Sem- VI | C-2019 | Dec-2023

(Time: 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 various types of accounts used in ethereum. **(05)**
b) Explain the need of smart contract. **(05)**
c) Explain the concept of transaction hash in blockchain. **(05)**
d) Compare private and public blockchain. **(05)**
e) Explain UTXO model for bitcoin. **(05)**

Q2 a) Explain the concept of Gas and Gas fees used in ethereum transactions. **(10)**
b) Explain Architecture of Fabric. **(10)**

Q3 a) Compare various consensus used in private blockchain. **(10)**
b) Explain the role of ethereum virtual machine. Explain with example for state change. **(10)**

Q4 a) How does Blockchain used in e-voting application? **(10)**
b) Write a note on Blockchain on AWS or Azure cloud. **(10)**

Q5 a) Explain the phases of development in ETH 2.0 with suitable diagram. **(10)**
b) Explain different types of test networks used in ethereum. **(10)**

Q6 Write a short note on: **(20)**

a) Mining pool difficulty
b) Corda architecture
c) Tools and frameworks of Hyperledger.
d) Blockchain in Ecommerce website

E-P code.

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Sem-VI | C-2019 | Dec-2023 | Honours / Minor

(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)	Cyber Terrorism and Cyber Stalking	
	b)	How to Present Digital Evidences	
	c)	Comment on Windows Systems- FAT32 and NTFS	
	d)	Sources of Network-Based Evidence	
	e)	Describe Goals of Incident Response	
Q2	a)	Explain Challenging Aspects of Digital Evidence	**(10)**
	b)	Describe DoS and Trojan Attacks	**(10)**
Q3	a)	Describe Digital Investigation Staircase Model	**(10)**
	b)	Describe Forensic Investigation Report Writing in terms of Standards, Content, Style, Formatting and Organization.	**(10)**
Q4	a)	Describe and Compare UNIX and MAC File System.	**(10)**
	b)	Memory Forensic and RAM Forensic Analysis	**(10)**
Q5	a)	Explain Computer Forensic Tools in detail	**(10)**
	b)	Comment on Investigation of Routers and Firewalls	**(10)**
Q6	a)	Describe Android OS Architecture and File Systems basics	**(10)**
	b)	Explain Image Acquisition over a Network and Removable Media	**(10)**

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Paper / Subject Code: 48847 / Statistical Learning for Data Science

SEM-VI / C-2019/HONOURS/MINOR DEGREE

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

N.B.: 1. Question No. 1 is compulsory.
2. Answer any three out of the remaining questions.
3. Assume suitable data if necessary.
4. Figures to the right indicate full marks.

Q1. Attempt the following (any 4): (20)

a. Compare descriptive and inferential statistics.

b. A bag contains four balls. Two balls are drawn at random (without replacement) and are found to be white. What is the probability that all balls in the bag are white?

c. Calculate the coefficient of correlation (r) for the following data:

x	9	8	7	6	5	4	3	2	1
y	15	16	14	13	11	12	10	8	9

d. What are type I and type II errors?

e. Construct 3 yearly moving averages from the following data:

Year	2017	2018	2019	2020	2021	2022	2023
Annual sale (in lakhs)	39	44	40	45	38	43	39

Q2. Attempt the following:

a. The Dow Jones Travel Index reported what business travelers pay for hotel rooms per night in major U.S. cities (The Wall Street Journal, January 16, 2004). The average hotel room rates for 20 cities are as follows: (10)

Atlanta	$163	Minneapolis	$125
Boston	177	New Orleans	167
Chicago	166	New York	245
Cleveland	126	Orlando	146
Dallas	123	Phoenix	139
Denver	120	Pittsburgh	134
Detroit	144	San Francisco	167
Houston	173	Seattle	162
Los Angeles	160	St. Louis	145
Miami	192	Washington, D.C.	207

(a) Calculate the mean hotel room rate (b) Calculate the median hotel room rate
(c) Calculate the mode (d) Calculate the first quartile
(e) Calculate the third quartile

b. Explain Poisson probability distribution. A car distributor in a city Y experiences on an average 2.5 car sales per day. Find the probability that on a randomly selected day, (10)
(a) they will sell 5 cars (b) they will sell no cars (c) they will sell at most 2 cars

Q3. Attempt the following:

a. What is sampling? State and explain different sampling methods. (10)

b. A random sample of size 64 is taken from a normal population with $\mu = 51.4$ and $\sigma = 6.8$. What is the probability that the mean of the sample will (10)
(a) exceed 52.9 (b) fall between 50.5 and 52.3 (c) be less than 50.6

Q4. Attempt the following:

a. A company manufacturing automobile tyres finds that tyre life is normally distributed with a mean of 40,000 km and standard deviation of 3,000 km. It is believed that a change in the production process will result in a better product and the company has developed a new tyre. A sample of 100 new tyres has been selected. The company has found that the mean life of these tyres is 40,900 km. Can it be concluded that the new tyre is significantly better than the old one? Use 1% LOS. (10)

b. The population proportion (p) is 0.30. What is the probability that a sample proportion will be within ±0.04 of the population proportion for each of the following sample sizes:

(a) $n = 100$ (b) $n = 200$

(c) $n = 500$ (d) $n = 1000$

(e) What is the advantage of a larger sample size? (10)

Q5. Attempt the following:

a. The following data gives the experience of machine operators and their performance rating as given by the number of good parts turned out per 100 pieces. (10)

Operators	1	2	3	4	5	6
Performance rating (x)	23	43	53	63	73	83
Experience (y)	5	6	7	8	9	10

Calculate the regression line of performance rating (x) on experience (y) and also estimate the probable performance if an operator has 11 years of experience.

b. Consider a sample with a mean of 30 and a standard deviation of 5. Use Chebyshev's theorem to determine the percentage of the data within each of the following ranges. (10)

(a) 20 to 40 (b) 15 to 45 (c) 22 to 38 (d) 18 to 42 (e) 12 to 48

Q6. Attempt the following:

a. From the following data, obtain two regression equations and estimate the value of sales when purchases were 75. Also, estimate the value of purchases when sales were 100. (10)

Sales	91	97	108	121	67	124	51	73	111	57
Purchases	71	75	69	97	70	91	39	61	80	47

b. What are non-parametric tests? Calculate Spearman's rank correlation coefficient between expenditure on advertising and sales from the data given below: (10)

Advertising expenses ('000 Rs.)	39	65	62	90	82	75	25	98	36	78
Sales (lakh Rs.)	47	53	58	86	62	68	60	91	51	84

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Sem. VI | C.2019 | Dec. 2023

[Time: Three Hours] **[Marks:80]**

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	Describe WSN network design for IoT.	
	b	Explain REST-based communication API.	
	c	State and explain main parts of "Things" referred in IoT.	
	d	Explain various IOT cloud platform.	
	e	Describe need of separate protocol for IIoT.	
	f	Explain Cyber Physical system.	
2	a	Explain the different Components of IIOT with diagram	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 IoT.	10
6	a	State design challenges for intelligent sensors.	10
	b	Explain IEC 62443 cyber security standard.	10

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G.P.code
38490

TE | sem- VII | C-2019 | Dec. 2023

Duration: 3hrs **[Max Marks: 80]**

N.B.: 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 State and explain prisoner's dilemma strategic game and discuss the Nash equilibrium strategy profile. ***[05]***

		Suspect 2	
		Quiet	Fink
Suspect 1	Quiet	2,2	0,3
	Fink	3,0	1,1

b What is supervised learning? How is regression different than classification? ***[05]***

c Explain the A* algorithm with admissibility conditions. ***[05]***

d Differentiate between propositional logic and first order predicate logic with suitable examples. ***[05]***

e What is machine learning? List and explain types of learning. ***[05]***

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

b Explain Bayesian game with suitable example. Discuss the Nash equilibrium condition of a Bayesian game. ***[10]***

3 a What is an agent? Explain basic building blocks of learning agent? ***[10]***

b Explain hill climbing algorithm with suitable example. ***[10]***

4 a Explain the planning in AI and discuss role of planning in AI with suitable example. ***[10]***

b Write first order logic statements for the following ***[10]***
i. If a perfect square is divisible by a prime p then it is also divisible by square of p.
ii. Every perfect square is divisible by some prime
iii. Alice does not like Chemistry and History
iv. If it is Saturday and warm, then Sam is in the park.
v. Anything anyone eats and is not killed is a food

G.P. code

5 *a* Find optimal hyperplane for the set of data points: ***[10]***

{(3,1), (3,-1), (6,1), (6,-1), (1,0), (0,1), (0,-1), (-1,0)}

Class 1: {(3,1), (3,-1), (6,1), (6,-1)}

Class 2: {(1,0), (0,1), (0,-1), (-1,0)}

b Explain the steps in developing the machine learning application considering any suitable example. ***[10]***

6 *a* What types of learning can be accomplished by HMM? Discuss state transition diagram of HMM. ***[10]***

b Trace the results of using Apriori algorithm on the grocery store example with support threshold s=33.34% and confidence threshold c=60%. Show the candidate and frequent item sets for each database scan. Enumerate all the final item sets. Also indicate the association rules that are generated and highlight the strong ones, sort them by confidence. ***[10]***

Transaction ID	Items
T1	HotDogs, Buns, Ketchup
T2	HotDogs, Buns
T3	HotDogs, Coke, Chips
T4	Chips, Coke
T5	Chips, Ketchup
T6	HotDogs, Coke, Chips