

Duration: 3 Hours

[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]
- What is machine learning? State and explain different types of machine learning. Calculate accuracy, precision, recall, and F1 score with the help of the following data: True Positive (TP) = 50, True Negative (TN) = 20, False Positive (FP) = 20, and False Negative (FN) = 10.
  - Differentiate between lasso (L1) and ridge (L2) regularization.
  - What is a Merkle tree? Explain the structure of a Merkle tree.
  - Compare centralized, decentralized and distributed systems.
2. a) Enlist and explain the steps for developing a machine learning application. [10]  
 b) The dataset about stolen cars is given below. Use Naïve Bayes classifier to predict whether a car that is {Red, SUV, and Domestic} is stolen or not. [10]

| Example No. | Color  | Type   | Origin   | Stolen? |
|-------------|--------|--------|----------|---------|
| 1           | Red    | Sports | Domestic | Yes     |
| 2           | Red    | Sports | Domestic | No      |
| 3           | Red    | Sports | Domestic | Yes     |
| 4           | Yellow | Sports | Domestic | No      |
| 5           | Yellow | Sports | Imported | Yes     |
| 6           | Yellow | SUV    | Imported | No      |
| 7           | Yellow | SUV    | Imported | Yes     |
| 8           | Yellow | SUV    | Domestic | No      |
| 9           | Red    | SUV    | Imported | No      |
| 10          | Red    | Sports | Imported | Yes     |

3. a) What is principal component analysis? Elaborate on the steps that are involved [10]  
in performing principal component analysis.  
What is clustering? Explain  $k$ -means clustering algorithm. Using  $k$ -means [10]  
b) clustering, cluster the following data into two clusters and show each step.  
{10, 4, 2, 12, 3, 20, 30, 11, 25, 31}
4. a) What is PoW? How cryptographic hash can act as a good indicator for PoW? [10]  
b) What is the need for the study of game theory? Explain the concept of 'zero- [10]  
sum games' in game theory.
5. a) Define smart contract? How crowdfunding platforms can be managed using [10]  
smart contracts?  
b) Explain various data privacy challenges in blockchain. [10]
6. Write short notes on (any TWO): [20]  
a) AdaBoost  
b) Neural network training issues  
c) Blockchain layers  
d) Blockchain in healthcare

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- N.B.** 1. Question No. 1 compulsory.  
 2. Attempt **any three** out of **remaining five** questions.  
 3. Figures to the right indicate full marks.  
 4. Draw neat diagram wherever necessary.

- Q1** Attempt any **Four** of the following:
- How does IIOT differ from Industry 4.0? **5**
  - Write down the advantages of Virtualization and Containerization in Edge Computing **5**
  - Draw neat Edge computing architecture with its components **5**
  - Enlist differences between Edge computing Vs Cloud computing **5**
  - What is the need of Edge computing in today's world? **5**
- Q2** Attempt the following:
- What are the best practices for implementing a multi-region container orchestration strategy for mission critical applications? **10**
  - Compare and contrast Edge Computing and cloud Computing. Highlight their similarities and differences, and discuss scenarios with suitable examples. **10**
- Q3** Attempt the following:
- Identify three uses for edge computing that stand to gain significantly. Provide a brief overview of one of them. **10**
  - Justify the statement "Fog computing is the future of Industry 4.0". **10**
- Q4** Attempt the following:
- Explain Resource Allocation Methods in edge computing **10**
  - Explain how IOT is used in our daily life **10**
- Q5** Attempt the following:
- How can organizations measure the efficiency and accuracy of edge-based machine learning inference tasks? **10**
  - Explain real-time data synchronization facilitates in detail. **10**
- Q6** Attempt the following:
- Discuss the role of Edge and Fog Computing in the context of the Internet of Things (IoT). How do these paradigms contribute to the efficiency and effectiveness of IoT deployments? **10**
  - Discuss the smart healthcare system use case inline with the application of edge computing. **10**

**3 Hours**

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**Note: (1) Q.No 1 is compulsory**

**(2) Attempt any three out of five remaining questions.**

- Q1. a) Explain different types of cloud attacks and vulnerabilities (05)  
b) Write short note on multi-factor authentication (05)  
c) What is meant by cloud Native security? (05)  
d) Explain Intruder Detection and prevention (05)
- Q2. a) Explain in detail CIA Triad (Confidentiality, integrity, and availability) cloud security concepts (10)  
b) Explain Network level Infrastructure security (10)
- Q3. a) Explain different cloud environment (10)  
b) Explain data obfuscation and its importance. (10)
- Q4. a) Explain Identity and Access Management (IAM), IAM Challenges and IAM standards and protocols (10)  
b) List and explain Threats to Cloud Native Applications (10)
- Q5. a) Explain different mitigation techniques in cloud infrastructure security (10)  
b) Explain data life cycle and Key Privacy Concerns in the Cloud (10)
- Q6. Write short notes (**any two**) (20)  
a) Identity federation in cloud  
b) Implementation of security in Virtual Data centers  
c) Cloud Governance, Risk, and Compliance (GRC).

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(3 Hours)

[Marks: 80]

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

- 2) Answer any three out of remaining questions.
- 3) Assume suitable data if necessary.
- 4) Figures to the right indicate full marks.

Q1. Attempt any FOUR

20

- (a) Explain the goals Software Testing.
- (b) Explain Six Sigma.
- (c) Discuss the features and use of TestDirector Testing Tool.
- (d) Explain Unit validation testing related stubs and driver with example.
- (e) What are the components of a test plan?

Q2. (a) Explain the software testing Methodology with a neat diagram

10

Q2. (b) A program computes  $ab$  where  $a$  lies in the range of  $[1,10]$  and  $b$  within  $[1,100]$ . Design test cases for this program using all boundary value analysis testing methods.

10

Q3. (a) Explain the need for Test Automation with its selection and cost criteria.

10

Q3. (b) Define Static Testing? What are the different types of static testing?

10

Q4. (a) Explain the process of test suite prioritization techniques in detail .

10

Q4. (b) Explain Web-based testing and its Challenges.

10

Q5. (a) Explain McCall's quality factors and Criteria.

10

Q5. (b) Explain Data flow testing in detail and discuss static data flow testing with example.

10

Q6. Write short note on any TWO.

20

- a) Test organization structure
- b) Software Quality Management
- c) Scrum phases

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(03 Hours)

Total Marks (80)

Note:

- 1) Question No 1 is Compulsory.
- 2) Answer any three from the remaining questions.
- 3) Assume suitable data wherever required

- Q1. Solve any four of the following (20)
- a. Discuss the role of Safety impact assessment in safety and security design.
  - b. What are some common IoT attack types that pose significant risks to the security?
  - c. How the PKI architecture can improve the authentication of IoT IAM Infrastructure?
  - d. Explain the password based key derivation to enhance the IoT security.
  - e. Elaborate on the principles and practices associated with a fair implementation policy within the context of PbD.
- Q2. a What are the essential steps for businesses to integrate their IoT systems into networks in a compliant manner? (10)
- b. Illustrate the relationship between threat, vulnerability and risk. (10)
- Q3. a How can OAuth 2.0 be adapted to facilitate secure authorization and access control within IoT environments? (10)
- b. Describe the significance of penetration testing in ensuring the security of entire IoT application. (10)
- Q4. a Discuss the benefits and challenges of symmetric and asymmetric encryption for IoT Security. (10)
- b. What are the key steps involved in performing a Privacy Impact Assessment (PIA) for an IoT deployment? (10)
- Q5. a Discuss the utilization of biometrics and password as credentials for identity and access management of IoT devices. (10)
- b. Explain Asset Integration Architecture (AIA) for the cold chain management. (10)
- Q6. a How does Identity life cycle process manage the creation, maintenance and termination of identities within a IoT system? (10)
- b How are IoT cryptographic controls integrated into communication protocols? (10)

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**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 4 20**
- a Explain about digital evidence.
  - b Explain different password cracking techniques.
  - c What are different Security Risks for Organizations?
  - d What is Cybercrime? Who are Cybercriminal? Explain.
  - e Explain about Credit card frauds in Mobile and Wireless Computing era.
- Q.2**
- a If a hacker creates a website similar to university website to cheat student. Identify attack and explain different types it. How to prevent from such attack. **10**
  - b Discuss steps involved in planning of cyberattacks by criminal. **10**
- Q.3**
- a Explain different types of Cybercrimes and how security will provide? **10**
  - b Explain why do we need cyber laws? Discuss about the challenges to Indian cyber laws **10**
- Q.4**
- a Explain Steps for SQL Injection attack. How to prevent SQL Injection attacks? **10**  
If an attacker creates heavy traffic on the college website so that it becomes **10**
  - b inaccessible to the legitimate user. Which is this attack. Explain in details with it's types.
- Q.5**
- a What are illegal activities observed in Cyber Cafes? What are safety and security measures while using the computer in Cyber Café? **10**
  - b What are basic security precautions to be taken to safeguard Laptops and Wireless devices? Explain? **10**
- Q.6 Write short notes on any FOUR 20**
- a Salami attack
  - b HIPAA
  - c Mobile/Cell Phone attacks
  - d Cyberstalking and harassment
  - e SOX
  - f Buffer overflow attack