

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.

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|---------|--|----|
| Q.1 (a) | Compare traditional data and big data. | 05 |
| (b) | What are the advantages and limitations of Hadoop | 05 |
| (c) | Differentiate between SQL vs NoSQL | 05 |
| (d) | List and explain Distance measures for Big Data | 05 |
| Q.2 (a) | Draw Hadoop Ecosystem and briefly explain its components | 10 |
| (b) | Write the functions of the components and execution steps in Map Reduce | 10 |
| Q.3 (a) | Explain Selection and Projection algebraic operation using MapReduce. | 10 |
| (b) | Explain Key-value store and Document Store NoSQL architectural pattern with example. | 10 |
| Q.4 (a) | Draw a neat sketch, explain the architecture of the data-stream management system | 10 |
| (b) | Explain DGIM algorithm for counting ones in a stream with example | 10 |
| Q.5 (a) | Explain Page rank using Map reduce, also explain spider traps and dead ends | 10 |
| (b) | Explain Movie recommendation using Content -based filtering. | 10 |
| Q.6 | Write short notes on any two (any 2) | 20 |
| (a) | Bloom Filter with analysis | |
| (b) | Cure Algorithm | |
| (c) | Clustering of Social-Network Graphs. | |
| (d) | Four ways that NoSQL systems handle big data problems. | |

(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. Figure to the right indicates full marks.

Q1. Attempt the following (any 4):

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|--|---|
| a. What is distributed ledger? Explain its need in blockchain. | 5 |
| b. What is Bitcoin Script? Explain pay to public key hash(P2PKH) with suitable example | 5 |
| c. Differentiate between ERC20 and ERC721 | 5 |
| d. Write a program in solidity to check given number is prime or not | 5 |
| e. Explain types of blockchain . | 5 |

Q2. Attempt the following:

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|--|----|
| a. Compare following consensus protocols PoW,PoB,PoS,PoA | 10 |
| b. Explain different types of cryptocurrencies in detail | 10 |

Q3. Attempt the following:

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|---|----|
| a. Describe RAFT consensus protocol. | 10 |
| b. With suitable diagram explain block structure of bitcoin | 10 |

Q4. Attempt the following:

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|---|----|
| a. Explain Hyperledger Fabric in detail | 10 |
| b. What are the challenges faced by Blockchain in the Education sector? | 10 |

Q5. Attempt the following:

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|---|----|
| a. Explain components of Ethereum. | 10 |
| b. What are pros and cons of ICO and IPO? | 10 |

Q6. Write short notes (any two)

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|---|----|
| a. Defi | 10 |
| b. UTXO model in Bitcoin | 10 |
| c. Application of Blockchain in Supply chain management | 10 |

Duration: 3 hours

Max. Marks: 80

N.B.: 1) Question No.1 is compulsory.

2) Attempt any THREE questions out of remaining FIVE questions.

3) Figures to the right indicates full marks.

4) Assume suitable data if necessary.

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|------------|---|-----------|
| Q1 | Attempt any FOUR of the following | 20 |
| a | What are Mobile Vulnerabilities? | |
| b | What are different Security Risks for Organizations? | |
| c | Difference between virus and worm. | |
| d | How cybercrimes differ from most terrestrial crimes? | |
| e | Explain the objectives of IT Act 2000. | |
| Q.2 | | |
| a | What is WIPO? List treaties prepared by WIPO. | 10 |
| b | Explain about the impact of Cybercrimes in Social Engineering. | 10 |
| Q.3 | | |
| a | Explain steps for SQL Injection attack. How to prevent SQL Injection attacks? | 10 |
| b | Explain E-contracts and its different types. | 10 |
| Q.4 | | |
| a | What is Cybercrime? Who are Cybercriminals? Explain | 10 |
| b | What is e-commerce? Discuss types of e-commerce. | 10 |
| Q.5 | | |
| a | What are basic security precautions to be taken to safeguard Laptops and Wireless devices? Explain. | 10 |
| b | What are illegal activities observed in Cyber Cafe? What are safety and security measures while using the computer in Cyber Cafe? | 10 |
| Q.6 | Write short notes on any FOUR | 20 |
| a | Digital evidence | |
| b | HIPAA | |
| c | Buffer overflow attack | |
| d | Planning of cyberattacks by criminal. | |
| e | Vishing attack | |
| f | Trojan horse and backdoor | |

Duration: 3hrs

Marks:80

- (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 basic architecture of feedforward neural network.
 - b) Explain regularization in neural network.
 - c) Explain types of neural network.
 - d) Explain the concept of overfitting and under fitting in neural network.
 - e) Explain basic working of CNN.
- 2 a) Explain the gradient descent algorithm used in neural network. Also discuss types of gradient descent in detail. [10]
 - b) Explain the working of auto encoders. Also discuss type of auto encoders in detail. [10]
- 3 a) Draw and explain any two modern deep learning architectures. [10]
 - b) Differentiate between the LSTM and GRU network. [10]
- 4 a) Explain the working of RNN with the help of suitable diagram. [10]
 - b) Explain how Recurrent Neural Networks (RNNs) are suited for sequential data. Compare the standard RNN architecture with Long Short-Term Memory (LSTM) networks in terms of their ability to handle long-term dependencies. Provide a real-world application where using an LSTM would be significantly more beneficial than a simple RNN and justify your reasoning. [10]
- 5 a) Discuss the role of a loss function in training a neural network. Compare Mean Squared Error (MSE) and Cross-Entropy Loss in terms of their usage, characteristics, and impact on model performance. In which scenarios would using Cross-Entropy Loss be more appropriate than MSE? Justify your answer with a suitable example. [10]
 - b) Explain architecture of GAN in detail. Also comment on applications of GAN. [10]
- 6 a) What is the significance of Activation Functions in Neural Networks, explain different types Activation functions used in NN. [10]
 - b) Explain the learning process in a neural network. How does a neural network update its weights during training? Describe the role of forward propagation, loss calculation, backpropagation, and optimization in this learning process. [10]

Time: 3 hours

Total Marks: 80

- N.B. 1. Question No. 1 is compulsory
2. Attempt any **three** questions from remaining five questions
3. Assume suitable data if **necessary** and justify the assumptions
4. Figures to the **right** indicate full marks

- Q1 **Answer the Following.** 20
- A Define Affixes. Explain types of Affixes 05
- B Compare Information Retrieval and Information extraction in detail 05
- C Discuss reference resolution problem in detail. 05
- D Explain types of word classes in English natural language processing 05
- Q2 A Discuss Hobbs algorithm for Pronoun Resolution. 10
- B Illustrate inflectional and derivational morphology with an example 10
- Q3 A Explain Porter Stemmer algorithm in detail. 10
- B What is Word Sense Disambiguation? Explain Dictionary based Approach for Word Sense Disambiguation. 10
- Q4 A Explain hidden Markov model for POS based tagging. 10
- B Explain preprocessing steps of NLP with example in detail 10
- Q5 A b) Consider the following corpus: 10
- `<s> I am Sam </s>`
`<s> I like college </s>`
`<s> Do Sam like college </s>`
`<s> Sam I am </s>`
`<s> Do I like Sam </s>`
`<s> Do I like college </s>`
`<s> I do like Sam </s>`
- List all possible bigrams. Compute conditional probabilities and predict the next word for the word i) like ii) Sam
- B Explain Machine Translation system in detail. 10
- Q6 A Discuss various challenges and applications of NLP in detail. 10
- B Write a short note on: 10
- i) Perplexity of any language model
- ii) Rule based taggers
