

GYANMANJARI INNOVATIVE UNIVERSITY
GYANMANJARI INSTITUTE OF TECHNOLOGY
B.Tech.-Mid Semester Examination (MSE)-W2026

Enrollment No.: _____

Subject Code: BETCE15313

Subject Name: Analysis and Design of Algorithms

Time: 10:30 AM to 12:30 AM

Date: 17-09-2026

Semester: 5th

Total Marks: 60

Instructions:

1. Question No. 1 is compulsory.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

Q.1 (a) Define Algorithm. Discuss the properties (characteristics) of an algorithm. [05]

Q.1 (b) What is an algorithm? Why is analysis of an algorithm required? [05]

Q.1 (c) Discuss Insertion Sort with its time complexity. Support your answer with a suitable example. [10]

Q.2 (a) What is the average case time complexity of Bubble Sort? [05]

Q.2 (b) Define graph, complete graph and connected graph. [05]

OR

Q.2 (b) Differentiate between Depth First Search (DFS) and Breadth First Search (BFS). [05]

Q.2 (c) Sort the list: 415, 213, 700, 515, 712, 615 using Merge Sort algorithm and also explain the time complexity of Merge Sort. [10]

OR

Q.2 (c) Write an algorithm/program for Quick Sort method and analyse it with a suitable example. [10]

Q.3 (a) Explain any two sorting methods which are based on the divide and conquer strategy. [05]

Q.3 (b) What is a minimum spanning tree? [05]

Q.3 (c) Define and explain NP-Complete and NP-Hard problems with a suitable example. [10]

OR

Q.3 (a) What is the "Make a Change" problem? [05]

Q.3 (b) What is Huffman code? Explain in brief. [05]

Q.3 (c) Explain finite automata with an example. [10]