Roll No. ☐☐☐☐☐☐☐☐☐☐☐☐☐   Total No. of Pages : 01

Total No. of Questions : 08

M.Tech. (CSE) (Sem.–2)
ADVANCE ALGORITHMS
Subject Code : MTCS-201-18
M.Code : 76055
Date of Examination : 21-05-2025

Time : 3 Hrs.   Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :
1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWELVE marks.

1. Differentiate between DFS and BFS with help of example.

2. Define divide and conquer paradigm. Briefly explain inverse of triangular matrix.

3. Explain with the help of example selection sorting and topological sorting.

4. Discuss in detail characterization of maximum matching by augmenting paths.

5. Define Chinese Remainder Theorem. Discuss conversion between base-representation and modulo representation.

6. What is DFT? How it is useful in modulo ring? Explain fast Fourier transform algorithm.

7. Write a short note on Edmond's Blossom algorithm to computer augmenting path.

8. Differentiate between approximation algorithms and randomized algorithms.

M.Tech. (CSE)   (Sem.–2)
COMPUTER VISION
Subject Code : MTCS-208-18
M.Code : 76059
Date of Examination : 28-05-2025

Time : 3 Hrs.   Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :
1.   Attempt any FIVE questions out of EIGHT questions.
2.   Each question carries TWELVE marks.

1.   Describe the components and functioning of computer imaging systems, including the role of lenses in image formation. Calculate the focal length of a lens if an object at 150mm from the lens produces an image at 300mm.

2.   Discuss the process and importance of corner detection in computer vision. Explain the Harris Corner Detector and its application, with an example.

3.   Provide a detailed explanation of segmentation techniques in image analysis. Explain thresholding as a segmentation method with a practical example.

4.   Discuss histogram-based feature extraction and its importance in image analysis. Explain how distance/similarity measures are applied to histogram features in computer vision.

5.   Describe clustering in pattern analysis. Explain the K-Means algorithm with a numerical example.

6.   What are Bayes and KNN classifiers and how are they used in supervised classification? Discuss the strengths and limitations of each classifier in pattern analysis.

7.   Explain Principal Component Analysis (PCA) and Linear Discriminant Analysis (LDA) for dimensionality reduction.

8.   Discuss recent advancements in biometrics and their applications in computer vision. Explain how machine learning enhances biometric systems accuracy and security.

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M.Tech. (CSE) (Sem.–2)

SOFT COMPUTING

Subject Code : MTCS-202-18

M.Code : 76056

Date of Examination : 24-05-2025

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWELVE marks.

1. Define soft computing. Explain the constituents of soft computing and their significance. Discuss how soft computing differs from conventional computing methods.

2. Describe the concept of fuzzy sets and the operations that can be performed on them. Explain the mathematical foundation of fuzzy sets.

3. Define fuzzy expert systems and their components. Discuss how fuzzy decision making is applied in various fields.

4. Discuss the use of neural networks in machine learning. Define adaptive networks and their characteristics. Discuss the architecture and applications of feed forward networks.

5. Explain reinforcement learning and its importance in neural networks. Discuss the role of radial basis function networks.

6. Discuss the implementation and benefits of genetic algorithms in various fields. Provide examples of real world applications of genetic algorithms. Analyze the advantages of using genetic algorithms over other optimization techniques.

7. Describe the neural network toolbox and fuzzy logic toolbox in Matlab. Provide an overview of the functionalities of these toolboxes. Explain how they can be used to implement artificial neural networks and fuzzy logic systems.

8. Discuss the latest developments in soft computing. Provide examples of how these techniques are being implemented in various fields.

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M.Tech. (CSE) (Sem.–2)

SOFT COMPUTING

Subject Code : MTCS-202-18

M.Code : 76056

Date of Examination : 24-05-2025

Time : 3 Hrs.   Max. Marks : 60

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Total No. of Questions : 08

Total No. of Pages : 01

M.Tech. (CSE)   (Sem.–2)
HUMAN AND COMPUTER INTERACTION
Subject Code : MTCS-209-18
M.Code : 76060
Date of Examination : 14-06-2025

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :
1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWELVE marks.

1. Compare and contrast the components of a computer system with those of the human brain. Compare computer memory and processing capabilities with human cognitive processes.

2. Define ergonomics and its role in human-computer interaction. Discuss how ergonomics influences the design of interactive systems.

3. Discuss how human computer interaction principles are integrated into the software development process. Explain the concept of usability engineering and its significance in software design.

4. Explain various methods used to evaluate interactive systems. Discuss the principles of universal design and their application in human computer interaction.

5. Explain the impact of socio-organizational factors on the design and implementation of interactive systems. Discuss the importance of understanding stakeholder requirements in human computer interaction projects.

6. Describe different platforms and application frameworks used in mobile computing. Discuss the various types of mobile applications, including fidgets, applications and games.

7. Discuss the principles of designing web interfaces with examples. Explain the concepts of drag & drop, direct selection, contextual tools, overlays, inlays and virtual pages.

8. Describe the advancements in speech recognition technologies. Discuss the concept and applications of multimodal systems.

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