

6E7101

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6E7101

B.Tech. VI-Sem. (Main/Back) Examination, April/May - 2026

Artificial Intelligence and Data Science

6AID3-01 Digital Image Processing

CS, IT, AID, CAI, CDS, CCS, CIT, CSD, CSR

Time : 3 Hours

Maximum Marks : 70

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions out of seven questions from Part B and Three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205).

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory.

(10×2=20)

1. Explain image formation in the eye.
2. Explain about image acquisition using a circular sensor strip.
3. What are the advantages of filtering in frequency domain?
4. What is Pseudo-colouring?
5. What is meant by image restoration?
6. How to estimate the degradation function by experimentation?
7. Define redundancy. Write the various types of redundancy techniques.
8. What is image compression? Why it is needed?
9. What is meant by image segmentation?
10. Explain how a point can be detected in an image?

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions.

(5×4=20)

1. Explain the basic concepts of sampling and quantization in the generation of digital image.
2. Write the difference between wavelet transform and Fourier transform.
3. Determine the convolution and correlation between the following images:

$$f(x,y) = \begin{bmatrix} 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \end{bmatrix} \text{ and } g(x,y) = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$$

4. Explain in detail about the HSI and CMYK color spaces.
5. What are the different types of mean filters used for noise reduction? Explain.
6. With an example, explain about Huffman coding.
7. Explain the basics of intensity thresholding in image segmentation.

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any Three questions.

(3×10=30)

1. Enlist various fundamental steps in Digital Image Processing with neat block diagram and explain them in detail.
2. Discuss how the various filter masks are generated to sharpen images in spatial filters.
3. Discuss the minimum mean square error filtering which includes both the degradation function and statistical characteristics of noise into the restoration process.
4. What are the different types of image compression? Discuss the different image compression standards?
5. What is meant by edge linking? Why Edge Linking is Necessary? Explain edge linking using local and global processing.

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	6E7102	
	B.Tech. VI-Sem. (Main/Back) Examination, April/May - 2026	
	Artificial Intelligence and Data Science 6AID4-02 Machine Learning CS, IT, AID, CAI, CDS, CCS, CIT, CSD, CSR	

Time : 3 Hours

Maximum Marks : 70

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions out of seven questions from Part B and Three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205).

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory.

(10×2=20)

1. Explain the role of labeled data in supervised learning.
2. How does K-Means assign a data point to a cluster?
3. Give one application of Apriori algorithm.
4. Compare wrapper and embedded methods
5. Mention one application of Singular Value Decomposition (SVD).
6. Why is margin maximization important in Support Vector Machine (SVM)?
7. Give an example of MDP in real life.
8. Why is Q-Learning considered model-free?
9. Explain the activation function in perceptron.
10. What is a neural network?

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions.

(5×4=20)

1. Illustrate how Random Forest can be used for classification with a suitable example.
2. Compare FP-Growth with Apriori in terms of efficiency and memory usage.
3. Apply cross-validation techniques for selecting the best model.
4. Analyze the advantages and challenges of model-based Reinforcement Learning.
5. Describe the backpropagation algorithm used in training neural networks.
6. Explain the concept of Gaussian Mixture Models and probability distributions.
7. Explain the Bellman equation in the context of reinforcement learning.

$$V(s) = \max_a \left[R(s, a) + \gamma \sum_{s'} P(s' | s, a) V(s') \right]$$

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any Three questions.

(3×10=30)

1. Explain the working principles of Naïve Bayes, Decision Tree, and K-Nearest Neighbour (KNN) algorithms with suitable diagrams.
2. Analyze differences in cluster formation, scalability, and interpretability.
3. Explain the concept of Singular Value Decomposition and its matrix factorization process.
 $A = U \Sigma V^T$
4. Compare convergence speed and computational complexity of policy iteration vs value iteration.
5. Design an intelligent recommendation system combining content-based filtering with ANN.

6E7103

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6E7103**B.Tech. VI-Sem. (Main/Back) Examination, April/May - 2026****Artificial Intelligence and Data Science****6AID4-03 Information Security Systems****CS, IT, AID, CAI, CIT, CCS, CDS, CSR****Time : 3 Hours****Maximum Marks : 70****Instructions to Candidates:**

Attempt all Ten questions from Part A, Five questions out of Seven questions from Part B and Three questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205).

PART - A**(Answer should be given upto 25 words only)****All questions are Compulsory.****(10×2=20)**

1. Define the terms -Cryptography and Steganography.
2. Define the terms - Cryptanalysis and Brute-force attack.
3. Define the term - Relative Prime (Co-Prime) Numbers. State the properties of Relative Prime Numbers using Mathematical Expression.
4. Differentiate between - Symmetric cipher and Asymmetric Cipher with suitable examples of each.
5. Define - Euler's Totient Function $\phi(n)$, where 'n' is a Positive integer. Evaluate - $\phi(400)$.
6. What is Triple DES algorithm? Explain in brief?
7. What is Cryptographic Hash Function? Write down its properties?
8. What is Transposition Cipher? Explain it with the help of suitable example.
9. What is SSH? Explain in brief.
10. Define the term -Primitive Root of a Prime 'p'. List all the Primitive Roots of Prime '5' over Z_5 . Show your calculations.

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions.

(5×4=20)

1. Define the term - Security Attacks. What are the different categories of Passive and Active Attacks? Explain each of them with suitable schematic diagram.
2. Define the terms - Monoalphabetic Cipher and Polyalphabetic Cipher with suitable examples of each. Decrypt the following Ciphertext (CT) into Plaintext (PT) using Vigenere Cipher - Ciphertext (CT) - MHVHSFFIUEBCQRJW Key (K) - UNIVERSE
3. Using the Extended Euclidean Algorithm, find the Multiplicative Inverse of '7 mod 187'.
4. Perform, Encryption and Decryption using RSA Algorithm for the given data - $p = 5$; $q = 13$; $e = 11$ and Plain Text $M = 10$.
5. List all the Block Cipher Modes of Operation and explain any One of them in detail with suitable diagram.
6. Explain Message Authentication Codes (MACs) based on Hash Functions (HMAC).
7. Explain the Distribution of Public Keys using Public-key Certificates scheme.

PART - C

(Descriptive/Analytical/Problem Solving/Design question)

Attempt any Three questions.

(3×10=30)

1. a) Construct a Playfair Cipher Matrix using the Key (K) - "remember" and Encrypt the Plaintext (PT) - "universe". Show the calculations/ process for Encryption of the Plaintext (PT) to the Ciphertext (CT). (4)
b) Using the Hill Cipher with the Key $(K) = \begin{pmatrix} 9 & 4 \\ 5 & 7 \end{pmatrix}$ do the following -
 - i) Encrypt the message - "mars".
 - ii) Also show the calculations/ process for the corresponding Decryption of the Ciphertext (CT) to recover the original Plaintext (PT). (6)
2. What is Advanced Encryption Standard (AES)? Explain the Transformation Stages (Steps) involved in Encryption and Decryption process of AES with suitable diagrams.
3. Explain ElGamal Algorithm in detail. Perform, Encryption and Decryption using ElGamal Algorithm for the given data - Prime $q = 19$, and a Primitive Root $\alpha = 13$. If B has a Private Key $X_B = 5$; and A choose a random integer $k = 6$; then what is Cipher Text (C_1, C_2) for Plain Text $M = 17$? If Prime $q = 19$, and Primitive Root $\alpha = 10$; B has a Private key $X_B = 7$; and Cipher Text (C_1, C_2) be the $(11, 13)$ then what is the Plain Text M ?
4. Explain ElGamal Digital Signature Scheme in detail with suitable diagrams. State the main limitation of ElGamal Digital Signature Scheme.
5. Draw the SSL Protocol Stack and explain all the Protocols associated with upper two layers of this Stack in detail with suitable diagrams.

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6E7104**B.Tech. VI-Sem. (Main/Back) Examination, April/May - 2026****Artificial Intelligence and Data Science****6AID4-04 Computer Architecture and Organization****CS, IT, AID, CAI, CDS, CCS, CIT, CSD, CSR****Time : 3 Hours****Maximum Marks : 70****Instructions to Candidates:**

Attempt all Ten questions from Part A, Five questions out of seven questions from Part B and Three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205).

PART - A**(Answer should be given up to 25 words only)****All questions are compulsory****(10×2=20)**

1. What is a cache coherence?
2. What is meant by instruction cycle?
3. What is meant by micro-operation?
4. Why do you need instruction format?
5. What do you understand by RISC?
6. What do you mean by control memory?
7. What is meant by pipelining?
8. What is auxiliary memory?
9. Define vector processing.
10. What do you mean by DMA?

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions.

(5×4=20)

1. State the differences MAR and MBR.
2. Design a 4×4 ROM.
3. Design a 4×3 RAM.
4. Explain Memory transfer?
5. Is there any difference among PROM, EPROM and PLA? Explain.
6. Show propagation of multiple data processing in a pipeline.
7. Design a bus system for 4 registers.

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any Three questions.

(3×10=30)

1. What are the arithmetic operations and how it can be implemented? Explain with diagram.
2. Design a stage of Arithmetic Unit and Logic Unit.
3. Show the steps of multiplication algorithm for 22×19 .
4. Is there any difference associative and set associative mapping related to cache memory.
5. Apply booth's algorithm for 10100×01101 .

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6E7105**B.Tech. VI-Sem. (Main/Back) Examination, April/May - 2026****Artificial Intelligence and Data Science****6AID4-05 Principles of Artificial Intelligence****CS, IT, AID, CAI, CCS, CIT, CSD, CSR****Time : 3 Hours****Maximum Marks : 70****Instructions to Candidates:**

Attempt all Ten questions from Part A, Five questions out of seven questions from Part B and Three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205).

PART - A**(Answer should be given up to 25 words only)****All questions are compulsory****(10×2=20)**

1. What do you understand by Artificial Intelligence?
2. What is an Intelligent Agent? Name any two.
3. What do you mean by Searching?
4. What is Constraint Satisfaction Problem?
5. Define and write a heuristic function?
6. What is Partial Order Planning?
7. What is Propositional Logic?
8. What do you mean by Situation Calculus?
9. What are different forms of Learning?
10. What is Natural Language Processing (NLP)?

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions.

(5×4=20)

1. What do you understand by AI Intelligent Agents? Explain Rule of AI agents with Example.
2. Explain the Hill Climbing algorithm. Discuss its different variants and limitations.
3. Enumerate classical "Water Jug Problem". Describe the state space for this problem solve this problem by giving its operation sequence.
4. Explain Building a Knowledge Base using Propositional Logic and write the following sentence propositional logic.
 - "If the thief runs, the dog barks, else not"
 - Today is Sunday and nice weather, we go for walk
 - Ram eats orange Biscuits
 - If Raihan buys mobile then colour is pink
5. Explain the role of Probability Theory in handling uncertainty in Artificial Intelligence.
6. What is a Decision Tree? Explain the working of a Decision Tree.
7. Explain different Phases of Natural Language Processing with suitable examples.

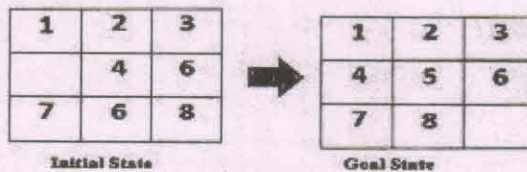
PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any Three questions.

(3×10=30)

1. Describe Uninformed Search techniques. Explain Breadth First Search (BFS) and Depth First Search (DFS) algorithms with examples. Compare BFS and DFS.
2. What do you mean by "Tile Problem"? Solve the given below - tile problem (8-puzzle problem).



3. What is Theorem Proving in First Order Logic? Explain resolution, unification proofs with a suitable example.
4. What is SVM? Explain its advantages. Describe the concept of SVM with diagram and real-life applications.
5. What do you understand by Robotics? Explain different Components of Expert System with example.

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6E7106**B.Tech. VI-Sem. (Main/Back) Examination, April/May - 2026****Artificial Intelligence and Data Science****6AID4-06 Cloud Computing****CS, IT, AID, CAI, CCS, CIT, CSD, CSR****Time : 3 Hours****Maximum Marks : 70****Instructions to Candidates:**

Attempt all Ten questions from Part A, Five questions out of seven questions from Part B and Three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205).

PART - A**(Answer should be given up to 25 words only)****All questions are compulsory.****(10×2=20)**

1. List any two enabling technologies of cloud computing.
2. What are the key characteristics of cloud computing?
3. Name the different service models in cloud computing.
4. What is MapReduce, and how is it used in cloud computing?
5. What is CPU virtualization?
6. Name any two hypervisors used in virtualization.
7. List any two security challenges in cloud computing.
8. What is a Service Level Agreement (SLA) in cloud computing?
9. What is Microsoft Azure, and what is its role in cloud services?
10. Name any two major cloud platforms used in industry.

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions.

(5×4=20)

1. Explain the key characteristics and components of cloud computing. Discuss the enabling technologies that support cloud computing.
2. Discuss the challenges and risks involved in migrating to cloud computing. What approaches can be adopted to ensure a smooth migration?
3. Explain the service models in cloud computing. Explain the architectural design of compute and storage clouds.
4. Describe different types of virtualization including CPU, memory, and I/O virtualization. Also explain virtual cluster and resource management in data centers.
5. Discuss data security in cloud computing. Explain the roles of business continuity, disaster recovery, risk mitigation, SLA (Service Level Agreement), and trust management.
6. Define virtualization and explain its key benefits. Discuss different implementation levels of virtualization.
7. Discuss Aneka as a cloud application platform. How does it support the integration of private and public clouds?

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any Three questions.

(3×10=30)

1. Discuss the challenges, risks, and approaches for migration to cloud computing. Also explain ethical issues, business impact, and future trends of cloud computing, including the concept of ubiquitous cloud and its relationship with IoT.
2. Explain the Cloud Reference Model in detail. Discuss different layers, types of clouds, and service models. Also describe the design of data centers and interconnection networks along with the architectural design of compute and storage clouds.
3. Explain the virtualization and explain its importance. Discuss different implementation levels, structures, tools, and mechanisms of virtualization. Also explain the working of hypervisors such as VMware, KVM, and Xen.
4. Evaluate the concept of cloud information security fundamentals in detail. Discuss cloud security services, design principles, and policy implementation. Also analyze major cloud computing security challenges and the architecture used to address them.
5. Explain the architecture, design, and key features of major cloud platforms such as Amazon Web Services (AWS). Google App Engine. And Microsoft Azure. Compare their roles in providing scalable cloud solutions.

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6E7136**B.Tech. VI-Sem. (Main/Back) Examination, April/May - 2026****Computer Science and Engineering (Regional Language)****6CSR5-11 Distributed System****CS, IT, CSD, CIT, CSR****Time : 3 Hours****Maximum Marks : 70****Instructions to Candidates:**

Attempt all ten questions from Part A, Five questions out of seven questions from Part B and three questions out of five questions from Part C

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/Calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART - A**(Answer should be given up to 25 words only)****All questions are compulsory.****(10×2=20)**

1. What is distributed system?
2. Define distributed file system.
3. Define Inter-process Communication .
4. What is the difference between shared memory and distributed memory?
5. Differentiate between the RPC and RMI?
6. What is concept of Fault?
7. Define distributed deadlock.
8. Define Distributed Computing Environment (DCE).
9. What is Static Process Scheduling.
10. Explain Distributed Mutual Exclusion .

PART - B

(Analytical / Problem Solving Questions)

Attempt any Five questions.

(5×4=20)

1. Differentiate between centralized and distributed systems with examples.
2. What is a Memory Consistency Models? Explain a particular model.
3. Give the reason for "Access transparency is not maintained by Conventional Remote Process Call (RPC)".
4. Explain the role of Distributed Computing Environment.
5. Describe the language of Mechanisms for Synchronization.
6. Why do you need Dynamic Load Sharing and Balancing? Explain.
7. Briefly explain the issue in Concurrency Control in a distributed system.

PART - C

(Descriptive / Analytical / Problem Solving / Design Questions)

Attempt any Three questions.

(3×10=30)

1. Explain the need of distributed system and also explain its characteristics with example.
2. Explain following problems-
 - a) Explain Byzantine Agreement problem with example.
 - b) Explain CORBA architecture and services.
3. Explain the architectural models of distributed systems with neat diagrams and examples.
4. Explain following strategies used for deadlock handling in distributed system:
 - a) Deadlock prevention.
 - b) Deadlock avoidance.
 - c) Deadlock detection and Recovery.
5. Explain any two -
 - a) General Parallel file System.
 - b) Andrew and Coda file systems.
 - c) Sun network file system.

6E7107

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6E7107**B.Tech. VI - Sem. (Main/Back) Examination, April/May - 2026****Artificial Intelligence and Data Science****6AID5-11 Artificial Neural Network****AID, CAI, CDS****Time : 3 Hours****Maximum Marks : 70****Instructions to Candidates:**

Attempt all Ten questions from Part A. Attempt any Five questions out of Seven questions from Part B and Three questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

*Use of following supporting material is permitted during examination.
(As Mentioned in form No. 205).*

PART - A**(Answer should be given up to 25 words only)****All questions are compulsory.****(10×2=20)**

1. What is Neuron Model? Draw its basic structure.
2. What are the limitations of Back Propagation learning?~
3. Define Boltzmann learning?
4. Explain credit Assignment problem.
5. What is cross validation?
6. What is learning rate? Why is it important?
7. What is Attractor in Neurodynamics?
8. State the perceptron convergence theorem.
9. What is recurrent Neural Network?
10. Explain Gradient Decent.

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions.

(5×4=20)

1. Explain the statistical nature of the learning process.
2. How Multilayer perceptron solves XOR problem? Explain with proper diagram.
3. Explain supervised learning techniques and discuss various supervised learning model.
4. Discuss the techniques for improving Generalization and preventing overfitting.
5. Formulate Backpropagation algorithm and Backward pass.
6. Describe the steps involved in the SOM algorithm.
7. What are Hopfield Models? Discuss the limitations and challenges of it. Also draw the structure of the model.

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any Three questions.

(3×10=30)

1. Explain the structure and working of a biological neuron and compare it with an Artificial Neuron model with diagram.
2. Discuss the adoptive filtering problem and explain how LMS algorithm is used to solve it.
3. Discuss the properties of Feature Map in SDM.
4. Explain learning vector Quantization (LVQ) and its role in pattern classification.
5. Explain the concept of dynamical systems and stability of Equilibrium states in neural networks.

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	B.Tech. VI-Sem. (Main/Back) Examination, April/May - 2026	
	Artificial Intelligence and Data Science 6AID5-12 Natural Language Processing(NLP) AID, CAI	

Time : 3 Hours

Maximum Marks : 70

Instructions to Candidates:

Attempt All Ten questions from Part A, Five questions out of seven questions from Part B and Three questions out of five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205).

PART - A

(Answer should be given up to 25 words only)

All questions are compulsory

(10×2=20)

1. What NLTK stands for?
2. Define Machine learning.
3. Briefly define role of term weighing in text analysis.
4. What is the significance of Argmax in NLP.
5. Give brief description of PCFG.
6. Differentiate between Top-Down and Bottom-up parsing
7. What is role of Parts Of Speech (POS) in NLP?
8. What is syntactic parsing?
9. What do you understand by text classification?
10. What is role of graphical models in sequencing labeling for NLP.

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions.

(5×4=20)

1. What are Keyphrase extraction techniques and why are they important?
2. How does word Net measure semantic similarity?
3. Explain sequence labelling and its applications in NLP.
4. What are key challenges in probabilistic parsing?
5. Describe the importance of text clustering in NLP.
6. What do you understand by syntactic collocations
7. Write Small note on Wiktionary.

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any Three questions.

(3×10=30)

1. Explain different term Weighting techniques and their applications in NLP.
 2. Discuss the different parsing algorithms used in NLP with examples.
 3. Explain distributional semantics and its role in text clustering.
 4. Discuss probabilistic parsing and the challenges involved in PCFG model.
 5. What are measures of word net similarity. Explain in detail their role in semantic relatedness
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6E7138

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[Total No. of Pages : **2**]**6E7138****B.Tech. VI-Sem. (Main/Back) Examination, April/May - 2026****Computer Science and Engineering (Regional Language)****6CSR5-13 Ecommerce and ERP****CS, IT, CSD, CSR****Time : 3 Hours****Maximum Marks : 70****Instructions to Candidates:**

Attempt all Ten questions from Part A, Five questions out of seven questions from Part B and three questions out of five questions from Part C

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/Calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No.205)

PART - A**(Answer should be given up to 25 words only)****All questions are compulsory.****(10×2=20)**

1. Define E-Business Models.
2. What are the Main Activities of Electronic Commerce?
3. List two Benefits of E-Commerce for a customer.
4. What is a Shopping Cart in an online store?
5. Define Internet Protocol (IP).
6. What is the role of an ISP?
7. Define Metadata in the context of a homepage.
8. What is XML?
9. Define E-Marketing.
10. What are Data Marts?

PART - B

(Analytical / Problem-Solving Questions)

Attempt any Five questions.

(5×4=20)

1. Explain the Functions of E-Commerce such as Process and Service Management.
2. Describe the Modes of Operation associated with E-Commerce.
3. What are the Strategic Capabilities of the Internet for a business?
4. Explain the steps to build a basic Homepage.
5. Compare HTML and XML based on their usage.
6. Discuss the Advantages of Online Marketing over traditional methods.
7. Describe the different Networking Categories used on the Internet.

PART - C

(Descriptive / Analytical / Problem-Solving / Design Questions)

Attempt any Three questions.

(3×10=30)

1. Explain the detailed steps required to design and develop an E-Commerce website.
 2. Discuss the role of XML and Data Warehousing in managing business data.
 3. Explain Online Publishing and the various approaches to online advertising.
 4. "The Internet is the backbone of E-Commerce." Justify this statement by explaining its components and services.
 5. Explain the factors and components involved in developing a Business Case for an E-commerce venture.
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6E1551

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[Total No. of Pages : 2]

6E1551**B.Tech. VI-Sem. (Back) Examination, April/May - 2026****Computer Sc. and Engg.****6CS3-01 Digital Image Processing****CS, IT****Time : 2 Hours****Maximum Marks : 80****Min. Passing Marks: 28****Instructions to Candidates:**

Attempt all Five questions from Part A, Four questions out of Six questions from Part B and Two questions out of Three from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination.

(Mentioned in form No. 205).

PART - A

(Answer should be given up to 25 words only)

All questions are Compulsory.

(5×2=10)

1. Write down the main steps involved in the image processing pipeline.
2. What is digital image representation?
3. Describe spatial filtering in image processing.
4. What are noise models in image restoration?
5. Differentiate between lossy and lossless compression techniques?

PART - B

(Analytical / Problem Solving Questions)

Attempt any Four questions.

(4×10=40)

1. Define sampling and quantization in image processing. Discuss the significance of both processes in converting an analog image to a digital format.
2. Explain the process of frequency domain filtering in image processing. What are the differences between low-pass, high-pass, and band-pass filters?

3. What is coding redundancy in image compression? How does the repetition of data in an image contribute to large file sizes, and how do compression algorithms use this redundancy to reduce the file size?
4. Compare point detection, line detection, and edge detection in image segmentation. How do each of these techniques help in identifying different features or structures within an image?
5. What are noise filters in image restoration? Describe some commonly used noise reduction techniques such as mean filtering and median filtering.
6. Describe the process of image acquisition. What are the key steps involved in capturing, digitizing, and storing an image?

PART - C

(Descriptive / Analytical / Problem Solving / Design Questions)

Attempt any Two questions.

(2×15=30)

1. Explain color image representation in digital systems. Discuss the RGB color model and its application in image processing. What are the advantages and limitations of using the RGB model for color image representation?
 2. What is image degradation in the context of image restoration? Explain the various types of image degradation and discuss the process of restoring a degraded image.
 3. Explain the JPEG compression standard. Describe its main steps and how it achieves compression through techniques like Discrete Cosine Transform (DCT), quantization, and entropy coding.
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6E1552	Roll No. _____	Total No. of Pages : 3
	6E1552	
	B.Tech. VI Sem. (Back) Examination, April/May - 2026	
	Computer Sc. & Engg. 6CS4-02 Machine Learning CS, IT	

Time : 3 Hours

Maximum Marks : 120
Min. Passing Marks : 42

Instructions to Candidates:

Attempt all Ten questions from Part A, Five questions out of Seven questions from Part B and Four questions out of Five questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205).

PART - A

(Answer should be given upto 25 words only)

All questions are compulsory.

(10×2=20)

1. Define supervised learning and give an example. (2)
2. Explain the working of the Naive Bayes classifier. (2)
3. What is K-nearest neighbor algorithm and how does it work? (2)
4. Describe the role of a decision tree in supervised learning. (2)
5. How does the Random Forest algorithm work? (2)
6. What is clustering? Differentiate between k-means and Hierarchical clustering. (2)
7. Explain the Apriori algorithm for association rule mining. (2)
8. What is the significance of principal component Analysis? (2)
9. Define reinforcement learning and mention its real life applications. (2)
10. What is the main difference between collaborative filtering and content based filtering in recommendation systems. (2)

PART - B

(Analytical/Problem solving questions)

Attempt any Five questions.

(5×8=40)

1. Derive the cost function for linear regression and explain the gradient descent optimization technique used to minimize it. (8)
2. Given a dataset, apply Naive Bayes classifier and discuss the model's accuracy. Compare with other classifiers. (8)
3. Perform a classification task using k-Nearest Neighbors (KNN) on a given dataset. Explain the algorithm's steps and results. (8)
4. For a given dataset, explain the working of the decision tree algorithm. Implement the decision tree for classification and evaluate its performance. (8)
5. Discuss the working of the support vector machine (SVM) for binary classification. Solve an example using a linear kernel. (8)
6. Implement the Apriori algorithm on a given dataset for association rule mining. Explain the generated frequent item sets. (8)
7. Explain State-Action Reward-State Action (SARSA). Show the steps involved and explain the learning process in reinforcement learning. (8)

PART - C

(Descriptive/Analytical/Problem Solving/Design questions)

Attempt any Four questions.

(4×15=60)

1. Design and implement a Machine Learning model for classifying emails into spam and non spam using Logistic Regression. Discuss the steps involved. (15)
2. Implement a recommendation system using collaborative filtering. Explain the working process and evaluate its performance on a sample dataset. (15)
3. Explain the concepts of Markov Decision processes and Bellman equations. Solve a simple problem using policy Iteration for reinforcement learning. (15)

4. Design and implement a deep learning model using a multi layer perceptron for classifying handwritten digits (MNIST dataset). Discuss the training and back propagation process. (15)
 5. Explain the concept of Gaussian Mixture Model(GMM) for unsupervised learning. Apply GMM on a dataset and analyze the clusters formed. (15)
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6E1553	Roll No. _____	[Total No. of Pages : 2]
	6E1553	
	B.Tech. VI-Sem. (Back) Examination, April/May - 2026 Computer Sc. & Engg. 6CS4-03 Information Security System CS, IT	

Time : 2 Hours

Maximum Marks : 80

Min. Passing Marks: 28

Instructions to Candidates:

Attempt all Five questions from Part A, Four questions out of Six questions from Part B and Two questions out of Three from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination. (Mentioned in form No. 205).

PART - A

(Answer should be given up to 25 words only)

All questions are Compulsory.

(5×2=10)

1. What is the Avalanche effect and why it is important?
2. What is SHA and how it fits within the broader category of cryptographic hash function?
3. Define digital signature.
4. Differentiate between stream and block cipher.
5. Write a short note on SSH.

PART - B

(Analytical / Problem Solving Questions)

Attempt any Four questions.

(4×10=40)

1. Explain SSL architecture and protocol. Discuss its importance and describe how it works in detail. (5+5)
2. Encrypt the message "Math" using the Hill cipher with the key $\begin{bmatrix} 7 & 3 \\ 2 & 5 \end{bmatrix}$ and decrypt the cipher text to original plain text. (10)

3. What is crypt analysis? Explain the substitution and transposition cryptographic technique. (4+3+3)
4. What is AES? Explain the processing of plain text with suitable diagram. (5+5)
5. Explain symmetric key distribution and its process using both symmetric and asymmetric encryption. (10)
6. Describe SHA (Secure Hash Algorithm). Explain the concept of hash functions along with its requirement and security. (10)

PART - C

(Descriptive / Analytical / Problem Solving / Design Questions)

Attempt any Two questions. (2×15)

1. Perform encryption and decryption using Elgamal algorithm for following
 $q = 97, \alpha = 5, X_a = 6, M = 45, K = 4.$ (15)
2. Explain Message Authentication code. Discuss its key requirements and Security aspects and describe MACs based on Hash Functions. (5+5+5)
3. Explain principal of RSA algorithm. Using RSA, perform encryption and decryption for following:
 $P=5, q=7, e=3, M=9.$ (7+8)

6E1555	Roll No. _____	[Total No. of Pages : 2]
	6E1555	
	B.Tech. VI-Sem. (Back) Examination, May/June - 2026 Computer Sc. and Engg. 6CS4-05 Artificial Intelligence CS, IT	

Time : 3 Hours

Maximum Marks : 80

Min. Passing Marks: 28

Instructions to Candidates:

Attempt all Five questions from Part A, Four questions out of Six questions from Part B and Two questions out of Three questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination.

(Mentioned in form No. 205).

PART - A

(Answer should be given up to 25 words only)

All questions are Compulsory.

(5×2=10)

1. Define Artificial Intelligence.
2. What is an intelligent agent?
3. Differentiate between informed and uninformed search.
4. Mention one difference between supervised and unsupervised learning.
5. What is the role of Natural Language Processing (NLP) in AI?

PART - B

(Analytical / Problem Solving Questions)

Attempt any Four questions.

(4×10=40)

1. What is alpha-beta pruning? Explain with a diagram how it reduces the search space compared to minimax.
2. Explain the AO* search algorithm. How does it differ from A* search in terms of efficiency and application?

3. Define the minimax algorithm. Illustrate its working with an example of a two-player game.
4. Describe knowledge representation using first-order logic. Compare it briefly with propositional logic.
5. Compare supervised, unsupervised, and reinforcement learning. Mention their objectives and give one real-world application each.
6. Explain decision trees. Construct a simple tree for a classification problem and discuss one advantage and one limitation.

PART - C

(Descriptive / Analytical / Problem Solving / Design Questions)

Attempt any Two questions.

(2×15=30)

1. Artificial Intelligence systems often rely on search strategies and intelligent agents to solve problems efficiently. Answer the following.
 - a) Compare the different approaches to AI (symbolic, sub-symbolic, hybrid).
 - b) Compare uninformed search techniques DFS, BFS, Iterative Deepening and Bidirectional Search in terms of their efficiency and limitations.
 - c) Explain informed search techniques. Derive the working of A* search with an example, and compare it with greedy search.
2. Artificial Intelligence systems rely heavily on knowledge representation and reasoning to solve complex problems. Answer the following.
 - a) What is planning in AI? Differentiate between classical planning and partial order planning.
 - b) Explain how uncertainty is handled in AI using probabilities.
 - c) Describe Bayesian Networks. Construct a simple Bayesian Network for a medical diagnosis problem (e.g., flu, fever, cough) and explain how inference is performed.
3. Write short notes on the following:
 - a) Hill-Climbing Search
 - b) Constraint Satisfaction Problems (CSP)
 - c) Issues involved in Natural Language Processing

6E1650	Roll No. _____	[Total No. of Pages : 2]
	6E1650	
	B.Tech. VI-Sem. (Back) Examination, April/May - 2026	
	Computer Sc. & Engg. 6CS5-11 Distributed System CS, IT	

Time : 2 Hours

Maximum Marks : 80
Min. Passing Marks: 28

Instructions to Candidates:

Attempt all Five questions from Part A, Four questions out of Six questions from Part B and Two questions out of Three questions from Part C.

Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination.

(Mentioned in form No. 205).

PART - A

(Answer should be given up to 25 words only)

All questions are Compulsory.

(5×2=10)

1. What is Distributed System?
2. What do you mean by RPC and RMI in distributed system?
3. What are the services of distributed systems?
4. What is distributed operating system? How is it different from Network operating system?
5. Define load sharing and balancing.

PART - B

(Analytical / Problem Solving Questions)

Attempt any Four questions.

(4×10=40)

1. Explain the Goals and Services of Distributed system.
2. What is message passing? How it is useful in distributed system?
3. What do you mean by static and dynamic process scheduling? Write down the differences between static and dynamic process scheduling.

4. What do you mean by dead lock detection in distributed system? Discuss any deadlock detection algorithm with example.
5. What are agreement protocols? Explain Atomic commit in distributed database system.
6. Explain CORBA RMI in detail and also write down CORBA-services.

PART - C

(Descriptive / Analytical / Problem Solving / Design Questions)

Attempt any Two questions.

(2×15=30)

1. Explain the various types of operating system associated with the distributed system along with design issues in distributed operating system.
 2.
 - a) What is distributed shared memory? Discuss its implementation in distributed system.
 - b) Discuss in short about Andrew and coda file system
 3. Write short notes on any three.
 - a) Request-Reply communication
 - b) Election process in distributed system
 - c) Byzantine faults
 - d) CORBA-case study in short
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