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.

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.	

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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. Figure to the right indicates full marks.

Q1.   Attempt the following (any 4):

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:

a.   Compare following consensus protocols PoW,PoB,PoS,PoA   **10**

b.   Explain different types of cryptocurrencies in detail   **10**

Q3.   Attempt the following:

a.   Describe RAFT consensus protocol.   **10**

b.   With suitable diagram explain block structure of bitcoin   **10**

Q4.   Attempt the following:

a.   Explain Hyperledger Fabric in detail   **10**

b.   What are the challenges faced by Blockchain in the Education sector?   **10**

Q5.   Attempt the following:

a.   Explain components of Ethereum.   **10**

b.   What are pros and cons of ICO and IPO?   **10**

Q6.   Write short notes (any two)

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.

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	

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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 [10]
       types of gradient descent in detail.
   b) Explain the working of auto encoders. Also discuss type of auto encoders in [10]
       detail.

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. [10]
       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.

5 a) Discuss the role of a loss function in training a neural network. Compare Mean [10]
       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.
   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 [10]
       different types Activation functions used in NN.
   b) Explain the learning process in a neural network. How does a neural network [10]
       update its weights during training? Describe the role of forward propagation, loss
       calculation, backpropagation, and optimization in this learning process.

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82863

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

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