

(3 Hours)**Total Marks: 80****N.B.: (1) Question No.1 is compulsory.****(2) Attempt any three questions from the remaining five questions.****(3) Assume suitable data if required and mention it clearly****(4) Figures to right indicate full marks**

1. **Solve any four**
 - (a) What are the different phases of web application reconnaissance? **05**
 - (b) What are some key differences between black-box and white-box vulnerability testing? **05**
 - (c) Why should HTTPS be used everywhere in modern web applications? **05**
 - (d) Explain the importance of encryption in maintaining the confidentiality and integrity of data in web applications. **05**
 - (e) What are the benefits of integrating security in the SDLC? **05**
 - (f) What are the key components of web application profiling? **05**
2.
 - (a) What is Cross-Site Scripting (XSS), and what are its types? **10**
 - (b) What are the benefits of using open-source security tools over commercial ones? **10**
3.
 - (a) Discuss the security best practices for API development to prevent unauthorized access. **10**
 - (b) Compare the impact of design flaws and security bugs in large-scale enterprise applications **10**
4.
 - (a) Discuss the Secure Coding Practices. **10**
 - (b) Explain how automation can improve application security in a DevSecOps environment. **10**
5.
 - (a) Describe the importance of penetration testing in cybersecurity. **10**
 - (b) Describe the role of CVSS in identifying and prioritizing vulnerabilities. **10**
6. **Write a short note on (Any Two)** **20**
 - a) SAST and DAST.
 - b) Threat modelling in different types of SDLC
 - c) Secure hardware architecture.

(3 Hours)

Total Marks: 80

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Q1 A What is the difference between data science and data analytics? **10**

B What is ANOVA? Brief about benefits of ANOVA technique. **10**

Q2 A What are Type I and Type –II errors? Give examples. **10**

B Explain the data science tasks with proper examples. **10**

Q3 A Describe the terms: Cross Validation, K-fold cross validation, leave-1 out and Bootstrapping. **10**

B Calculate the coefficient of correlation for the following data with Karl Pearson's method. **10**

X	15	18	20	28	34
Y	40	42	46	50	52

Q4 A Find Bowley's coefficient of skewness of the following series. **10**

Profit (in crores)	4-8	8-12	12-16	16-20	20-24
No. of films	4	10	15	8	3

B What are the pros and cons of an Auto Regressive Integrated Moving Average (ARIMA) model? Explain with proper examples. **10**

Q5 A Explain the steps to build a product recommendation model in detail. **10**

B What is Hypothesis testing? Write about the different types of Hypothesis testing. **10**

Q6 Write a note on any **FOUR** : **20**

- A. Data Visualization
- B. Applications of Data Science
- C. Data Exploration
- D. Taxonomy of time series forecasting methods
- E. Outlier detection methods

(Time: 3 Hours)

Marks: 80

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Q 1

- A Enlist the issue in designing the Distributed System? Explain failure transparency & location transparency in detail [5]
 B What are the key features of Global Scheduling algorithm. [5]
 C Explain Bully algorithm with example [5]
 D Explain the various ordered semantics used for Many to Many communication [5]

Q 2

- A Explain Chandy Misra Hass Algorithm [10]
 B Desirable features of a good DFS? [10]

Q 3

- A Explain load estimation, process transfer and location policies with respect to load balancing approach in distributed systems. [10]
 B Explain Raymond's algorithm for mutual exclusion. [10]

Q 4

- A Explain the goals of distributed systems. [10]
 B How Lamport does synchronizes logical clock explain with example? Which events are said to be concurrent in Lamport's timestamp. [10]

Q 5

- A What is fault tolerance? Describe different types of failure models. [10]
 B What is RPC? Explain working of RPC in detail [10]

Q 6

- A Discuss the technique to achieve the Process resilience. [10]
 B What is need of code migration? Explain the role of process to resource and resource to machine binding in code migration. [10]

[Time: 3 Hours]

[Marks:80]

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3. Figures to the right Indicate full marks.

Q.1 Attempt any Four.

20

- a) Explain any five Salient features of the Environment Protection Act, 1986.
- b) Describe the current energy scenario in India. What challenges does India face in meeting its energy demands?
- c) What is a food chain? How does it differ from a food web?
- d) What are atomic and biomedical hazards?.
- f) Explain the role of the government as a planning and regulatory agency.

Q.2 a) Discuss major environmental problems in India and their implications for public health and natural resources.

10

- b) Explain Ozone layer depletion? What are the Causes, effects and preventive measures of Ozone depletion?

10

Q.3 a) Define ecosystem. Classify different types of Ecosystems? What are the biotic and abiotic components of an ecosystem?

10

- b) Discuss the role of Central Pollution Control Board (CPCB) in pollution monitoring.

10

Q.4 a) What is ISO 14000? Explain its significance in environmental management and how it helps organizations reduce their environmental impact.

10

- b) What is Corporate Environmental Responsibility (CER)? Explain its importance and mention any three ways in which companies can practice CER to promote environmental sustainability.

10

Q.5 a) Compare natural and human-made sources of greenhouse gases. Which ones have the greatest impact on global warming and why? Support your answer with examples

10

- b) What is Environmental Quality Management (EQM)? Explain its objectives in detail.

10

Q.6 a) With reference to EMS, explain PDCA cycle with neat diagram.

10

- b) Critically evaluate the concept of sustainable development as a multidimensional approach. How does it reconcile the conflicting goals of economic growth, environmental conservation, and social equity?

10

Duration: - 3 Hours

Marks: 80 Marks

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- Q.1 Solve any four 20**
- Explain Action Analytics with example.
 - What is the role of Centralization and Tie Strength in social network analysis?
 - Highlight the differences between Social Media Text Analytics and Hyperlink Analytics.
 - Explain the challenges faced while performing Social Media Analytics.
 - Explain how Social Network Visualization enhances the interpretation of large-scale online interactions.
- Q.2 a. What is social network structure? List at least two different networks that exist within Instagram. For each one, answer the following: 10**
- What constitutes a node?
 - What constitutes an edge?
 - Is it directed?
 - Is it weighted? If so, what does the weight indicate?
 - What is the smallest component in the graph?
- b. Explain each of the seven layers in Social Media Analytics and how their integration gives a complete view for business intelligence, with real-life examples 10**
- Q.3 a. Discuss the role of text analytics in social media analytics. Using a hypothetical social media dataset, explain the process of extracting meaningful insights using text analytic. 10**
- b. What is a social media-based recommendation system and how can social media-based recommendation systems be used to improve customer service and support, explain with example? 10**
- Q.4 a. What is search engine optimization? What are the different methods to do it? consider a small, local bakery in Dadar struggled with low online visibility despite having a loyal customer base. Explain how they can improve the visibility using SEO strategies? 10**
- b. What are social media KPIs? Identify five essential KPIs for an e-commerce brand launching a new product via influencer marketing on Instagram. How do these KPIs support business decision-making? 10**

- Q.5 a. Explain the process of managing misinformation risks on social media. Describe the four steps of risk management in the context of a health awareness campaign. **10**
- b. Describe how public sector agencies can leverage social media analytics during disaster response with examples.
- Q.6 **20**
- a. What is centralization in social network analysis? Illustrate its role using an example from a political campaign.
- b. Write short note on
- i) Privacy concerns in location analytics with examples
 - ii) Challenges to Social Media Analytics,

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[Max Marks:80]

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|---|--|------|
| 1 | Attempt any FOUR | [20] |
| a | What is the role of stemming , lemmatization and stop word removal in text preprocessing? Briefly explain each technique. | 5 |
| b | Explain the HMM model in detail and state its limitations. | 5 |
| c | Discuss two common hiding techniques employed by spammers to conceal their activities from users and search engine crawlers. | 5 |
| d | Define link spamming and describe common techniques used in it. | 5 |
| e | How is behavior analytics used in the context of social media data? | 5 |
| 2 | a Explain the concept of an inverted index and Latent Semantic Indexing (LSI) in web mining. How do these techniques facilitate efficient web search? | [10] |
| | b Explain how spammers manipulate website content and links to unfairly boost search rankings, and discuss methods to detect and prevent such web spam. | [10] |
| 3 | a Describe different approaches to model and integrate social context into recommendation algorithms. Explain evaluation metrics used to assess recommendation system performance. | [10] |
| | b Discuss the various relation extraction and NER extraction techniques from unstructured text. | [10] |
| 4 | a Explain distance based clustering algorithm in detail. | [10] |
| | b Explain web usage mining possess in detail. How association and correlation analysis is performed in web usage mining? | [10] |
| 5 | a Explain behavior analytics in the context of social media. | [10] |
| | b Explain any two text classification algorithms | [10] |
| 6 | a Discuss unsupervised methods of document sentiment classification. | [10] |
| | b Explain text mining applications and challenges. | [10] |
