



GAUHATI UNIVERSITY
CENTRE FOR DISTANCE AND ONLINE EDUCATION
HOME ASSIGNMENT

Master of Science in Information Technology (M.Sc.-IT)
Semester - II (Session: 2024-25 (January) and 2025-26 (July))

Guidelines for Submission:

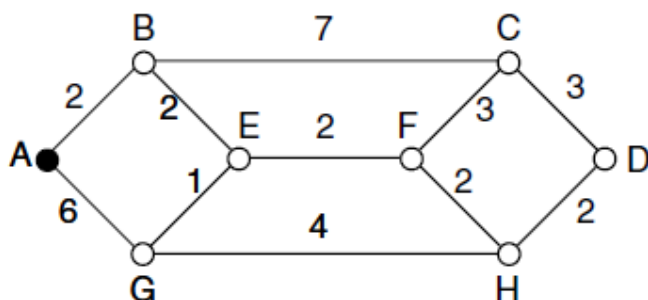
- Learners who have been admitted in the Academic Session (2024-25 (January) and 2025-26 (July)) will write the Home Assignment.
- Learners should write their **Roll Number, GU Registration Number, Subject, Semester, Paper Title, Paper Code** and **Name of the Study Center** clearly on the first page of the answer script in the space provided.
- The formats of the answer scripts are available at and can be downloaded from, the GUCDOE website (www.gucdoe.in).
- There will be 2 (two) compulsory questions in each paper, and each question will have options (Total Marks: 2 questions × 10 marks= 20 marks).
- Typed/Computerized answers will not be accepted.** Learners will write the answers neatly in their own handwriting.
- Learners should not submit any plagiarized answers as such a practice is deemed to be unfair.
- Learners of different Study Centers under GUCDOE will mandatorily submit the answer scripts at their respective Study Centers.
- Learners of GUCDOE center will submit their answer scripts at GUCDOE Office.
- Last Date of Submission : 30th April, 2026.**

PAPER: INF 2016 (DATA COMMUNICATION AND COMPUTER NETWORKS)

Answer the following questions (any two)

2 x 10 = 20

Q. No. 1. Find the shortest path from A to D using Dijkstra’s shortest path algorithm from the following graph 10



Q. No. 2. Explain different types of approaches used in variable size framing. 10

Q. No. 3. Discuss the importance of network topology in designing a computer network. What factors should be considered while choosing a topology? 5 + 5 = 10

Q. No. 4. Explain the concepts of **Virtual Circuit** and **Datagram networks**. Compare both in terms of different parameters. 5 + 5 = 10

PAPER: INF 2026 (ALGORITHM AND COMPLEXITY THEORY)

Answer the following questions **2 x 10 = 20**

Q. No. 1. Analyse the best and worst case time complexity of Quick sort algorithm with appropriate examples. **10**

OR

Explain the Recursion Tree method to solve Recurrences with suitable example. **10**

Q. No. 2. Explain different Genetic algorithm operations with suitable examples. **10**

OR

Explain Topological sorting with a suitable example. Explain how Topological sorting can be performed with a suitable example. **10**

PAPER: INF 2036 (SOFTWARE ENGINEERING)

Answer the following questions: **2 x 10 = 20**

Q. No. 1. Analyze the Spiral model by explaining its unique features compared to other models. Describe how the risk assessment is integrated into this model and provide a real world example of a project type that would benefit from using the Spiral model. **5 + 5 = 10**

OR

Analyze the role of Software Requirement Specification (SRS) in software engineering. Identify the key components of an SRS document and discuss their importance in the development life cycle.

5 + 5 = 10

Q. No. 2. Discuss the importance of Software Project Planning in the software development life cycle (SDLC). Highlight different phases within project planning and their impact on overall project success.

5 + 5 = 10

OR

Given a healthcare management system, develop a Level 0 and Level 1 Data Flow Diagram. Explain how each component of your DFD contributes to the overall and how data moves through the entire system.

6 + 4 = 10

PAPER: INF 2046 (COMPUTER GRAPHICS AND MULTIMEDIA)

Answer any two of the following questions: **2 x 10 = 20**

Q. No. 1. Explain the concept of line clipping and its significance in computer graphics. Discuss the characteristics of the different line clipping algorithms. **10**

Q. No. 2. Describe the process of transforming window coordinates to viewport coordinates in the context of two dimensional viewing in computer graphics. Why this transformation is necessary in graphics rendering? **10**

Q. No. 3 Discuss the role of homogenous coordinates in 3D geometric transformations. How do they simplify the process of composition of transformations and provide an example where their application is critical? **10**

Q. No. 4. Describe and analyse the Bresenham's Line Drawing algorithm. Discuss its efficiency and applicability in modern computer graphics systems, particularly when dealing with high resolution displays. **10**

PAPER: INF 2056 (ADVANCED DATA STRUCTURE)

Answer the following questions:

2 x 10 = 20

Q. No. 1. Write a C++ program to delete the Nth node from a doubly linked list. Explain the program with suitable example. **10**

OR

Explain how queue can be used to implement any ticket reservation system with a suitable example. **10**

Q. No. 2. Explain how a new node can be inserted into a Red-Black tree with a suitable example. **10**

10

OR

Explain how two Binomial heaps can be united with suitable example. **10**

10

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