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	Explain open and closed word classes in English Language. Show how the tags are assigned to the words of following sentence: "He used to provide help to other people"	05
	B	Discuss Information Retrieval vs Information Extraction in detail	05
	C	Define Discourse & Pragmatic analysis.	05
	D	What do you mean by word sense disambiguation (WSD)?	05
Q2	A	What is language model? Write a note on N-gram model. .	10
	B	Explain Porter's Stemming algorithm with example.	10
Q3	A	Explain with suitable example following relationships between word meanings: Homonymy, Polysemy, Synonymy, Antonymy, Hypernomy, Hyponomy, Meronomy.	10
	B	What is Natural language processing (NLP)? Discuss various stages involved in NLP process with suitable example.	10
Q4	A	Discuss reference resolution problem in detail.	10
	B	What do you mean by ambiguity in natural Language? Explain its types and ways to resolve it with suitable example	10
Q5	A	Explain Lesk's algorithm in detail.	10
	B	Discuss the following potential problems in CFG such as 1) Agreement 2) Sub categorization 3) Movement	10
Q6		Write Short Notes.(5 marks each)	20

      a. Text Summarization
      b. Named Entity Resolution
      c. Machine Translation
      d. Question Answering System

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Time: 3 Hours   **Total 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)	Explain 5 V's of big data.	05
	(b)	Differentiate between SQL vs NoSQL	05
	(c)	Write the limitations of Hadoop.	05
	(d)	Explain how failures are handled in Map Reduce job	05
Q.2	(a)	Illustrate relational algebra operations with example.	10
	(b)	Explain big data enabling technologies.	10
Q.3	(a)	Explain PCY algorithm and its types with neat labeled diagram	10
	(b)	Compare different types of NoSQL architectural pattern	10
Q.4	(a)	Explain Hadoop Architectural Model with both components in detail	10
	(b)	Write the functions of the components and execution steps in Map Reduce	10
Q.5	(a)	Write issues in data stream queries. Explain the issues in data streaming	10
	(b)	Explain Page rank using Map reduce, also explain spider traps and dead ends	10
Q.6	(a)	Explain CURE algorithm with its advantages over traditional clustering algorithm	10
	(b)	Explain Movie recommendation using Collaborative -based filtering.	10

(Time: 3 HOURS)   (MAX. MARKS : 80)

Note:
1. **Question No. 1 is compulsory.**
2. **Attempt any three questions out of remaining five questions.**
3. **Assume suitable data wherever necessary.**
4. **Figures to right indicate full marks.**

Q.1		Answer the following (**Any four**)	
	a.	Define Blockchain. Explain the Data structure used in blockchain.	05
	b.	Explain Genesis block in detail.	05
	c.	Write a note on Mining Difficulty.	05
	d.	Explain the key characteristics of private Blockchain	05
	e.	Explain different types of cryptocurrency.	05
	f.	Explain applications of blockchain in supplychain.	05
Q.2	a.	List and explain various types of consensus mechanisms in brief.	10
	b.	Explain various components of ethereum.	10
Q.3	a.	What is the UTXO model? How can the double spending problem be solved in bitcoin Blockchain?	10
	b.	Explain Hyperledger fabric architecture in detail.	10
Q.4	a.	Explain the ERC20, ERC721, ICO and STO in detail.	10
	b.	Explain Corda architecture. Compare it with quorum.	10
Q.5	a.	Illustrate a case study on consortium blockchain. Give its architecture.	10
	b.	Explain merkle tree in detail.	10
Q.6	a.	Explain transaction lifecycle with respect to private blockchain.	10
	b.	Explain different types of wallets in detail.	10

Duration: 3 Hours [Max 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)	Comment on the Representation Power of MLPs.	
	b)	Explain Gradient Descent in Deep Learning.	
	c)	Explain the dropout method and it's advantages.	
	d)	What are Denoising Autoencoders?	
	e)	Explain Pooling operation in CNN.	
2	a)	What are the Three Classes of Deep Learning , explain each?	[10]
	b)	Explain and analyze the architectural of AlexNet Convolution Neural Network.	[10]
3	a)	What are the different types of Gradient Descent methods, explain any three of them.	[10]
	b)	Differentiate between the architecture of LSTM and GRU network.	[10]
4	a)	Explain the key components of an RNN.	[10]
	b)	Consider a CNN layer with the following configuration:	[10]

-The input to the layer has 32 channels and a spatial size of 64x64.
-The convolutional layer has 64 filters (kernels), each of size 3x3, with a stride of 1 and no padding.
-Each filter is applied to every channel of the input.
Calculate the total number of parameters (weights) in this convolutional layer.

5	a)	Comment on the significance of Loss functions and explain different types of Loss functions while training a network.	[10]
	b)	Explain any three types of Autoencoders.	[10]
6	a)	What is the significance of Activation Functions in Neural Networks, explain different types Activation functions used in NN.	[10]
	b)	Explain Generative Adversarial Networks Architecture and its applications.	[10]

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Time: 3 Hours   Total Marks: 80

N.B. (1) Question No.1 is compulsory
        (2) Attempt any three questions out of remaining five questions.

Q .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 6(six) real-world
        applications.   (5)

Q.2   (a) How could advances in genome analysis lead to more personalised medicine? (10)

       (b) What is visualization? Explain different types of visualization techniques, tools

       with Advantages and Disadvantages.   (10)

Q.3   (a) Illustrate Predictive Modelling in Healthcare with few examples (atleast 2)   (10)

       (b) Describe: -   (10)

            1. BAN
            2. Dense/Mesh area network for smart living environment
            3. SENSOR TECHNOLOGY
            4. Image Registration
            5. Feature Extraction

Q.4   (a) What is validation of clinical prediction models?   (10)

       (b) Explain types of Fraud detection in healthcare with the help of example.   (10)

Q.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)

Q.6   (a) Illustrate the process of information extraction from clinical text.   (10)

       (b) Define Biomedical Imaging Modalities with their Applications.   (10)

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

NB:
(1) Question No.1 is Compulsory
(2) Attempt any three questions out of 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 are technical measures of Information Security

    b. Explain concept of Identification, Authentication.

    c. Illustrate various XSS attacks.

    d. Explain benefits of Cloud computing

    e. List down various Malwares and describe anyone.

2. a. Illustrate an Overview of Certifiable Standards in (How, What, When, Who).term. **[10]**
    b. Compare Intrusion Detection System (IDS) and Intrusion Prevention System (IPS). **[10]**

3. a. Explain how availability is calculated including metrics such as Mean Time Between Failure (MTBF) and Mean Time to Repair (MTTR). **[10]**
    b. Describe OCTAVE: Risk Assessment Framework along with its benefits. **[10]**

4. a. Describe various Disaster Recovery Techniques. **[10]**
    b. How are access control methods categorized into administrative, physical, technical and the layering of access control? **[10]**

5. a. Compare the quantitative and qualitative risk assessment approaches. **[10]**
    b. Explain Open Web Application Security Project (OWASP) and identify the common issues in Web Apps. **[10]**

6. a. What are the key characteristics of NIST risk assessment framework? **[10]**
    b. What are the objectives of IT ACT? Explain in detail IT ACT 2000 and IT ACT 2008. **[10]**

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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 remaining FIVE questions.**
3) **Figures to the right indicates full marks.**
4) **Assume suitable data if necessary.**

Q1   20
a   What is Cybercrime? Who are Cybercriminals? Explain.
b   How Cybercrimes differs from most terrestrial crimes?
c   What are different Security Risks for Organizations?
d   Outline the challenges for securing data in business perspective.

Q.2
a   What are illegal activities observed in Cyber Cafe? What are safety and security   10
     measures while using the computer in Cyber Cafe?
b   What is digital evidence? Where one can find it.   10

Q.3
a   Explain different types of Cybercrimes.   10
b   What are basic security precautions to be taken to safeguard Laptops and Wireless   10
     devices? Explain.

Q.4
a   Explain Steps for SQL Injection attack. How to prevent SQL Injection attacks?   10
b   Discuss steps involved in planning of cyberattacks by criminal.   10

Q.5
a   What is vishing attack? How it works? How to protect from vishing attack?   10
b   What is e-commerce? Discuss types of e-commerce.   10

Q.6 Write short notes on any FOUR   20
a   Cyberstalking and harassment
b   HIPAA
c   Buffer overflow attack
d   Botnets
e   DOS attack
f   Mobile/Cell Phone attacks

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