2

   b) Compute the routing table for node S using any one of the shortest path algorithms for the network as shown below where the numbers on edges indicate the cost metric.

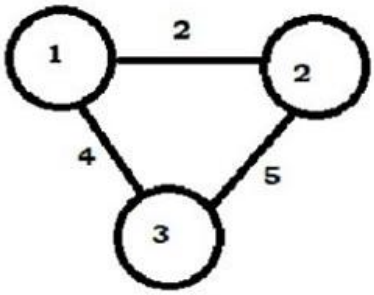


8M CO3 L5

OR

7. a) Define the terms unicast, multicast and broadcast. 4M CO3 L1

   b) How does Distance Vector Routing differ from that of Link State Routing? Determine the routing table for all the three nodes for the following network graph using distance vector routing.



8M CO3 L4

UNIT–IV

8. a) What are the factors that affect the reliability of the end-to-end communications? How does the transport layer help maximizing reliability? 6M CO4 L2

   b) Distinguish between TCP and UDP giving suitable examples. 6M CO4 L3

OR

9. a) Draw a neat sketch of TCP header format and explain the use of various fields in it. 6M CO4 L2

   b) What are the types of IP addresses? Give suitable examples giving the range of such IP addresses. 6M CO4 L3

UNIT–V

10. a) Define the term URL and explain the process of clients getting resolved the IP addresses of the corresponding URLs. 6M CO5 L2

    b) What are TCP/UDP 'ports'? Give standard port numbers for the following services: http; snmp; smtp; tcp 6M CO5 L3

OR

11. a) Write brief notes on the client-server model. 6M CO5 L2

    b) Describe the functioning of hypertext transfer protocol and its use in world wide web. 6M CO5 L2

*** End ***

Hall Ticket Number :										

R-20

Code: 20A5H01

III B.Tech. I Semester (Honors) Regular Examinations December 2023

DevOps

(Common CSE, AI&DS and AI&ML)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**

2. In Part-A, each question carries **Two marks.**

3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

		CO	BL
1.	Answer ***all*** the following short answer questions (5 X 2 = 10M)		
a)	How DevOps is different from agile methodology?	CO1	L1
b)	What is the primary goal of the DevOps lifecycle in enhancing business agility? Provide two key stages in the DevOps process that contribute to achieving this goal.	CO2	L2
c)	Briefly define what a project code is. Provide one example of a key role and a project code	CO3	L1
d)	Name two key features of Jenkins that enhance the efficiency of the build server.	CO4	L1
e)	Why are there so many deployment systems? Explain?	CO5	L1

PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

		Marks	CO	BL
	UNIT-I			
2.	Discuss the core principles and key components of ITIL (Information Technology Infrastructure Library) in detail. Provide examples of how ITIL practices can improve IT service management within an organization. Additionally, elaborate on the challenges that organizations might face when implementing ITIL and suggest potential strategies to overcome these challenges.	12M	CO1	L2
	OR			
3.	Examine the significance of Release Management in the context of DevOps, outlining the key principles and processes involved. Discuss how effective Release Management contributes to the overall success of a DevOps implementation, citing specific examples	12M	CO2	L3
	UNIT-II			
4.	Describe Devops architecture and resilience in detail?	12M	CO2	L2
	OR			

5.	Write short note on software architecture. Explain about the monolithic scenario?	12M	CO2	L1

UNIT-III

6.	How does a Source Code Management (SCM) system facilitate code migrations in software development? Explain in detail.	12M	CO3	L2

OR

7.	What are the key distinctions between various Git server implementations and their impact on collaborative software development?	12M	CO3	L2

UNIT-IV

8.	Discuss the critical aspects of managing build dependencies in software development, covering the challenges, strategies, and tools involved. Provide real-world examples illustrating the importance of effective dependency management, and outline how improper handling can impact the overall build process.	12M	CO4	L3

OR

9.	Discuss the advantages of using build pipelines and job chaining for software development. Provide a step-by-step explanation of how these practices contribute to a streamlined development process.	12M	CO4	L2

UNIT-V

10.	Write short on: a) Deploying with saltstack b) Testing backend integration points	12M	CO5	L1

OR

11.	Write short on: a) Virtualization stacks b) Advanced Integration Testing	12M	CO5	L1

*** End ***

Hall Ticket Number :										

R-20

Code: 20A3051T

III B.Tech. I Semester Regular & Supplementary Examinations December 2023

Data Warehousing and Data Mining

(Common to AI&DS and AI&ML)

Max. Marks: 70 Time: 3 Hours

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Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B)**
2. In Part-A, each question carries **Two marks.**
3. Answer **ALL** the questions in **Part-A** and **Part-B**

PART-A

(Compulsory question)

		CO	BL
1.	Answer ***all*** the following short answer questions (5 X 2 = 10M)		
	a) Describe about transactional database.	CO1	L2
	b) Define a frequent set.	CO2	L2
	c) Explain about Gini index	CO3	L2
	d) What is a dendrogram?	CO4	L2
	e) Summarize about spatial data mining	C05	L2

PART-B

Answer *five* questions by choosing one question from each unit (5 x 12 = 60 Marks)

		Marks	CO	BL
	UNIT-I			
2.	a) Describe about Data Reduction & Data Discretization	6M	CO1	L2
	b) What are the major issues in data mining?	6M	CO1	L2
	OR			
3.	a) Discuss in detail about classification of Data mining systems.	6M	CO1	L2
	b) In real world data tuples with missing values for some attributes are common occurrence. Describe various methods for handling this problem	6M	CO1	L2
	UNIT-II			
4.	a) What are the various OLAP operations are used in the multidimensional data model? Illustrate them in detail with an example.	6M	CO2	L3
	b) Explain about pattern evaluation methods.	6M	CO2	L2
	OR			
5.	a) Explain Star schema and Snowflake schema with examples.	6M	CO2	L2

b) The Big Basket departmental store has the following snapshot of their transactional Database.

T_ID	Items bought
T1	Milk, Tea, Cake
T2	Eggs, Tea, Cool Drink
T3	Milk, Eggs, Tea, Cool Drink
T4	Eggs, Cool Drink
T5	Juice

Generate all the frequent itemsets to help the manager of Big Basket. (Assume min support 25%) using Apriori Algorithm. 6M CO2 L3

UNIT-III

6. a) Write about Rule Based classification. 6M CO3 L2

b) Why is tree pruning useful in decision tree induction? What is a drawback of using a separate set of tuples to evaluate pruning? 6M CO3 L3

OR

7. a) Discuss metrics for evaluating classifier performance illustrating with examples 6M CO3 L3

b) What is Bayes theorem? Explain about Naive Bayesian classification. 6M CO3 L2

UNIT-IV

8. a) Discuss the distance measures frequently used in clustering the data. 6M CO4 L2

b) Explain about DBSCAN clustering. 6M CO4 L2

OR

9. Explain in detail about partitioning methods and hierarchical methods of clustering 12M CO4 L2

UNIT-V

10. a) Discuss the principles underlying text clustering. 6M CO5 L2

b) What are the different types of web mining? How is web usage mining different from web structure mining? 6M CO5 L3

OR

11. Explain in detail about mining complex data types 12M CO5 L2

*** End ***