(2 ½ Hours) [Total Marks: 75]

N.B. 1) All questions are compulsory.
2) Figures to the right indicate marks.
3) Illustrations, in-depth answers and diagrams will be appreciated.
4) Mixing of sub-questions is not allowed.

Q. 1 Attempt ANY FOUR from the following: (20M)

(a) Write States, Initial States, Actions, Transition Model, Goal Test and Path Cost for 8-Queens problem.

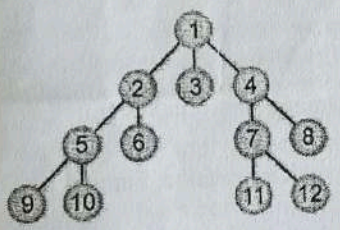
(b) Explain the concept of Depth Limited Search Strategy with suitable example.

(c) Explain Episodic and Sequential properties of the Task environment along with suitable example.

(d) Explain the role of Neuroscience field in the foundation of Artificial Intelligence.

(e) Write short note on Model Based Agents.

(f) Consider the graph given below. Use Breadth First Search Strategy to traverse by considering Node 1 as starting node and Node 10 as goal node.



(d)State the features and purpose of HR policies.

Q. 2 Attempt ANY FOUR from the following: (20M)

(a) What is Feed Forward Neural Network? Write note on Multi-Layer Feed Forward Neural Network.

(b) What is Regularization? Explain Ridge Regression Technique.

(c) How does Polynomia. Regression model non-linear relationships in data? Why is it effective?

(d) Explain the architecture of Fuzzy Logic System.

(e) Write a short note on Gradient Descent.

(f) What is Reasoning in Artificial Intelligence? Explain Inductive Reasoning with suitable example.

Q. 3 Attempt ANY FOUR from the following: (20M)

(a) Explain the concept of Unsupervised Learning.

(b) Write note on Naïve Bayes Model.

(c) Explain the concept of Hidden Markov Model.

(d) Explain the concept of Q-Learning.

(e) Write a short note on Statistical Learning.

(f) Consider the database given below.

Transaction ID	Items
T1	Butter, Curd, Jam
T2	Butter, Curd, Jam, Cake
T3	Curd, Jam, Nuts
T4	Butter, Jam, Cake, Nuts
T5	Cake, Nuts

Calculate:

i) Support (Butter)

ii) Support (Curd, Jam)

iii) Confidence (Butter, Jam)

iv) Confidence (Jam, Nuts)

v) Lift (Curd, Jam)

Q. 4 Attempt ANY FIVE from the following:

(a) Write PEAS for Refinery Controller and Satellite Image Analysis System.

(b) Explain Thinking Rationally approach of AI.

(c) Explain the concept of hyperplane and margin with respect to Support Vector Machine.

(d) What is Universal Quantifier? Give example of it.

(e) Explain the concept of Active Reinforcement Learning.

(f) What is Market Basket Analysis?

****

(2 ½ Hours) [Total Marks: 75]

N.B. 1) All questions are compulsory.
2) Figures to the right indicate marks.
3) Illustrations, in-depth answers and diagrams will be appreciated.
4) Mixing of sub-questions is not allowed.

Q. 1 Attempt ANY FOUR from the following: (20M)

(a) Differentiate between substitution technique and transposition technique in encryption.
(b) Briefly define categories of security mechanism.
(c) State and explain steps involved in RSA Algorithm.
(d) Using a simple columnar transposition cipher, encrypt the given plaintext message. Plaintext: NETWORKSECURITY, Key: LEMON
(e) What are the components of simple symmetric cipher model? Explain with suitable diagram.
(f) Describe the Feistel Structure of encryption & decryption.

Q. 2 Attempt ANY FOUR from the following: (20M)

(a) Define message authentication. What are the requirements of message authentication?
(b) Describe X.509 certificate format with suitable diagram.
(c) What is the purpose of the Secure Hash Algorithm (SHA) in cryptographic applications? Explain how variants of SHA differ from one another?
(d) Explain the two approaches of Digital Signature.
(e) Write a note on Kerberos.
(f) Alice and Bob want to securely communicate using the Diffie-Hellman Key Exchange method. Given the following parameters : Prime number p = 5, Generator g = 3, Alice's private key = 3, Bob's private key = 2
Calculate Alice's public key, Bob's public key. And also compute the shared secret key using the public keys.

Q. 3 Attempt ANY FOUR from the following: (20M)

(a) How does Pretty Good Privacy(PGP) encryption work?
(b) Describe Secure Electronic Transaction(SET).
(c) Write a short note on Secure/Multipurpose Internet Mail Extensions (S/MIME).
(d) Explain IP security architecture.
(e) Define virus. State and explain any four types of viruses.
(f) What is Intrusion Detection System(IDS)? State and explain different types of IDS.

Q. 4 Attempt ANY FIVE from the following: (15M)

(a) Explain any two active attacks with suitable illusration.
(b) State design objectives of HMAC.
(c) What is packet filtering firewall?
(d) How does Electronic Code Book (ECB) encryption mode operate?
(e) Explain three charcteristics of hash function.
(f) Define the role of honeypots.

****

(2 ½ Hours) [Total Marks: 75]

N.B. 1) All questions are compulsory.
2) Figures to the right indicate marks.
3) Illustrations, in-depth answers and diagrams will be appreciated.
4) Mixing of sub-questions is not allowed.

Q. 1 Attempt ANY FOUR from the following: **(20M)**

(a) What is quality assurance? Write down the purpose of the quality assurance.
(b) Explain the concepts of Software Review, Inspection and Walkthrough.
(c) Differentiate Between Verification and Validation.
(d) List and explain goals and objectives of SQA.
(e) Explain the role of testing in each phase of SDLC.
(f) Explain in Details McCall's Quality factor.

Q. 2 Attempt ANY FOUR from the following: **(20M)**

(a) Explain the different testing principles.
(b) Explain testing documentation in detail.
(c) What is White Box testing and its types? Explain branch coverage testing.
(d) Difference between Regression and smoke testing
(e) Explain metric lifecycle.
(f) What is Black Box testing and its types? Explain Boundary Value Analysis and Equivalence Partitioning

Q. 3 Attempt ANY FOUR from the following: **(20M)**

(a) Explain the steps of the defect management process.
(b) Explain how statistical techniques are used in Software Quality Assurance.
(c) What are the key principles of ISO 9000, and how do they contribute to software quality?
(d) How can Run Charts be used during a software release cycle to ensure software quality?
(e) Discuss the role of software reliability metrics, such as Mean Time Between Failures (MTBF) and Failure Rate.
(f) Compare and contrast Formal Technical Reviews with informal reviews.

Q. 4 Attempt ANY FIVE from the following: **(15M)**

(a) State the objective of testing.
(b) What are the different types of experienced based testing?
(c) What is the format of the defect report?
(d) Discuss about Quality Process Control.
(e) Write a short note on testing strategy.
(f) Describe a scenario where a Scatter Diagram was useful in improving software performance.

****

T.Y. CS Sem V 2024-25

(2 ½ Hours) [Total Marks: 75]

N.B. 1) All questions are compulsory.
2) Figures to the right indicate marks.
3) Illustrations, in-depth answers and diagrams will be appreciated.
4) Mixing of sub-questions is not allowed.

Q. 1 Attempt ANY FOUR from the following: (20M)

(a) Explain role of maintaining Professional Conduct in cyber crime investigation?
(b) Explain testing procedures for private sector High tech investigations as an investigator.
(c) How to setup workstation for digital forensics.
(d) Describe the RAID Acquistions method.
(e) Write a note on Digital Evidence and its storage formats.
(f) Explain how we can acquire Hidden data from an image using steganography?

Q. 2 Attempt ANY FOUR from the following: (20M)

(a) Describe available digital forensics software tools.
(b) What are the steps in preparing for an evidence search
(c) Describe the types of graphics in file formats.
(d) Describe how to secure a computer incident or crime scene.
(e) How does the Windows Registry works?
(f) How to perform live network acquisition using wireshark tool

Q. 3 Attempt ANY FOUR from the following: (20M)

(a) What are the standard procedures for conducting forensic analysis of virtual machines?
(b) Describe standard procedures in network forensics and network-monitoring tools.
(c) What are the guidelines should follow for Writing Reports?
(d) Explain what is the roles of client and server in e-mail?
(e) Explain the use of E-mail server logs?
(f) Explain using FTK how will you perform email forensics on any give email .pst backup files.

Q. 4 Attempt ANY FIVE from the following: (15M)

(a) Define and explain digital forensics.
(b) Write note on "Evidence and its types".
(c) What are the procedures for acquiring data from mobile devices?
(d) Write the list of other forensics tools available for data acquisitions.
(e) Explain what are the methods for validating and testing forensics tools?
(f) Where are the legal challenges faced in conducting cloud forensics?

(2 ½ Hours) [Total Marks: 75]

N.B. 1) All questions are compulsory.
2) Figures to the right indicate marks.
3) Illustrations, in-depth answers and diagrams will be appreciated.
4) Mixing of sub-questions is not allowed.

Q. 1 Attempt ANY FOUR from the following: **(20M)**

(a) Explain in detail Cross Product or Vector product with suitable examples.
(b) Explain the concept of Colour in 3D Modeling and rendering.
(c) State and explain Lambert's cosine law with suitable examples.
(d) How does Dot product help in Light Intensity calculation?
(e) Write a short note on trigonometric interpolation.
(f) Explain 2D reflection and 2D shearing.

Q. 2 Attempt ANY FOUR from the following: **(20M)**

(a) Explain various feature levels in Direct 3D.
(b) Write a note on Corona SDK and Sprite Kit.
(c) Explain multisampling theory.
(d) What is game logic? Describe the necessary components for game logic system.
(e) Describe any five mobile gamming tools.
(f) Write a note on PyGLM.

Q. 3 Attempt ANY FOUR from the following: **(20M)**

(a) What is Canvas Screen Space in Unity, and how does it affect UI
(b) Explain the UI elements in Unity and describe the primitive data types used in Unity.
(c) Explain the concepts of Animation, Scripting, and the process of publishing games and setting up Build Settings in Unity.
(d) Describe UI elements and particle effects in Unity.
(e) Define the terms Assets and Materials in Unity, and explain how physics materials are applied to game objects
(f) What types of looping statements are available in Unity, and how do they work?

Q. 4 Attempt ANY FIVE from the following: **(15M)**

(a) Write a short note on the homogeneous Coordinate system.
(b) Write any three features of 2D Pygame.
(c) What is the purpose of Colliders in Unity?
(d) How does Animation work in Unity, and what role does it play measure its components. Perform addition and subtraction of vector
(e) Write a short note on types of vectors
(f) Given a square with coordinate points A(0, 2), B(2, 2), C(2, 0), D(0,0) Find the reflection of the square with respect to x-axis and y-axis and origin and Obtain the new coordinates of the square.

****

(2 ½ Hours) [Total Marks: 75]

N.B.
1) All questions are compulsory.
2) Figures to the right indicate marks.
3) Illustrations, in-depth answers and diagrams will be appreciated.
4) Mixing of sub-questions is not allowed.

Q. 1 **Attempt ANY FOUR from the following:** (20M)
(a) State and explain any five characteristics of project management.
(b) Describe the process of Stakeholder identification and Analysis.
(c) Explain the components of a Project charter.
(d) Describe the monitoring activity in the various phases of project Management.
(e) State the advantages of preparing Work breakdown Structure.
(f) Explain any three cost estimation techniques.

Q. 2 **Attempt ANY FOUR from the following:** (20M)
(a) What is a Contract and explain its different types?
(b) Explain how risk can be identified in Project Management.
(c) Discuss the significance of Six sigma concept in Project management
(d) Illustrate the importance of relationship building during project management process.
(e) What are the ways to achieve Quality assurance in project management.
(f) Describe how effective communication management contribute to the success of the project.

Q. 3 **Attempt ANY FOUR from the following:** (20M)
(a) Describe any three types of leadership skills.
(b) Explain the term emotional intelligence in the context of project Management.
(c) State and explain the principles of Agile project.
(d) Discuss any three forms of negotiation skills.
(e) Mention the ways in which conflict resolution can be achieved.
(f) Write a short note on professional responsibility and code of conduct.

Q. 4 **Attempt ANY FIVE from the following:** (15M)
(a) Mention the steps to generate project schedule.
(b) Describe the importance of change management in project development.
(c) Mention the advantages of virtual teams in project management.
(d) Name the various tools and software used in the development of project.
(e) Discuss the advantage of technology in project management.
(f) Define the term Procurement planning.

****