

Sem - VI / May - 2023

Duration: 3hrs

[Max Marks: 80]

- NB:** 1) Question No 1 is Compulsory.
 (2) Attempt any three questions out of the remaining five.
 (3) All questions carry equal marks.
 (4) Assume suitable data, if required and state it clearly.

1 Attempt any **FOUR** [20]

a Define pure and mixed strategy with suitable example. [05]

b Find all the Pure strategy Nash Equilibrium in the following simultaneous game, the Payoff matrix s as follow, [05]

		Player 2		
		L	C	R
Player 1	T	2,0	1,1	4,2
	M	3,4	1,2	2,3
	B	1,3	0,2	3,0

c Analyze the drawbacks of the Hill Climbing Heuristic Search policy. [05]

d What is planning in AI? Explain partial order planning in detail. [05]

e Differentiate Artificial Intelligence vs Machine learning [05]

f Explain the functions of Support Vector Machine and Kernel. [05]

2 a State and explain Bertrand's model of oligopoly. [10]

b What is Nash equilibrium condition in game theory? Discuss the Nash equilibrium condition for following strategic games. [10]

i. Matching Pennies

ii. Stag Hunt

3 a What are the heuristic techniques in AI? Explain the use of heuristics in the following techniques in detail with suitable example. [10]

i. Best first search

ii. A* algorithm

b Explain local search techniques in AI? Discuss the simulated annealing in hill climbing algorithm. [10]

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- 4 a Explain the use of Computing the SVM for Classification. [10]
- b Discuss types of learning can be accomplished by Hidden Markov Model? Discuss state transition diagram of HMM. [10]
- 5 a Find the most cost-effective path to reach the final state from initial state using A* Algorithm. Given an initial state of a 8-puzzle problem and final state to be reached- [10]

2	8	3
1	6	4
7		5

Initial State

1	2	3
8		4
7	6	5

Goal State

- b What is Uncertainty? Explain Bayesian network with example. [10]
- 6 a Use the k-means algorithm and Euclidean distance to cluster the following 8 data points into 3 clusters: $C1=A1=(2,10)$, $C2=A4=(5,8)$, $C3=A7=(1,2)$ [10]
 Data points: $A1=(2,10)$, $A2=(2,5)$, $A3=(8,4)$, $A4=(5,8)$, $A5=(7,5)$, $A6=(6,4)$, $A7=(1,2)$, $A8=(4,9)$.
 Form the distance matrix with Euclidean distance and solve the problem up to two iterations.
- b What is association rule learning? How to evaluate the association rules? Illustrate the working with suitable example. [10]

Sem-VI | May-2023

(3 Hours)

Total Marks : 80

INSTRUCTIONS

- (1) Question No. 1 is compulsory.
- (2) Attempt any (3) from remaining (5) questions.
- (3) Assume suitable data if required.
- (4) Figures to the right indicate full marks.

Q1 Attempt any four (4) questions.

- a) Explain different types of Blockchain. Give example of each. [5]
- b) What is Smart Contract? Explain different types of Smart Contracts. [5]
- c) Explain the concept of Ethereum Virtual Machine with suitable diagram? [5]
- d) With suitable diagram explain how transaction flow occurs in Hyperledger fabric? [5]
- e) What are different types of test-networks used in Ethereum? [5]

Q2 a) Explain the phases of development in ETH 2.0 with suitable diagram. [10]
b) What are different steps involved in the implementation of Blockchain? [10]

Q3 a) Explain Bitcoin UTXO with suitable example. [10]
b) Explain the RAFT consensus mechanism with suitable diagram. [10]

Q4 a) Explain Ethereum Accounts in detail. [10]
b) How does Blockchain Supports Crowd Funding? [10]

Q5 a) What is Hyperledger Fabric? What are different components of Hyperledger Fabric? [10]
b) What is Quorum Blockchain? Explain the structure of Quorum Node with suitable diagram. [10]

Q6 Write a short note on : [20]

- a) MetaMask
- b) Mist Wallet
- c) Ripple Blockchain.
- d) Byzantine Fault Tolerant

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Sem-VI | May-2023

(3 Hours)

(Maximum Marks: 80)

- NB.** 1. Question number One is compulsory
2. Attempt any three out of remaining five questions
3. Assume suitable data
4. Figures to the right indicate the maximum marks

- Q1 Attempt any FOUR: (20)**
- a) Define and classify Cybercrime
 - b) Comment on Windows OS Artifacts
 - c) Explain Principles of Digital Forensic.
 - d) Which are the Goals of Incident Response
 - e) How to Acquire Image over a Network
- Q2 a) Explain Digital Forensics and its lifecycle. (10)**
b) Explain in detail Incidence Response Methodology (10)
- Q3 a) Describe Steps to prevent cybercrime and explain Hackers, Crackers and Phreakers (10)**
b) Explain Forensic Investigation Report Writing in terms of Standards, Content, Style, Formatting and Organization. (10)
- Q4 a) Describe Digital Investigation Staircase Model (10)**
b) How to Acquire an Image with dd Tools and with Forensic Formats (10)
- Q5 a) Describe in details OS File Systems. (10)**
b) Explain Network-Based Evidence acquisition and its analyzing. (10)
- Q6 a) Explain Need and types of Computer Forensic Tools in detail. (10)**
b) In Mobile Forensics explain Challenges, Evidence Extraction Process, Types of Investigation, and Procedure for Handling an Android Device. (10)

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Sem - VI | May - 2023 .

[Marks:80]

[Time: Three Hours]

- N.B:
1. Question.No.1 is compulsory.
 2. Attempt any three questions from remaining five questions.
 3. Assume suitable data wherever necessary.

- 1 Solve any Four. 20
- a Explain IIOT in brief.
 - b Explain WebSocket-based communication API.
 - c Explain need for IT and OT integration.
 - d Explain various IOT cloud platform.
 - e Describe need of separate protocol for IIoT.
 - f Explain Cyber Physical system.
- 2 a Explain in brief about Cloud computing, AI and Machine learning technologies driving Industry 4.0 10
- b Compare IOT and IIOT 10
- 3 a IoT devices can perform remote sensing, actuating, and monitoring, justify. 10
- b Explain advantages, and disadvantages of edge computing. 10
- 4 a Explain architecture, packet structure, and message types of CoAP protocol. 10
- b List and explain vulnerabilities in IIoT devices. 10
- 5 a Describe non-repudiation and how it helps to Ensure IoT Security. 10
- b Write a case study on Plant Automation using IIoT. 10
- 6 a State design challenges for intelligent sensors. 10
- b Explain IEC 62443 cyber security standard. 10

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1 Attempt any FOUR

[20]

- a Explain Categorical data and quantitative data.
- b Find S.D of the average temperature recorded over a five-day period last winter
18,22,19,25,12
- c Define Binomial distribution and Poisson distribution.
- d Explain Type I and Type II error in detail.
- e Define the following key terms for simple linear regression.
i) Response ii) Record iii) Independent variable iv) Regression co-efficient v) Residuals

2 a The runs scored in a cricket match by 11 players are as follows: 7,16,121,51,101,81,1,16,9,11,16.
Find mean, mode, median for the given data.

[10]

- b An agent sells life insurance policies to five equally aged healthy people. According to recent data, the probability of a person living in these conditions for 30 years or more is $\frac{2}{3}$. Calculate the probability that after 30 years if
 - i) All five people are still living.
 - ii) At least three people are still living.
 - iii) Exactly two people are still living (Hint: Binomial Distribution)

[10]

3 a X is a normally distributed variable with mean $\mu=30$ S. D $\sigma=4$. Find i) $P(X<40)$
ii) $P(X>21)$ iii) $P(30<X<35)$

[10]

b Brief the steps in multinomial distribution goodness of fit. Elaborate the steps with an example.

[10]

4 a Brief the steps in test of independence. Elaborate the steps with an example

[10]

b Find the simple linear regression that fits the given data and co efficient of determination.

[10]

Bill	34	108	64	88	99	54
Tip	5	17	11	8	14	5

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5 a In the context of multiple linear regression. Explain what is over fitting and multi collinearity. [10]

b Predict equation for y. [10]

y	x1	x2
-3.7	3	8
3.5	4	5
2.5	5	7
11.5	6	3
5.7	2	1

6 a Explain TIME SERIES PATTERNS [10]

- i) Horizontal Pattern
- ii) Trend Pattern
- iii) Seasonal Pattern
- iv) Trend and Seasonal Pattern
- v) Cyclical Pattern

b Consider the following time series data. [10]

Week	1	2	3	4	5	6
Value	18	13	16	11	17	14

Using the naive method (most recent value) as the forecast for the next week, compute the following measures of forecast accuracy.

- i) Mean absolute error.
- ii) Mean squared error.
- iii) Mean absolute percentage error.
- iv) Determine the forecast for week 7?
