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Total No. of Pages: 02

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B.Sc.(AIML),Semester-4th

IMAGE PROCESSING

Subject Code: UGCA1974

M.Code:91708

Date of Examination: 02-12-2025

Time: 3 Hrs. **Max. Marks: 60**

INSTRUCTIONS TO CANDIDATES:

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B consists of SIX questions, each carrying TEN marks each and student has to attempt any FOUR questions.**

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	What is computer graphics?	CO1	L1
b.	Explain translation and rotation in 2D graphics.	CO1	L2
c.	Recall the components of an image processing system.	CO2	L1
d.	Classify the process of image sensing and acquisition.	CO2	L2
e.	Show the difference between smoothing and sharpening spatial filters.	CO3	L1
f.	Illustrate the histogram equalization.	CO3	L2
g.	Define the Fourier Transform in image processing.	CO4	L1
h.	Compare Ideal and Gaussian filters.	CO4	L2
i.	List the characteristics of salt-and-pepper noise.	CO5	L1
j.	Interpret the region-based segmentation.	CO6	L2
	SECTION-B		
2.	Identify various color models used in computer graphics, such as RGB, CMYK, HSV, and YIQ. Describe their applications and advantages.	CO1	L3
3.	Apply the elements of visual perception. Describe how human visual system characteristics such as brightness, contrast sensitivity, and color perception influence digital image processing.	CO2	L3
4.	Analyze the various gray-level transformation techniques such as negative transformation, log transformation, power-law transformation, and piecewise-linear transformation. Illustrate each with examples and graphs.	CO3	L4
5.	Classify Butterworth, and Gaussian low-pass filters in detail. Compare their characteristics, effects on images, and practical applications in frequency domain smoothing.	CO4	L4
6.	Evaluate the effectiveness of spatial domain and frequency domain restoration techniques. Discuss scenarios where each technique performs better, supported with examples.	CO5	L5

7.	Explain different boundary detection techniques. Explain chain codes, boundary following, and boundary representation methods with examples.	CO6	L5

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Total No. of Questions: 07

B.Sc. (AIML), Semester-4th

MACHINE LEARNING

Subject Code: UGCA1977

M.Code: 91706

Date of Examination: 26-11-2025

Time: 3 Hrs. Max. Marks: 60

INSTRUCTIONS TO CANDIDATES:

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B consists of SIX questions, each carrying TEN marks each and the student has to attempt any FOUR questions.

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	List any two issues in machine learning.	CO1	L1
b.	What is K-nearest neighbor algorithm?	CO3	L1
c.	Compare hierarchical and partition based clustering.	CO3	L2
d.	What is information gain?	CO2	L1
e.	Explain the concept of overfitting and underfitting.	CO2	L2
f.	Define Linear and Logistic discrimination.	CO5	L1
g.	Illustrate the activation functions commonly used in MLP.	CO5	L2
h.	Explain the goals of Machine Learning.	CO1	L2
i.	What is meant by evolution-based learning?	CO6	L1
j.	Demonstrate search space with a relevant example.	CO4	L2
	SECTION-B		
2.	Simplify how data plays different roles in supervised, unsupervised, and reinforcement learning. Explain with diagrams or simple examples.	CO1	L4
3.	Identify the principles of support vector machines. Model the concepts of hyperplane, margin and maximum margin classifier with a suitable diagram.	CO3	L3
4.	Explain how decision trees are used for classification and regression problems.	CO2	L5
5.	Determine the working of an artificial neural network with a suitable diagram. Explain the roles of input layer, hidden layers and output layer.	CO5	L5
6.	Identify the advantages and limitations of Genetic Algorithms. Construct a comparison showing how GA differs from traditional optimization techniques.	CO6	L3
7.	Discuss the Naive Bayes classifier and its assumptions.	CO4	L4

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B.Sc. (AIML), Semester-4th

DATA SCIENCE

Subject Code: UGCA1978

M.Code: 91707

Date of Examination: 29-11-2025

Time: 3 Hrs.

Max. Marks:60

INSTRUCTIONS TO CANDIDATES:

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B consists of SIX questions, carrying TEN marks each and student have to attempt any FOUR questions.**

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	Define data cleaning in data science.	CO1	L1
b.	Name four stages in data science project.	CO1	L1
c.	List any two types of data storage methods.	CO2	L1
d.	Define under-fitting in data regression model.	CO3	L1
e.	Explain the importance of using multiple data source.	CO2	L2
f.	Classify the type of data visualization.	CO4	L2
g.	What are retinal variables in visualization?	CO4	L1
h.	Illustrate model evaluation in data science.	CO5	L2
i.	Explain Over-fitting in regression model.	CO3	L2
j.	Explain regression model in data science.	CO3	L2
	SECTION-B		
2.	Analyze different visualization technique for data interpretation.	CO4	L4
3.	Explain the different stages of data science project.	CO1	L5
4.	Explain data cleaning technique for heterogeneous and missing data.	CO3	L5
5.	Identify the application of data science across different fields.	CO1	L3
6.	Examine sources of data and technique for managing them effectively.	CO2	L4
7.	Construct model evaluation using residual and distribution plots.	CO5	L3

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B.Sc.(AIML), Semester-4th
ADVANCED PYTHON PROGRAMMING
Subject Code: UGCA1983
M.Code: 91712
Date of Examination: 05-12-2025

Time: 3 Hrs. **Max. Marks: 60**

INSTRUCTIONS TO CANDIDATES:

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B consists of SIX questions, each carrying TEN marks each and student must attempt any FOUR questions.**

Q. No.	Question	Course Outcome	Bloom's Level
	SECTION-A		
1.	Answer briefly:		
a.	Name different types of errors handled during database connection in Python.	CO1	L1
b.	Define MySQL and its role in Python database connectivity.	CO1	L1
c.	Illustrate the use of 'commit()' in executing queries.	CO3	L2
d.	Compare Series and DataFrame in Pandas.	CO4	L2
e.	List any two statistical functions used in Pandas.	CO4	L1
f.	Show how do you create a 2*2 matrix with values 1,2,3 and 4 using NumPy.	CO2	L2
g.	Outline basic introduction to Scipy.	CO2	L2
h.	What is Ndarray and its significance in NumPy?	CO1	L1
i.	Interpret the concept of array slicing with an example.	CO3	L2
j.	List two advantages of Scikit-learn for machine learning tasks.	CO4	L1
	SECTION-B		
2.	Identify error handling in Python-MySQL integration with suitable code snippets.	CO4	L3
3.	Apply the process of establishing a database connection using Python with a code example.	CO3	L3
4.	Simplify merging, joining, and concatenation operations with examples.	CO2	L4
5.	Evaluate various mathematical and statistical functions in NumPy.	CO2	L5
6.	Explain how Scikit-learn is used for implementing machine learning algorithms.	CO4	L5
7.	Distinguish file input/output operations in NumPy with examples.	CO1	L4

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