Year- April 2024

MSC- Computer Science

SEM - III

No of pages - 10

(1)

MSc - Sem. III

Time :2 ½ Hours [Total Marks: 60]

N.B: (1) **All questions are compulsory.**
(2) Figures to the **right** indicate full marks.
(3) **Assume additional data if necessary** but state the same clearly.
(4) Symbols have their usual meanings and tables have their usual standard design unless stated otherwise.

Q.1	Attempt **any two** of the following	**(12)**
a)	How Web Mining is differentiated with Data Mining?	**06**
b)	State and Explain Information Retrieval.	**06**
c)	What do you mean by relevance feedback?	**06**
d)	Write a short note on Apriori algorithm.	**06**
Q.2	Attempt **any two** of the following	**(12)**
a)	State and Explain different types of opinion with example.	**06**
b)	Write a short note on Rational and emotional evaluation in Opinion Mining	**06**
c)	Explain Opinion quintuple with example.	**06**
d)	Write a short note on Aspect based opinion summary.	**06**
Q.3	Attempt **any two** of the following	**(12)**
a)	Define the term centrality with proper example.	**06**
b)	Write a short note on Hyperlink analysis.	**06**
c)	Write a short note on Closeness Centrality.	**06**
d)	Write a short note on Co-citation.	**06**
Q.4	Attempt **any two** of the following	**(12)**
a)	Write a short note on Universal Crawler.	**06**
b)	Explain Focused Crawlers.	**06**
c)	State and Explain Crawler ethics and conflicts.	**06**
d)	Discuss Basic Crawler algorithm.	**06**
Q.5	Attempt **any two** of the following	**(12)**
a)	What is the use of Web Mining in the world of Internet?	**06**
b)	Write a short note on Sentiment Classification.	**06**
c)	Explain the term degree prestige.	**06**
d)	What are different advantages of web crawlers?	**06**

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M Sc - sem III - CS

Time: 2 ½ Hours [Total Marks: 60]

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Q.1	Attempt **any two** of the following	**(12)**
a)	Explain Secret Key Cryptoystems.	**06**
b)	Write in detail about Message Authentication Codes	**06**
c)	Write in detail about Cryptographic Protocols	**06**
d)	Write in Detail about Hybird Cryptography.	**06**
Q.2	Attempt **any two** of the following	**(12)**
a)	Explain the concept of Substitution-Permutation Networks	**06**
b)	Explain the Data Encryption Standard (DES) and its significance in the field of data security.	**06**
c)	What are Hash Functions , explain Data Integrity	**06**
d)	What is Piling up Lemma explain in detail	**06**
Q.3	Attempt **any two** of the following	**(12)**
a)	Explain Shanks' Algorithm in detail.	**06**
b)	Write in detail about Security of ElGamal System	**06**
c)	Explain in detail Full Domain Hash (FDH)	**06**
d)	Explain in detail RSA Algorithm	**06**
Q.4	Attempt **any two** of the following	**(12)**
a)	Write about Key Predistribution in Sensor Networks.	**06**
b)	Explain in detail Diffie-Hellman Key Predistribution.	**06**
c)	Explain Elgamal Cryptosystem with example	**06**
d)	Explain the concept of key agreement also distinguish between key distribution and key agreement.	**06**
Q.5	Attempt **any two** of the following	**(12)**
a)	Explain Substitution Cipher in detail.	**06**
b)	Elaborate on Differential Cryptanalysis highlighting is techniques and applications in cryptography?	**06**
c)	Write about Blom Scheme in Detail.	**06**
d)	Write in detail about Kerberos.	**06**

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MSc – CS – Sem III

Time: 2 ½ Hours **[Total Marks: 60]**

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Q.1	Attempt **any two** of the following	**(12)**
a)	What is Electronic cash? What are the fundamental e-cash issues?	**06**
b)	Explain Blockchain layers.	**06**
c)	What is a Wallet? Discuss the types of Wallets.	**06**
d)	State and explain the steps of lifecycle of a Bitcoin transaction.	**06**
Q.2	Attempt **any two** of the following	**(12)**
a)	Explain standard mechanics of how oracles work.	**06**
b)	Why Ethereum blockchain is considered as a state transition function?	**06**
c)	Discuss State storage in the Ethereum blockchain.	**06**
d)	Explain the following Ethereum protocols: i) Whisper ii) Swarm	**06**
Q.3	Attempt **any two** of the following	**(12)**
a)	Explain Deployment on decentralized storage using IPFS.	**06**
b)	Discuss the goals behind the development of Serenity?	**06**
c)	Write a short note on Hyperledger Fabric.	**06**
d)	Differentiate between fungible and non - fungible tokens.	**06**
Q.4	Attempt **any two** of the following	**(12)**
a)	State and explain the qualifiers associated with State variables.	**06**
b)	Write a short note on Data types in Solidity.	**06**
c)	Explain Error handling in solidity.	**06**
d)	What are events in Solidity? Explain.	**06**
Q.5	Attempt **any two** of the following	**(12)**
a)	Discuss the generic elements of a blockchain.	**06**
b)	Explain the components of the Ethereum ecosystem?	**06**
c)	What are the advantages and disadvantages of tokenization?	**06**
d)	Write a short note on Interfaces in solidity.	**06**

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(2½ Hours) [Total Marks: 60]

N. B. : (1) **All** questions are **compulsory**.
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Q.1 Attempt *any two* of the following: 12

a) How to create a pandas Series from a dictionary? Explain with an appropriate example
b) How to transpose a pandas DataFrame? Give suitable example of it.
c) Describe various data visualization libraries in Python and their features.
d) Why is data visualization important?

Q.2 Attempt *any two* of the following: 12

a) What are various ways to clean data in pandas DataFrame?
b) Explain reshaping with hierarchical indexing and pivoting between "long" and "wide" formats.
c) What is hierarchical indexing in pandas? How to reorder and sort levels in a DataFrame?
d) What are various ways to combine and merge datasets? Explain anyone with suitable example.

Q.3 Attempt *any two* of the following: 12

a) How to connect various data sources to Tableau and manage data source metadata?
b) What are different File based data sources in Tableau?
c) What is the role of calculations in Tableau. Explain Aggregate calculations.
d) What is the process of creating and using parameters in Tableau?

Q.4 Attempt *any two* of the following: 12

a) What are trend models in Tableau? How they are useful to analyze trends in data?
b) What are the primary steps of Tableau Prep?
c) What do you mean by forecasting? What are the considerations for accurate forecast?
d) Explain some advanced geospatial features in Tableau. How they are used to create custom maps?

Q.5 Attempt *any two* of the following: 12

a) How to select, add, and delete columns in a pandas DataFrame? Provide examples for each operation.
b) Explain the concept of reading data from JSON format. Elaborate with code snippet.
c) How to design effective dashboard in Tableau?
d) What is Clustering? How it is useful in Data Analysis?

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MSc - CS - Sem III

(2½ Hours)

[Total Marks: 60]

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Q.1 Attempt *any two* of the following: **(12)**

a) What is Data Frame? How to create Data Frame from Dictionary of Series? Illustrate with code example.
b) Explain Box Plot and Histogram Plot Technique.
c) Why is data visualization important?
d) Write a program to create a data frame which consists of three cities' names associated with their temperature of three different locations and then add a new column named **Mean** to maintain the calculated mean temperature per city. Display the final data frame. Also display rows where **Mean** values are greater than 30.

Name	Location 1	Location 2	Location 3
Mumbai	32	34	31
Delhi	36	38	41
Chennai	35	34	36

Q.2 Attempt *any two* of the following: **(12)**

a) Explain the concept of reading data from JSON format. Elaborate with code snippet.
b) How Hierarchical Indexing is convenient to rearrange data in a Data Frame?
c) What are various ways to combine and merge datasets? Explain anyone with suitable example.
d) Explain the concept of Data Transformation with respect to following operations:
   i) Removing Duplicates
   ii) Replacing Values

Q.3 Attempt *any two* of the following: **(12)**

a) What are different File based data sources in Tableau?
b) Explain the types of Geographic Visualization offered by Tableau.
c) Write note on Aggregate level Calculation.
d) Write note on Dashboard Approaches.

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Q.4 Attempt *any two* of the following:

a) Explain the concept of Wide and Tall data. (12)

b) What do you mean by forecasting?

c) What are the different Trend Models used in Tableau?

d) Write a note on Clustering.

Q.5 Attempt *any two* of the following:

a) What is Series data structure? How to create Series with an index? Illustrate with code example. (12)

b) Explain the concept of Pivoting "Long" to "Wide" format with suitable example.

c) How Tableau works with Extracts?

d) What are the primary steps of Tableau Prep?

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Subject Code: 74909 / Computer Science: Track C : Computer Networking : Elective II: Wireless Networking (R-20

MSC – CS – sem III

Time: 2 ½ Hours

[Total Marks: 60]

N.B: (1) All questions are compulsory.
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Q.1	Attempt **any two** of the following	(12)
a)	Write a short note on Wireless Sensor Node	06
b)	Discuss the concept of Energy Scavenging.	06
c)	Explain Wireless Sensor Network architecture.	06
d)	Write a short note on Data eccentricity.	06
Q.2	Attempt **any two** of the following	(12)
a)	Explain the types of Wireless Optical Network.	06
b)	Write a short note on scintillation.	06
c)	Explain advantages of Wireless Optical Network.	06
d)	How beam spreading affects Wireless Optical Communication?	06
Q.3	Attempt **any two** of the following	(12)
a)	How QoS is associated with 4G?	06
b)	State and Explain any one application of 4G.	06
c)	Write a short note on Smart Antenna Technique.	06
d)	Write a short note on Multicarrier modulation (MCM).	06
Q.4	Attempt **any two** of the following	(12)
a)	Write a short note on CRAN.	06
b)	Explain 5G RAN architecture.	06
c)	Write a short note on 5G mobile edge computing.	06
d)	List and explain different 5G spectrum requirements.	06
Q.5	Attempt **any two** of the following	(12)
a)	How Technologies are enabled for Wireless Sensor Network ?	06
b)	Write a short note on Atmospheric losses.	06
c)	Write a short note on OFDM-MIMO system.	06
d)	Write a short note on Network Slicing.	06

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Subject Code: 74906 / Computer Science: Track B: Security : Elective I: Cryptography & Cryptanalysis (R-2022

MSC - CS - Sem 3 III

Time: 2 ½ Hours [Total Marks: 60]

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Q.1	Attempt **any two** of the following	**(12)**
a)	Explain public-key cryptosystem in detail.	**06**
b)	Write a short note on hash function.	**06**
c)	What is cryptographic protocol?	**06**
d)	Differentiate between block and stream cipher.	**06**
Q.2	Attempt **any two** of the following	**(12)**
a)	Explain Pilling up lemma.	**06**
b)	What are the modes of operation explain different modes.	**06**
c)	Explain cryptanalysis of LFSR stream cipher.	**06**
d)	What is RSA cryptosystem.	**06**
Q.3	Attempt **any two** of the following	**(12)**
a)	What are the challenges and response in the secret-key setting?	**06**
b)	Explain the working of ElGamal Cryptosystem.	**06**
c)	Explain signing and encrypting techniques.	**06**
d)	What is Schnorr identification scheme?	**06**
Q.4	Attempt **any two** of the following	**(12)**
a)	What is MTI Key Agreement?	**06**
b)	What is the purpose of Diffie-Hellman key agreement?	**06**
c)	Explain the use of station-to-station protocol in Key Distribution and Key Agreement scheme.	**06**
d)	What is Cocks identity-based cryptosystem?	**06**
Q.5	Attempt **any two** of the following	**(12)**
a)	Briefly explain what is MAC?	**06**
b)	In an RSA cryptosystem, a particular A uses two prime numbers, 13 and 17, to generate the public and private keys. If the public key of A is 35. Find the private key of A ?	**06**
c)	What is RSA signature scheme?	**06**
d)	What are adversarial goals and attack models?	**06**

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MSc (Research) Sem III

(9)

Time : 2½ Hours **[Total Marks: 60]**

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Q.1	Attempt **any two** of the following	**(12)**
a)	Discuss the different phases of NLP.	**06**
b)	How is the noisy channel used for spelling correction?	**06**
c)	What are the steps to be taken to build an NLP application?	**06**
d)	State different types of ambiguities with example.	**06**
Q.2	Attempt **any two** of the following	**(12)**
a)	What is computational Morphology? With the help of example explain any four computational morphology example.	**06**
b)	Write a note on Probabilistic CKY parsing.	**06**
c)	What are the applications of POS tagging? How to generate POS tags for input strings in python?	**06**
d)	Explain the working of n gram model.	**06**
Q.3	Attempt **any two** of the following	**(12)**
a)	Write a note on PCFG.	**06**
b)	Review the concept of Singular Value Division.	**06**
c)	How is NLP implemented in machine translation	**06**
d)	With the help of diagram, explain skip gram model.	**06**
Q.4	Attempt **any two** of the following	**(12)**
a)	Write a short note on Speech Recognition.	**06**
b)	Explain how NLP is used in handling fraud and sms.	**06**
c)	Explain the need and working of LSTM model	**06**
d)	In short explain the BERT model in NLP.	**06**
Q.5	Attempt **any two** of the following	**(12)**
a)	Discuss the advantages of NLP.	**06**
b)	Explain the use of NLP in tutoring and authoring systems	**06**
c)	State the working of Tf-Idf.	**06**
d)	Explain the concept of word sense	**06**

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Paper / Subject Code: N57751 / NoSQL Technologies

M.Sc. (Computer Science) NEP -2020

(Time :1 Hours) [Total Marks: 25]

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Q.1	Attempt **any two** of the following	**(10)**
a)	Define NoSQL. Explain any four characteristic of NoSQL.	**05**
b)	What are key value stores? List out some popular key value databases. Explain how all the data is stored in a single bucket of key value store.	**05**
c)	What is architectural framework of HBase distributed storage system?	**05**
d)	How to create records in document centric databases? Explain with examples.	**05**

Q.2	Attempt **any two** of the following	**(10)**
a)	How to create and use indexes in MongoDB?	**05**
b)	Explain distributed ACID system.	**05**
c)	How to access data from Column-Oriented Databases like HBase?	**05**
d)	What are the similarities between SQL and MongoDB Query features?	**05**

Q.3	Attempt **any one** of the following	**(05)**
a)	How to Access documents from Mongodb? Explain with examples?	**05**
b)	Explain indexing in Apache Cassandra.	**05**

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