(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   05
   integrity of data in web applications.
   (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   10
   applications

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.

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Duration: 3 hours [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.

Q1.		**Attempt any four**	**Marks**
	a.	Explain Blockchain CAP theorem with relationship diagram of CAP.	5
	b.	Discuss Incentive based Engineering in Bitcoin.	5
	c.	Explain Hyperledger Fabric Channels.	5
	d.	List the key characteristics of ICO.	5
	e.	Enumerate the different advantages of Blockchain with Cybersecurity.	5
Q2.	a.	Explain different node types and their roles in bitcoin. What is the Extended bitcoin network?	10
	b.	Describe the Architecture of Hyperledger Fabric Blockchain.	10
Q3.	a.	How to create an account on Metamask (Ethereum Wallet). List and explain different testnets for deployments.	10
	b	Discuss Bitcoin Mining steps to validate the block. What is the difficulty level and how does it calculate in terms of bitcoin?	10
Q4	a.	What is consensus? List and explain permissioned and permissionless consensus algorithms.	10
	b.	Define Blockchain Technology. Compare different types of blockchain systems.	10
Q5	a.	Differentiate between ERC20 & ERC721. Demonstrate NFT with small code.	10
	b.	Explain different components of Ethereum in detail.	10
Q6	a.	Explain Wallet Technologies in Bitcoin	10
	b.	Discuss Structure of a Block, Genesis Block, Linking Blocks in the Blockchain, Merkle Tree.	10

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Time: 03 Hours   **Marks: 80**

Note: 1. Question 1 is compulsory
2. Answer any three out of the remaining five questions.
3. Assume any suitable data wherever required and justify the same.

Q1   Explain   [20]
a) Big Data and its characteristics
b) Distance measures for Big Data
c) Similarity measure can be used in an application to find plagiarism in documents
d) How failures are handled in MapReduce job

Q2   a) Draw and explain Hadoop ecosystem showing all components   [10]
b) Explain Issues in Data stream query processing   [10]

Q3   a) Write a Map reduce pseudo code to multiply two matrices. Illustrate with an example
showing all the steps.   [10]
b) Explain Column family store and Graph Store NoSQL architectural pattern with
example.   [10]

Q4   a) Explain PCY algorithm and its 2 types with neat labeled diagram.   [10]
b) Explain HITS algorithm with example.   [10]

Q5   a) Explain Collaborative filtering system. How is it different from content   [10]
based system.
b) What is clique percolation method. Write an algorithm on (CPM).   [10]
Also show how the CPM finds clique for the following graph. Explain with steps.
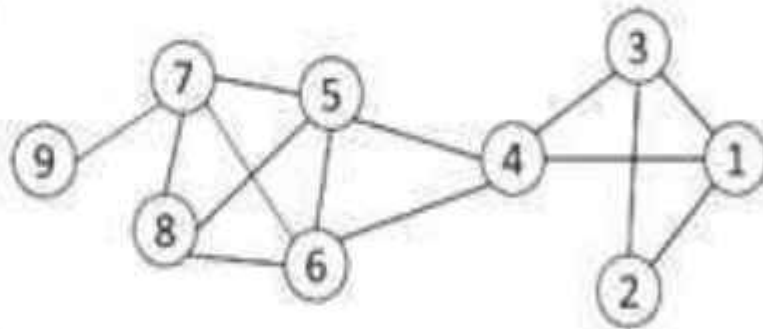
Q6   a) Explain DGIM algorithm.   [10]
b) Explain CURE algorithm.   [10]

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82370

[Time: 3 Hours]   [Marks:80]

1. Questions No. 1 is Compulsory.
2. Attempt any three out of remaining Questions.
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   10
are the biotic and abiotic components of an ecosystem?
    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: 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	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]

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83570

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

N.B.: (1) Question No. 1 is Compulsory.
         (2) Attempt any THREE questions from the remaining FIVE.
         (3) All questions carry equal marks.
         (4) Assume suitable data wherever necessary and state your assumptions clearly.

Q1. Attempt any FOUR   **[20]**
   a. Describe the key attributes of effective error messages. Support your answer with a relevant example.
   b. Explain how consistency in user interfaces enhances usability, with supporting arguments.
   c. Discuss the importance of accessibility in user interaction design and outline methods for its implementation.
   d. Explain the role of cognition in user interaction design, citing a practical example.
   e. Discuss the importance of developing user personas in interactive system design.

Q2.
   a. Identify and explain the seven primary factors that influence user experience. Describe their contribution to usability.   **[10]**
   b. Discuss common challenges faced during data gathering sessions in UX research.   **[10]**

Q3.
   a. Explain the five dimensions of interaction design with appropriate examples.   **[10]**
   b. Outline the main phases in the interaction design process with an emphasis on user-centered design.   **[10]**

Q4.
   a. Highlight the significance of observation as a technique for data gathering in user research. Mention its benefits and practical application.   **[10]**
   b. Describe different types of prototypes in interaction design. Discuss the concept and use of low-fidelity prototypes.   **[10]**

Q5.
   a. Define usability testing. Explain its goals, methods, and how it improves product design. **[10]**
   b. For a language learning app with daily goals and gamification, propose design strategies that maintain user engagement while mitigating the impact of missed goals. Discuss key design considerations.   **[10]**

Q6.
a. Analyze the principle of flexibility in usability design. Provide examples demonstrating its influence on user experience.   **[10]**
b. Elaborate on Norman's seven principles of design and evaluate their role in creating user-friendly interfaces.   **[10]**

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