

Time : [3 hrs]

[80 Marks]

- Note :**
- 1. Question 1 is compulsory**
  - 2. Answer any three out of remaining questions**
  - 3. Assume suitable data where required**

- Q1 Solve any 4
- |  |   |
|--|---|
| a) Explain ZigBee in brief.  | 5 |
| b) Explain the Need of lightweight new communications protocols for IoT. | 5 |
| c) Explain data retention strategy.                                      | 5 |
| d) Write a short note on I-IoT   | 5 |
| e) Explain functional blocks of IoT                                      | 5 |
- Q2 a) Elaborate in detail the strategies to organize Data for IoT Analytics. 10  
b) Illustrate the role of Data refineries in preventing data lakes to turn into data swamps 10
- Q3 a) Describe the communication system and protocols involved in long range communication system of IoT 10  
b) With neat diagram, elaborate briefly the simplified 3 layered IoT architecture. 10
- Q4 a) Differentiate and give Hierarchy between Edge, Fog, and Cloud computing 10  
b) Consider Smart Irrigation system. Elaborate its working with block diagram and list down the different types of sensors and actuators required during the deployment scenario. 10
- Q5 a) Elaborate MQTT with its working in details and two advantages over COAP. 10  
b) Illustrate 3 methods for effective Data Visualization 10
- Q6 a) Define sensor, actuators and their role and classifications in brief. 10  
b) Explain the following access technologies with applications area of each 10  
1) IEEE 802.15.4 2) RFID

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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 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]

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**Duration : 3hrs**

**(Max Marks: 80)**

**Please check whether you have got the right question paper.**

- N.B:**
- 1. Question No 1 is Compulsory**
  - 2. Attempt any three questions out of the remaining five.**
  - 3. All question carry equal marks.**
  - 4. Assume suitable data, if required and state it clearly.**

- 1** Attempt any FOUR **(20)**
- A What are the guidelines to select appropriate testing tool?
- B What is the need of Automation testing
- C Differentiate between Verification and Validation
- D What are the different types of bugs depending upon stages of SDLC
- E What are key elements of Test Management?
- 2** A A program reads three numbers, A, B, and C, with in the range (2, 1000) and prints the Largest **(10)**
- B What are the Quality Factors and Criteria outlined by McCall, and how do they contribute to **(10)**  
the overall understanding of software quality?
- 3** A How do unit Testing and Integration testing differ from each other? **(10)**
- B What exactly is Mutation Testing, and could you elaborate on the concept of a primary mutant with one example.
- 4** A Explain Different components of Test plan document **(10)**
- B Explain Test Point Analysis. **(10)**
- 5** A How does Agile testing work, and what are some of the challenges that can arise in the **(10)**  
process?
- B What insights can be gained from exploring Graph Metrics? **(10)**
- 6** A What difficulties do you encounter when testing web-based software? **(10)**
- B What is Alpha testing? What is the entry and exit criteria for Alpha Testing **(10)**

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Time: 3-hour

Max. Marks: 80

N.B

1. Q.1 is compulsory
2. Attempt any three from the remaining five questions.
3. Each Question carries 20 marks.
4. Assume suitable data, if required and state it clearly.

Q 1 Attempt any four (20 marks)

- a. Illustrate different types of keyword-based queries.
- b. Compare boolean model and vector model
- c. Discuss concept of Text search engine
- d. Explain inverted file indexing with suitable examples

Q 2 . Attempt all. (20 marks)

- a. State the different types of queries. Explain the pattern matching query concept with an example.
- b. Explain the taxonomy of Information retrieval model with classification diagram.

Q3 . Attempt all. (20 marks)

- a. What is the significance of **tf** and **idf**? How can you calculate tf and idf in a vector model?
- b. Explain ranking and similarity measures with suitable example.

Q.4. Attempt all. (20 marks)

- a. Describe the process of creating an inverted index. How can this be optimized with the help of block addressing?
- b. Discuss starting points. Explain list of collection and overviews in detail.

Q 5. Attempt all. (20 marks)

- a. What is flat browsing and hypertext browsing? Explain.
- b. Define Multimedia information retrieval. Discuss indexing and searching.

Q 6 . Write short not on : ( 20 marks)

- a. Interface support for the search process
- b. Sequential searching
- c. User relevance feedback
- d. Information Retrieval in digital libraries.

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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. Senor 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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**Duration: 3hrs**

**[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. 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]**

Max. Marks: 80

Duration: 3hr.

**Instructions:**

- (1) Question one is Compulsory.
- (2) Assume suitable data wherever required but justify it.
- (3) Solve any THREE from Question No. 2 to 6.
- (4) Figure to the right indicate full marks.

Question No.		Marks																			
Q.1	(a) From below given probability distribution find $P(\neg \text{Cavity}   \text{Toothache})$ <table border="1" style="margin-left: 20px; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2"></th> <th colspan="2">Toothache</th> <th colspan="2"><math>\neg</math> Toothache</th> </tr> <tr> <th>Catch</th> <th><math>\neg</math> Catch</th> <th>Catch</th> <th><math>\neg</math> Catch</th> </tr> </thead> <tbody> <tr> <th>Cavity</th> <td>0.108</td> <td>0.012</td> <td>0.072</td> <td>0.008</td> </tr> <tr> <th><math>\neg</math> Cavity</th> <td>0.016</td> <td>0.064</td> <td>0.144</td> <td>0.576</td> </tr> </tbody> </table>		Toothache		$\neg$ Toothache		Catch	$\neg$ Catch	Catch	$\neg$ Catch	Cavity	0.108	0.012	0.072	0.008	$\neg$ Cavity	0.016	0.064	0.144	0.576	5
	Toothache		$\neg$ Toothache																		
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Cavity	0.108	0.012	0.072	0.008																	
$\neg$ Cavity	0.016	0.064	0.144	0.576																	
	(b) Define defuzzification and State the necessity of the defuzzification process.	5																			
	(c) Implement AND function using Mc-Culloch-Pitts neuron. (take binary data) ?	5																			
	(d) What is the significance of ROC curves?	5																			
Q.2	(a) State Ensemble methods and describe anyone.	10																			
	(b) Illustrate usage of taxonomies and ontologies for knowledge representation in cognitive system.	10																			
Q.3	(a) Explain the components of CNN architecture.	10																			
	(b) Perform a case study on book recommendation system (data science based)	10																			
Q.4	(a) Describe the Properties of Fuzzy Sets with an example.	10																			
	(b) Illustrate inferencing in Bayesian Belief Network with an example.	10																			
Q.5	(a) List and explain the design principles of Cognitive System.	10																			
	(b) State and elaborate the applications of deep learning.	10																			
Q.6	(a) Calculate Accuracy, Precision, Recall, Sensitivity and Specificity for the following example.	10																			
	<table border="1" style="margin-left: 20px; border-collapse: collapse; text-align: center;"> <thead> <tr> <th style="border: none;">Actual Class \ Predicted Class</th> <th>Buys_ Computer=yes</th> <th>Buys_ Computer =no</th> </tr> </thead> <tbody> <tr> <th>Buys_ Computer =yes</th> <td>6954</td> <td>46</td> </tr> <tr> <th>Buys_ Computer =no</th> <td>412</td> <td>2588</td> </tr> </tbody> </table>	Actual Class \ Predicted Class	Buys_ Computer=yes	Buys_ Computer =no	Buys_ Computer =yes	6954	46	Buys_ Computer =no	412	2588											
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	(b) Write a short note on- Data Science for Multi modal applications.	10																			

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