MCA | SEM-II | C.2020 / JULY-2023

Duration: 3 Hrs **Total Marks: 80**

N.B: (1) Question 1 is **compulsory.**
(2) Attempt any **Three questions** out of remaining **Five questions.**
(3) Assume any **necessary data**, if required, but **justify the same.**
(4) **Figures** to the **right** indicate **full marks** for that question.
(5) Use of Scientific **calculator** is **allowed.**

Q.1 A) Solve the following LPP using Graphical Method **[05]**

Maximize $Z = 4x + y$

Subject to $x + y \leq 50$

$3x + y \leq 90$

$x, y \geq 0$

B) Write Applications of Simulations. **[05]**

C) Determine the optimum strategies for the players and the value of the game. **[05]**

		Player B		
		B1	B2	B3
Player A	A1	1	8	3
	A2	6	7	5
	A3	8	3	0

D) Solve the following assignment problem and find the optimum assignment that will result in minimum man hours needed. **[05]**

		Jobs				
		A	B	C	D	E
Workers	1	20	15	18	20	25
	2	18	20	12	14	15
	3	21	23	25	27	25
	4	17	18	21	23	20
	5	18	18	16	19	20

Q.2 A) Solve the following LPP by using Simplex Method **[10]**

Maximize $Z = 4x_1 + 10x_2$

Subject to $2x_1 + x_2 \leq 10$

$2x_1 + 5x_2 \leq 20$

$2x_1 + 3x_2 \leq 18$

$x_1, x_2 \geq 0$

B) Find the optimum strategies and value of the game where pay-off matrix of the two player is given by **[10]**

		Player B		
		B1	B2	B3
Player A	A1	4	10	2
	A2	12	4	6
	A3	2	4	2

Q.3 A) Find optimum solution for the following transportation problem by using MODI method. **[10]**

	D1	D2	D3	D4	Supply
S1	10	7	9	8	22
S2	9	13	6	11	15
S3	9	11	12	10	8
Demand	7	12	17	9	

B) Solve the following LPP by using Two Phase Method **[10]**

Maximize $Z = 4x1 + 3x2$

Subject to $2x1 + x2 \leq 12$

$3x1 + 3x2 \leq 10$

$4x1 + 2x2 \leq 8$

$x1 + x2 \geq 1$

$x_1, x_2 \geq 0$

Q.4 A) A salesman wants to visit cities A, B, C and D. He does not want to visit any city twice before completing the tour of all the cities and wishes to return to his home city, the starting station. Cost of going from one city to another in rupees is given in the table. Find the least cost route. **[10]**

		To city			
		A	B	C	D
From city	A	0	30	80	50
	B	40	0	140	30
	C	40	50	0	20
	D	70	80	130	0

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B) The state of natures and strategies of food products company are as follows: [10]

		Strategies		
		S1	S2	S3
States of nature	N1	7000	5000	3000
	N2	3000	4500	3000
	N3	1500	0	3000

Which strategy should the concerned executive choose on the basis of

i) Maximin criterion
ii) Maximax criterion
iii) Minimax regret criterion
iv) Laplace criterion

Q.5 A) At railway ticket window, eight customers arrive on an average every 4 minutes, while the ticket vendor can serve 9 customers in 4 minutes. Use Poisson distribution for arrival rate and exponential distribution for service rate. Determine: [10]

a) Average time a customer keeps waiting in line
b) Average number of customer in the system
c) Average queue length
d) Utilization factor

B) Solve the following LPP by using Big M Method [10]

Maximize $Z = 3x_1 - x_2$

Subject to $2x_1 + x_2 \geq 2$

$x_1 + 3x_2 \leq 3$

$x_2 \leq 4$

$x_1, x_2 \geq 0$

Q.6 A) Find initial basic feasible solution for the following transportation problem by using [10]

i) North West Corner Method
ii) Least Cost Method

	B1	*B2*	*B3*	*Supply*
A1	5	8	4	50
A2	6	6	3	40
A3	3	9	6	60
Demand	20	95	35	

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B) A cloth store keeps stock of a popular brand of shirts. Previous experience shows the daily demand for the shirt with associated probabilities as given below: **[10]**

Daily Demand	0	10	20	30	40	50
Probabilities	0.01	0.20	0.15	0.50	0.12	0.02

Use the following sequence of random numbers to simulate the demand for next 10 days.

Random Numbers: 26, 40, 66, 77, 13, 09, 74, 90, 18, 48.

Also estimate the daily average demand for the fabric on the basis of the simulated data. Use Monte-Carlo method.

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Paper / Subject Code: 70652 / Artificial Intelligence & Machin Learning

MCA - Sem-II / C-2020 | July-2023

(3 Hours) **Total Marks: 80**

N.B.: 1) Question No.1 is **compulsory.**
2) Attempt any **THREE** of the remaining questions.
3) Figures to the right indicate full marks.

Q1. Write a Short Note on any Four [4*5= 20]

(a) Agent Environment types [05]

(b) K-Nearest Neighbor Classifier [05]

(c) Types of Activation Function [05]

(d) Linear Discriminant Analysis [05]

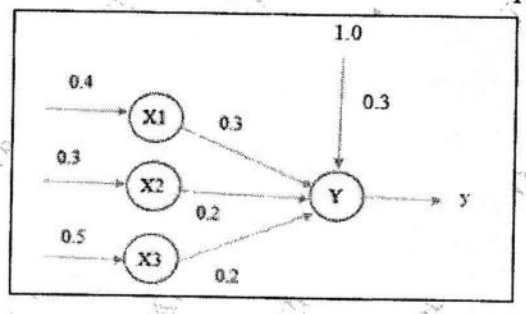
(e) Bagging and boosting [05]

Q2. (a) What are the different types of Agents? Explain PEAS representation of an Agent. [10]

(b) Discuss the various search strategies and explain the un-informed Search. [10]

Q3. (a) What is the inference in first order logic? Explain with suitable examples. [10]

(b) For the network shown in figure calculate the net input to the output neuron. [10]



Q4. (a) What is the application of Machine Learning? Explain the Supervised Learning. [10]

(b) Describe Adaline Network with a neat Diagram. [10]

Q5. (a) Discuss in detail the Random Forest and define the term Bias and Variance. [10]

(b) Explain the Support Vector Machine (SVM) in detail with example. [10]

Q6.

a) Describe in detail the Bayesian Belief Network with an example. [10]

b) Compare Feature Extraction and Feature Selection techniques. Explain how dimensionality can be reduced using Principal Components Analysis. [10]

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MCA - Sem-II / C-2020 / July-2023

(3 Hours) **Total Marks: 80**

Note: 1) **Question No.1 is compulsory.**
2) **Attempt any THREE from the remaining questions.**
3) **Figures to the right indicate full marks.**

1. (a) Discuss various components of Information security. **5**
(b) Explain Inference. **5**
(c) Discuss various types of P-Boxes. **5**
(d) Write a short note on SAML Assertion. **5**

2. (a) Discuss SHA-512. **10**
(b) Discuss various types of authentication tokens. **10**

3. (a) What is a Digital Certificate? Explain the process of generating digital Certificate? **10**
(b) Explain SSL as an internet security protocol and discuss three major protocol use at SSL? **10**

4. (a) What are firewalls? Discuss various methods used for firewall configuration, along with their advantages and disadvantages. **10**
(b) In a system, an RSA algorithm with p=5 and q=11 is implemented for data security. What is the value of decryption key if value of encryption key is 27? Also verify that calculated value of decryption key is correct. **10**

5. (a) Why certificates are revoked? Explain the methods used for the same. **10**
(b) Using the Euclidean algorithm, find the greatest common divisor of the following pairs: **10**
84 and 320
400 and 60

6. (a) Discuss one round structure of DES. **10**
(b) Explain the security features of OS. **10**

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Paper / Subject Code: 70655 / Elective I : Internet of Things

MCA/ SEM-III/C-2020/ AUGUST 2023

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(3 Hours) [Total Marks: 80]

N.B.: (1) Question No.1 is compulsory

(2) Attempt any THREE Questions between Question No.2 to 6

Q1. Solve any Four Questions out of Five [20]

a) Physical design of IoT
b) IoT enabling technologies
c) Smart Lighting
d) Smart Grids
e) Zigbee Architecture

Q2.A. With a neat sketch, explain the functional blocks of IoT. [10]

B. With the help of neat labelled diagram explain the IoT Level-1 and Level-2 templates. [10]

Q3.A. With reference to IoT reference model discuss in detail the IoT domain model in detail. [10]

B. Describe how the environment can be more protected with the help of IoT Technology. [10]

Q4.A. Describe Process Specification and Information model Specification involved in IoT system design methodology. [10]

B. Explain the information view with reference to the IoT architecture in detail [10]

Q5.A. Difference between Web of Things versus Internet of Things [10]

B. Why there is a need for securing IoT systems? Discuss the different elements of IoT security. [10]

Q6.A. Explain Two Pillars of the Web. Discuss SOA and Cloud Computing. [10]

B. Explain cloud of things architecture in detail. [10]

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MCA/SEM-II /R 2020-21 / AUGUST 2023 (-1)

Time: 3 hours | Max. Marks: 80

Note: 1. Question 1 is compulsory. All questions in Q1 must be solved.
2. Solve any three from Q2 to Q6.
3. All questions carry equal marks.

Q1.	**Solve all four questions**	**(20)**
A	What are the advantages of Microcontroller?	5
B	Write a short note on Microcomputer	5
C	Explain arithmetic operators in assembly language used in 8051 Microcontroller.	5
D	Differentiate C and Embedded C Programming.	5
Q2.	**Answer the following questions.**	**(20)**
A	What is Microprocessor in Embedded System? Explain the features of Embedded System.	10
B	Explain architecture of 8051microcontroller.	10
Q3.	**Answer the following questions.**	**(20)**
A	What is addressing mode? Explain Immediate, Register and Direct addressing Modes in 8051 microcontroller with example.	10
B	What is Embedded C? Explain data types and basic structure of embedded C program.	10
Q4.	**Answer the following questions.**	**(20)**
A	Explain the types of functions used in Embedded C programming.	10
B	How LED's interface with 8051 Microcontroller? Explain in details.	10
Q5.	**Answer the following questions.**	**(20)**
A	What are the design challenges in embedded system? Explain in detail.	10
B	Explain While statement and For Statement in Embedded C programming with example.	10
Q6.	**Answer the following questions.**	**(20)**
A	Explain the use of embedded system in designing home automation systems.	10
B	Explain different types of registers used in 8051 Microcontroller.	10

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MCA/SEM-III/C-2020/AUG.2023

Paper / Subject Code: 70659 / Elective II : Natural Language Processing

Time: 3Hrs. **[Total Marks: 80]**

N.B.:(1) Question No.1 is compulsory
(2) Attempt any three question between Question No.2 to 6

Q1. A) Write a short note on following **(Attempt Any Four)** [20]

1. Word Sense Disambiguation
2. Applications of NLP
3. Affective Lexicons
4. Compare Inflectional Morphology and Derivational Morphology
5. Differentiate between Top down and Bottom up parsing

Q2. A) Elaborate N –Grams- N-gram language model. [10]

B) Define NLP. Explain the stages of NLP in detail. [10]

Q3. A) What is Text Summarization? Explain LexRank algorithm. [10]

B) Explain types of POS tagging with example. [10]

Q4. A) Explain FST in detail with the help of an example. [10]

B) Elaborate CFG with suitable example. Explain potential problems in CFG. [10]

Q5 A) What do you mean by lexical ambiguity and syntactic ambiguity in Natural language? What are different ways to resolve these ambiguities? [10]

B) Explain Dictionary based approach in details. [10]

Q6 A) Explain with suitable examples following relationships between word meanings: Homonymy, Polysemy, Synonymy, Antonymy, Hypernomy, Hyponomy, Meronomy [10]

B) Explain Hidden Markov Model (HMM) in detail. [10]

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MCA/SEM-II / R 2020-21 / AUGUST 2023 (-1)

(3 Hours) **Total Marks: 80**

N.B. :1) Question No.1 is **compulsory.**
2) Attempt any **THREE** from the remaining questions.
3) Figures to the right indicate full marks.

Q1. (a) What is GIS? Explain the components & integration of GIS. [10]

(b) Define Vector Data Model. Explain the different types of Vector Data Model. [10]

Q2. (a) What is topology? Using a simple diagram explain the three types of topological relationships in geographic data representation. [10]

(b) What are the different types of elements of Raster Data Model? Explain briefly. [10]

Q3. (a) Write the differences between Raster Data Model & Vector Data Model. [10]

(b) Define Remote Sensing Technologies. What are different types of Remote Sensing Technologies? [10]

Q4. (a) What do you understand by Satellite Images? Explain in detail. [10]

(b) Describe Terrain Mapping with its features. [10]

Q5. (a) Explain Watershed Analysis in detail with suitable example? [10]

(b) What are the different applications of Geocoding? Explain briefly. [10]

Q6. **Short Note (Solve Any Four)** [20]

a) TIN
b) Optical Sensor in Digital Elevation Models
c) Variations of Geocoding
d) Dynamic Segmentation
e) Types of remote sensing

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MCA/SEM-II / R 2020-21 / AUGUST 2023

(3 Hours) **[Total Marks: 80]**

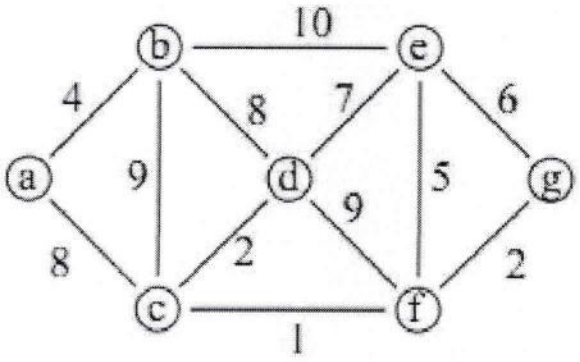
Note:

1. Question No: 01 is compulsory.
2. Attempt any three questions from the remaining five questions (Q. 2 to Q. 6).
3. Figures to the right indicate full marks.
4. Answers to sub questions should be answered together.

Q1 A) List and explain the characteristic properties associated with a problem that can be solved using dynamic programming. Give the algorithm for matrix chain multiplication and state the time complexity of the algorithm. **10**

B) What is divide and conquer technique? Write quick sort algorithm and apply it to 45, 32, 11, 56, 77, 90, 41, 62, 99, 22, 88. **10**

Q2 A) Write down Prim's algorithm and analyze the complexity. Apply Prim's algorithm on the graph given below. **10**



B) Device backtracking algorithm to find all solutions to the Graph coloring problem and represent the solution space in state space tree. **10**

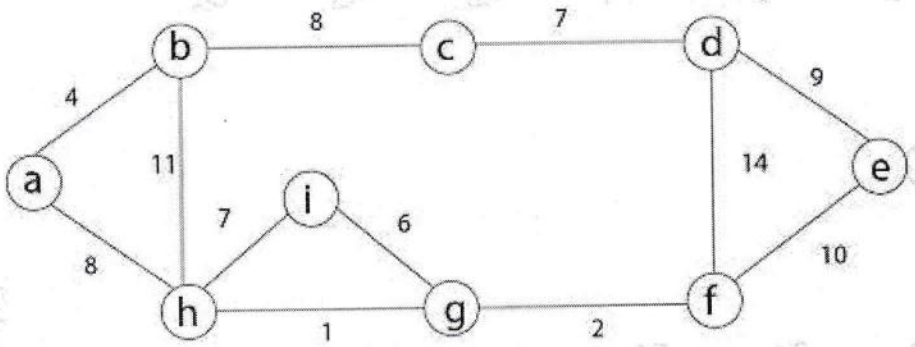
Q3 A) What do you understand by NP Hard and NP complete problems also differentiate between NP Hard and NP complete problems. **10**

B) What is dynamic programming? How it is applied to the Longest Common Subsequence. Perform the Longest Common Subsequence for the following strings – **10**

S1 = "AGGTAB" and S2 = "GXTXAYB".

Q4 A) Specify the difference between divide and conquer strategy and dynamic programming. How divide and conquer strategy is applied to Binary Search algorithm. **10**

B) Find the Minimum Spanning Tree of the following graph using Kruskal's algorithm. **10**



Q5 A) What do you mean by Branch and Bound technique? Explain LIFO Search, FIFO search and least cost search with examples. **10**

B) Compare and contrast Recursive and Non-recursive algorithms. Also analyze and solve the recurrence relation for binary search. **10**

Q6 A) Knutt-Morris-Pratt algorithm **05**

B) Asymptotic Notations and their properties **05**

C) Boyer Moore algorithm **05**

D) Rabin-Karp algorithm **05**

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(3 Hours) [Total Marks: 80]

N.B. : 1) Question No.1 is **compulsory.**
2) From Q.2 to Q.6 attempt any **THREE from** the remaining **Five** questions.
3) Figures to the right indicate full marks

Q.1	(a)	Describe the P-O-E-M framework.	5
	(b)	What do you mean by Ad Placements? Explain.	5
	(c)	Explain advantages of Display Ads.	5
	(d)	Explain skills required for digital marketing.	5
Q.2	(a)	What is digital marketing? Explain strategies applied for digital marketing.	10
	(b)	Explain the campaign process for Facebook marketing in detail.	10
Q.3	(a)	Why mobile marketing is extremely relevant? Discuss.	10
	(b)	Discuss the buying models for digital marketers.	10
Q.4	(a)	How social media marketing is used by marketers and what kind of opportunities does it provide to marketers. Explain.	10
	(b)	What is web analytics? Explain its advantages in detail?	10
Q.5	(a)	Explain the concept of off-page optimization in detail.	10
	(b)	Why Twitter is significant and different platform from other social media. Justify in detail.	10
Q.6	(a)	Define SEO. What important role does SEO plays in the field of digital marketing?	10
	(b)	How LinkedIn platform helps professionals in B2B marketing. Elaborate.	10

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