

00 DEC 2025

Roll No.

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Total No. of Pages : 01

Total No. of Questions : 08

M.Tech. (CSE/ECE/EE/Power System/VLSI Design) (Sem.-1)

RESEARCH METHODOLOGY AND IPR

Subject Code : MTRM-101-18

M.Code : 75161

Date of Examination : 19-01-2026

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 research problem and its sources. Enumerate characteristics of a good research problem.
2. Why is data collection an important aspect of research process? Distinguish the terms analysis and interpretation of datasets.
3. a) Discuss the complete step-by-step process of patenting and development.
b) Explain the different process, procedures and documents associated in trademark and copyright. Draw a rough figure to explain.
4. What is sampling in research process? Explain the various factors that should be considered in decision making of a sampling method.
5. What is the role of plagiarism? How can we deal with it? Discuss the tools of plagiarism.
6. Differentiate between descriptive and experimental research.
7. Explain the benefits of effective technical writing focusing upon major sections to be included in a report or research paper.
8. **Write short notes on the following :**
 - a) Patenting under PCT.
 - b) New Developments in IPR.

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M.Tech. (CSE)(Sem.-1)
MACHINE LEARNING

Subject Code : MTCS-105-18

M.Code : 75155

Date of Examination : 10-01-2026

Time : 3 Hrs.

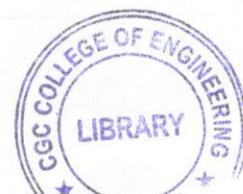
Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

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

1. Write a detailed note on linear regression and SVM.
2. How PCA is different from SVD? How you will decide in which scenario which technique is used?
3. Explain the principle of the gradient descent algorithm with a diagram.
4. Explain how back propagation algorithm works for multilayer feed forward network?
5. Write a note on the IOT applications that use machine learning. Explain with suitable examples.
6. Write a note on Ensemble machine learning. Explain with concrete examples.
7. What is the purpose of k-means algorithm? Write down the basic algorithm for k-means and explain with help of a graphical example.
8. Differentiate between matrix factorization and matrix completion.

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M.Tech.(Computer Science & Engineering) (Sem.-1)

DATA SCIENCE

Subject Code : MTCS-108-18

M.Code : 75158

Date of Examination : 08-01-2026

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. Explain the Data Science Life Cycle process in detail.
2. What is sampling? Explain its various types.
3. Explain SVM with the help of example.
4. What is Data Visualization? What are its types? How it is useful to Data Science?
5. Explain various pre-processing techniques used in exploring and fixing data.
6. How machine learning is used to solve problems in Data Science?
7. Differentiate between t-test and z-test. How and where are they used?
8. Write a note on applications of data science. Explain the concept of central tendencies.

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Total No. of Questions : 08

M.Tech.(CSE)(Sem.-1)
ADVANCED DATA STRUCTURES

Subject Code : MTCS-102-18

M.Code : 75154

Date of Examination : 07-01-2026

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. a) Explain the concept of dictionary ADT. Discuss the implementation of dictionaries.
 b) What are various collision resolution techniques in hashing? Explain them in detail.
2. What is the need for randomizing data structures and algorithms? What are deterministic skip lists? Discuss probabilistic analysis of skip lists.
3. Start with an empty Red-Black tree and insert the following keys in the given order: 40, 50, 70, 30, 42, 15, 20, 25, 27, 26, 60, and 55. Draw figures depicting the tree immediately after each insertion and following the rebalancing.
4. a) Define Dictionary and Dictionary with duplicates. List the operation performed on dictionary.
 b) Explain the KMP algorithm with example and also compute prefix () function for the Pattern 'ababaca'.
5. a) Construct the Huffman code for the following data :

Character	A	B	C	D	-
Probability	0.4	0.1	0.2	0.15	0.15

- b) Encode the text ABACABAD using the code a) above.
- c) Decode the text whose encoding is 10001011100101 with the code of a) above.



6. a) Discuss Knuth-Morris and Pratt string matching algorithm with example.
b) Explain the construction of priority search tree in detail with example.
7. What are the approaches to solve the LCS problem? Also, explain the problem using an illustrative example.
8. Explain the concepts of Double hashing, Re-hashing and Extendible hashing with suitable examples.

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