

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 Explain the challenges faced by Knowledge management in different business scenarios.
 - b Identify the five factors that contribute to the increasing vulnerability of information resources, and provide a specific example of each one?
 - c Analyze the impact of BI on Decision making.
 - d Explain the applications of computer networks.
 - e Explain the importance of Information systems to Society.
- 2 a Develop the plan for delivery application in M-commerce using social computing. [10]**
- b Explain Data warehouse and Data Mart in an organization. [10]**
- 3 a Explain the major security threats to information security and discuss the measures for controlling the same. [10]**
- b Explain CRM. Describe the different types of CRM with example. [10]**
- 4 a What is Cloud Computing? Explain its models. [10]**
- b Write note on e-business. [10]**
- 5 a Identify the measures to improve cyber security with example. [10]**
- b Explain the phases of the system development lifecycle with example. [10]**
- 6 a Explain the steps involved in knowledge capturing. [10]**
- b Compare and contrast Web 1.0, 2.0, 3.0 with example. [10]**

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- 1 Attempt any FOUR [20]
- a Explain how criminals plan the attack
 - b Explain various security challenges posed by mobile devices
 - c Explain need of Cyber law in India
 - d Explain E-contracts and its different types.
 - e What are Botnets? How it is exploit by attacker to cause cyber-attack?
- 2 a Explain the classification of cybercrimes with examples. [10]
- b Explain Phishing and Identity theft in detail. [10]
- 3 a Explain different buffer overflow attacks also explain how to mitigate buffer overflow attack [10]
- b Explain electronic banking in India and what are laws related to electronic banking in India [10]
- 4 a What do you understand by DOS and DDOS attack? Explain in detail. [10]
- b Write a note on Intellectual Property Aspects in cyber law. [10]
- 5 a Explain SQL injection attack. State different countermeasure to prevent the attack. [10]
- b Explain the objectives and features of IT Act 2000 [10]
- 6 a Explain the term evidence and different types of evidences [10]
- b Write key IT requirements for SOX and HIPAA. [10]

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 a) What is Hadoop and Why it Matters. [5]
b) Compare traditional database and big data. [5]
c) Explain CAP theorem. State how it is different from ACID properties. [5]
d) Compare DBMS VS DSMS. [5]
- Q2 a) Draw Hadoop Ecosystem and briefly explain its components. [10]
b) Explain the four types of NoSQL database. [10]
- Q3 a) Explain architecture of Big data and give characteristics of it. [10]
b) Explain DGIM algorithm. [10]
- Q4 a) List the main components of Mapreduce execution pipeline. [10]
b) Explain cure algorithm. [10]
- Q5 a) What is Recommender System? Explain Types of recommender system. [10]
b) What is a Social Network? Give Varieties of Social Networks and the need for social network graph. [10]
- Q6 a) Explain with example two major classes of distance measures. [10]
b) Explain the structure of web with suitable diagram. [10]
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(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. What is distributed ledger? Explain its need in the Blockchain.
- b. What is Bitcoin? Explain the role of hash cash.
- c. List and explain different types of accounts in ethereum.
- d. Explain the need of private blockchain.
- e. Differentiate between ERC20 and ERC721.

Q2. Attempt the following:

- a. What Merkle root tree. Explain Patricia Merkle root in ethereum. (10)
- b. Explain the process of mining in detail. (10)

Q3. Attempt the following:

- a. Write a smart contract in solidity to explain various types of arrays. (10)
- b. Explain Hyperledger Fabric in detail. (10)

Q4. Attempt the following:

- a. Explain the benefits and limitations of blockchain. (10)
- b. Describe the various types of consensus in blockchain. (10)

Q5. Attempt the following:

- a. Explain ethereum components in detail? (10)
- b. Explain Different types of cryptocurrencies in detail. (10)

Q6. Write short notes on (any 2): (20)

- a. Case study on any Blockchain platform
- b. Consensus in private blockchain
- c. Blockchain in Defi and Metaverse

Time: (3 Hours)

[Total Marks: 80]

N.B.: (1) Question **No.1** is **Compulsory**.

(2) Attempt **any three** questions from the **remaining** questions.

(3) Assume **suitable** data wherever required but **justify** the same.

(4) **Figures** to the **right** indicate **full marks**.

(5) Answer to each new question must start on a **fresh page**.

1. (a) What type of data analytics is used in healthcare? [5]
(b) Which imaging technologies do not use radiation? Explain those technologies in brief. [5]
(c) What you mean by the term Natural Language Processing for clinical/medical text data. [5]
(d) Define Advanced Data Analytics for Healthcare with six real-world applications. [5]
2. (a) Define Phenotyping Algorithms with key aspects. [10]
(b) What is visualization? Explain different types of visualization techniques, tools with advantages and disadvantages. [10]
3. (a) Illustrate Predictive Modelling in Healthcare with at least two examples. [10]
(b) Describe the following: - [10]
 1. BAN
 2. Dense/Mesh area network for smart living environment
 3. Sensor Technology
 4. Image Registration
 5. Feature Extraction
4. (a) What are the components of EHR? What are the barriers for adopting EHR? [10]
(b) Explain types of Fraud detection in healthcare with the help of example. [10]
5. (a) What are the challenges one may face while processing Covid clinical reports? [10]
(b) Define Data science with applications of healthcare data analytics. [10]
6. (a) How will we analyze Mental health status of someone using their tweets on twitter? [10]
(b) Define Biomedical Imaging Modalities with their Applications. [10]

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- 1 Attempt any **FOUR** [20]
- a List and explain any one defuzzification method. [05]
 - b Define fuzzy relation with example [05]
 - c Explain Lambda-cuts for fuzzy set with example. [05]
 - d Describe with an example supervised and unsupervised learning. [05]
 - e Discuss Associative Memory Networks in brief [05]
- 2 a Elaborate Radial Basis function Neural network [10]
- b Discuss the training of Self-organizing kohonen feature map [10]
- 3 a Describe Fuzzy Reasoning in detail. [10]
- b Write a note on Gaussian Machine [10]
- 4 a Discuss Fuzzy Inference System (FIS) and compare Mamdani and Sugeno FIS. [10]
- b Describe the training algorithm for ART1. [10]
- 5 a Draw and explain ANFIS Architecture. [10]
- b Discuss Training and Testing algorithm for Heteroassociative Memory Network [10]
- 6 a Explain different operations on Fuzzy relation with example. [10]
- b Explain the algorithm for Mexican Hat Net [10]
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(3 hrs.)

Maximum Marks = 80

- NB:**
- 1. Question No. 1 is compulsory and solve any THREE questions from remaining questions**
 - 2. Assume suitable data if necessary**
 - 3. Draw clean and neat diagrams**

- Q1.**
- Explain Hyperledger sawtooth. [05 Marks]
 - Explain uses and limitations of python in blockchain. [05 Marks]
 - Describe the features in Ethereum that are not available in Bitcoin. Also discuss what is Whisper and Swarm. [05 Marks]
 - What are the best practices for blockchain dApp Testing [05 Marks]
- Q2**
- Describe each Component of Ethereum. [10 Marks]
 - With a neat diagram explain the components of the dApp architecture. [10 Marks]
- Q 3.**
- Explain built in and user defined functions in solidity with example. [10 Marks]
 - Explain Chaincodes For Developers and Operators In Blockchain [10 Marks]
- Q 4.**
- With a neat diagram explain Transaction Flow in Hyperledger Fabric [10 Marks]
 - What is Decentralized Autonomous Organization? Discuss its benefits and limitations. [10 Marks]
- Q 5.**
- Explain ERC20 token standard with its functions. Compare how ERC721 tokens are different than ERC20 tokens. [10 Marks]
 - Explain contract inheritance and modifiers in solidity with example. [10 Marks]
- Q .6.**
- Explain use of blockchain for Supply Chain Management. [10 Marks]
 - Describe IPFS with reference to file storage in Blockchain. [10 Marks]

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1. Attempt **any FOUR** **[20]**
 - a. Discuss CIA Triad in Information Security.
 - b. Explain concept of High Availability.
 - c. Illustrate various XSS attacks
 - d. Explain Information Security issues in Cloud computing
 - e. Explain various threats to Access Control.
 2.
 - a. Describe Risk assessment techniques outlined in ISO31010 framework. **[10]**
 - b. Define Intrusion Detection System. Explain in detail IDS techniques. **[10]**
 3.
 - a. Explain Availability, Mean Time Between Failure (MTBF), Mean Time to Repair (MTTR), and Calculate the Availability for a product has MTBF of 200hrs and MTTR of 10 hrs. **[10]**
 - b. Explain in detail COBIT Framework. **[10]**
 4.
 - a. Describe various Disaster Recovery Techniques. **[10]**
 - b. Explain any two different Access Control Models from the following. **[10]**
 - a. Discretionary,
 - b. Mandatory,
 - c. Role based
 - d. Rule-based.
 5.
 - a. Compare the quantitative and qualitative risk assessment approaches. **[10]**
 - b. Explain various types of Audits in Windows Environment. **[10]**
 6.
 - a. What are the key characteristics of OCTAVE approach? **[10]**
 - b. What are the objectives of IT ACT? Explain in detail IT ACT 2000 and IT ACT 2008. **[10]**
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- Q1. ATTEMPT ANY FOUR. [20]**
- a. Design AND gate using Perceptron.
 - b. Suppose we have N input-output pairs. Our goal is to find the parameters that predict the output y from the input x according to some function $y = x^w$. Calculate the sum-of squared error function E between predictions y and inputs x. The parameter w can be determined iteratively using gradient descent. For the calculated error function E, derive the gradient descent update rule $w \leftarrow w - \alpha \frac{dE}{dw}$.
 - c. Explain dropout. How does it solve the problem of overfitting?
 - d. Explain denoising auto encoder model.
 - e. Describe sequence learning problem.
- Q2. a. Explain Gated Recurrent Unit in detail. [10]**
- b. What is an activation function? Describe any four activation functions. [10]**
- Q3. a. Explain CNN architecture in detail. Suppose, we have input volume of $32 \times 32 \times 3$ for a layer in CNN and there are ten 5×5 filters with stride 1 and pad 2; calculate the number of parameters in this layer of CNN. [10]**
- b. Explain early stopping, batch normalization, and data augmentation. [10]**
- Q4 a. Explain RNN architecture in detail. [10]**
- b. Explain the working of Generative Adversarial Network. [10]**
- Q5 a. Explain Stochastic Gradient Descent and momentum based gradient descent optimization techniques. [10]**
- b. Explain LSTM architecture. [10]**
- Q6 a. Describe LeNET architecture. [10]**
- b. Explain vanishing and exploding gradient in RNNs. [10]**
