

[3 Hours]

[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) Define IOT with Conceptual Framework **5**
- b) Compare and contrast RFID with Bluetooth **5**
- c) What are the four big data strategies? **5**
- d) Explain IoT Data Analytics importance **5**
- e) Illustrate the components of IEEE 802.11 architecture. **5**

Q2

- a) Describe IoT World Forum (IoTWF) Standardized Architecture. **10**
- b) Explain the concept of Fog Computing with Diagram. **10**

Q3

- a) Draw and explain Architecture of MQTT with diagram. **10**
- b) Explain the role of NoSQL in IoT Data Analytics Challenges. **10**

Q4

- a) Discuss Various IoT Application Transport Methods. **10**
- b) Design the Forest Fire Detection system using IoT sensors. **10**

Q5

- a) Explain the architecture of LoRaWAN with its major Characteristics. **10**
- b) What is the purpose of using a dashboard for data visualization? **10**

Q6

- a) Explain ecosystem for IoT enabled Smart Home with respect to sensors, actuators, framework, protocols, storage, data analysis, security etc. **10**
- b) Write short note on i) CoAP ii) Internet of Behaviour. **10**

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[Time: 3 Hours]

[ Marks:80]

- N.B:
1. **Q 1 is compulsory.**
  2. **Attempt any three from the remaining five questions.**
  3. **Each Question carries equal marks.**

- Q.1 Answers all 20
- a) Explain logical view of a document with diagram.
  - b) Differentiate between data retrieval and information retrieval.
  - c) How does search engine retrieves the information?
  - d) Describe metasearchers and it merits with example.
- Q.2 Answers all 20
- a) Explain taxonomy of information retrieval model with classification diagram.
  - b) Explain various phases of text preprocessing within a document. Discuss any one application for same.
- Q. 3 Answers all 20
- a) Discuss Huffman Algorithm in detail with suitable example.
  - b) What is the purpose of using keyword based query? Briefly explain any 3 types of keyword based queries.
- Q. 4 Answers all 20
- a) What is human-computer interaction? List and discuss any four design principles of human computer interaction.
  - b) Describe the process of creating inverted index with example. How this process can be optimized using block addressing?
- Q. 5 Answers all 20
- a) What is starting point? Explain list of collections and overviews in detail.
  - b) Discuss sequential searching. Explain any one algorithm used in sequential searching.
- Q.6 Write a note on: (Any two) 20
- a) Interface support for the search process
  - b) Multimedia indexing approach
  - c) Document clustering
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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 Define each software testing terminology:  
 i) Failure, ii) Defect, iii)Error, iv)Testware and v)Test oracle.
- b What is Mutation testing? Differentiate between primary and secondary mutants.
- c What criteria you will consider for selection of test tools for automation Testing.
- d Explain structure of testing Group.
- e Discuss Six Sigma.

2 a Consider a project with the following distribution of data and calculate its defect spoilage.

SDLC Phase	No. of Defects	Defect Age
Requirement Specs.	34	2
HLD	25	3
LLD	17	7
Coding	10	8

**[10]**

b Explain Agile Testing Life Cycle and its challenges. **[10]**

3 a A program reads three numbers A, B and C, within the range [1,100] and prints the minimum number. Design test cases for this program using BVC and Robust testing methods. **[10]**

b What is the need of software measurement? Discuss the various types of software metrics. **[10]**

4 a What is the need of automation testing activities? Differentiate between static and dynamic tools? **[10]**

b Consider following C code. **[10]**

```
main()
{
    int number, index;
    1. printf("Enter a number");
    2. scanf("%d",&number);
    3. index=2;
    4. while(index<=number-1)
```

```
5. {  
6.   if(number%index==0)  
7.   {  
8.     printf("Not a prime number");  
9.     break;  
10.  }  
11.  index++;  
12. }  
13. if(index==number)  
14.  printf("prime number");  
15. } // end main
```

Draw DD graph, Calculate cyclomatic complexity, List out independent paths and design test cases.

- 5 a What are the components of a test plan? Illustrate test plan hierarchy with a neat diagram. [10]  
b Explain McCall's Quality factors and Criteria. [10]
- 6 a Explain a bug life cycle with a neat diagram in detail. List down the states of a bug. [10]  
B Differentiate between Effective Software Testing and Exhaustive Software Testing. [10]

Time: 3 Hours

Max. Marks: 80

INSTRUCTIONS:

- (1) Question 1 is compulsory.
- (2) Attempt any **three** from the remaining questions.
- (3) Draw neat diagrams wherever necessary.

**Q.1**

**5 marks each**

- (a) From above given probability distribution find **P** (Cavity | Toothache)

	Toothache		¬ Toothache	
	Catch	¬ Catch	Catch	¬ Catch
Cavity	0.108	0.012	0.072	0.008
¬ Cavity	0.016	0.064	0.144	0.576

- (b) Explain the Centroid method of Defuzzification with a suitable diagram?
- (c) Describe Deep Learning concept with an example.
- (d) Describe in detail Holdout method and Random subsampling?

**Q.2**

**10 marks each**

- (a) How to improve the classification accuracy of class-Imbalanced data. Explain with suitable examples.
- (b) Define Cognitive Computing. Draw a neat diagram of elements of the cognitive system and explain the elements.

**Q.3**

**10 marks each**

- (a) Explain the components of CNN architecture.
- (b) What is Multi modal application? Explain the Data Science for Multi modal applications.

**Q.4**

**10 marks each**

- (a) Consider two fuzzy sets.

$$\underline{A} = \left\{ \frac{0.2}{1} + \frac{0.3}{2} + \frac{0.4}{3} + \frac{0.5}{4} \right\}$$

$$\underline{B} = \left\{ \frac{0.1}{1} + \frac{0.2}{2} + \frac{0.2}{3} + \frac{0.1}{4} \right\}$$

Find the algebraic sum, algebraic product, bounded sum, and bounded difference of the given fuzzy sets and also describe properties of fuzzy sets.

- (b) Illustrate inferencing in Bayesian Belief Network with an example.

**Q.5**

**10 marks each**

- (a) List steps in building a typical cognitive application. Explain the same for Healthcare application.
- (b) Illustrate the autoencoder with architecture diagram.

**Q.6**

**10 marks each**

- (a) Calculate Accuracy, Precision, Recall, Sensitivity and Specificity for the following example.

Actual Class \ Predicted Class	Cancer=yes	Cancer=no
Cancer=yes	90	210
Cancer=no	140	9560

- (b) Write a short note on- Trends in Data Science.

Duration: 3hrs

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- 1 Attempt any FOUR [20]**
- a Differentiate between cybercrime and cyber fraud.
  - b Explain various threats associated with cloud computing.
  - c Explain methods of password cracking
  - d Explain E-contracts and its different types.
  - e Explain different attack vectors in cyber security
- 2 a Explain the classification of cybercrimes with examples. [10]**  
**b Explain various types of credit card frauds [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 the objectives and features of IT Act 2000 [10]**  
**b What are Botnets? How it is exploit by attacker to cause cyber attack? [10]**
- 6 a Explain SQL injection attack. State different countermeasure to prevent the attack. [10]**  
**b Explain what is Information Security Standard and Explain HIPAA act in detail [10]**

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