Date: 27-08-2025

# GAUHATI UNIVERSITY
## CENTRE FOR DISTANCE AND ONLINE EDUCATION
HOME ASSIGNMENT

**Master of Science in Information Technology (M.Sc.-IT)**

**Semester - II (Session: 2024-2025, July)**

***Guidelines for Submission*:**

1. Learners who have been admitted in the Academic Session (2024-25, July) will write the Home Assignment.
2. 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.
3. The formats of the answer scripts are available at and can be downloaded from, the GUCDOE website (www.gucdoe.in).
4. There will be 2 (two) compulsory questions in each paper, and each question will have options (Total Marks: 2 questions × 10 marks= 20 marks).
5. **Typed/Computerized answers will not be accepted**. Learners will write the answers neatly in their own handwriting.
6. Learners should not submit any plagiarized answers as such a practice is deemed to be unfair.
7. Learners of different Study Centers under GUCDOE will mandatorily submit the answer scripts at their respective Study Centers.
8. Learners of GUCDOE center will submit their answer scripts at GUCDOE Office.
9. **Last Date of Submission : 22nd September, 2025.**

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## PAPER: INF 2016 (DATA COMMUNICATION AND COMPUTER NETWORKS)

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

**Q. No. 1.** What is Network topology? How does the choice of topology affect network performance?

**OR**

Why multiplexing is required in networking? How does the choice of multiplexing technique affect the overall networking performance?

**Q. No. 2.** Explain the Dijkstra's Shortest Path Algorithm with a suitable example.

**OR**

Explain the Link State Routing Algorithm with a suitable example.

## PAPER: INF 2026 (ALGORITHM AND COMPLEXITY THEORY)

**Q. No. 1.** Analyse the best and worst case time complexity of Selection sort algorithm. **10**

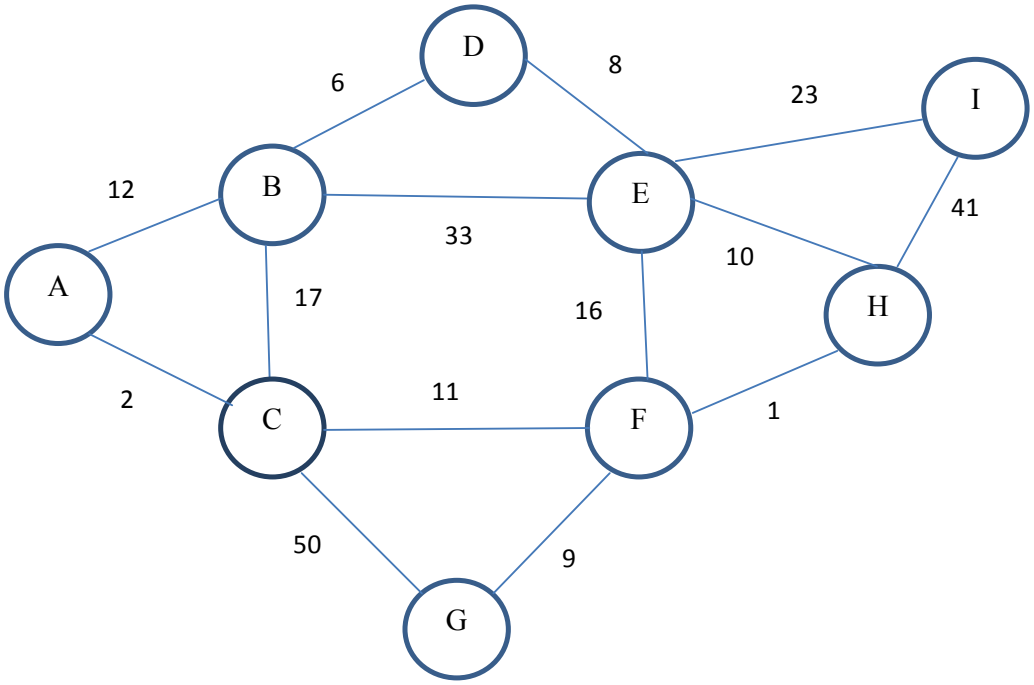
**OR**

Explain Prim's Algorithm to find out minimum spanning tree with a suitable example. **10**

**Q. No. 2.** Explain different approaches of Graph representation in memory with suitable examples. **10**

**OR**

Find out the single source shortest path from the following Graph using Dijkstra's algorithm. **10**




**PAPER: INF 2036 (SPFTWARE ENGINEERING)**

**Q. No. 1.** What type of projects are suitable for the following two software process models and why?

a) Prototyping Model b) Spiral Model **5 + 5 = 10**

**OR**

"Based on the findings of the feasibility study, the organization can plan for the risk analysis and zero in on the business alternatives". Explain why and how it is possible? **5 +5 = 10**

**Q. No. 2.** Suppose that a project was estimated to be 4 million LOC. Calculate effort and time for each of 3 modes of development. **10**

Given,

| Type | a | b | c | d |
|---|---|---|---|---|
| **Organic** | 2.4 | 1.05 | 2.5 | 0.38 |
| **Semi-detached** | 3.0 | 1.12 | 2.5 | 0.35 |
| **Embedded** | 3.6 | 1.20 | 2.5 | 0.32 |

**OR**

Draw the context diagram and level 1 of Data Flow Diagram (DFD) by taking an example of your own. **5+5 =10**

**PAPER: INF 2046 (COMPUTER GRAPHICS AND MULTIMEDIA )**

**Q. No. 1.** Let there be two points (3,4) and (11,9). Draw a line joining these two points using DDA algorithm. **10**

**OR**

Let there be two points (15,12) and (15,20). Draw a line joining these two points using Bresenham's Line Drawing algorithm. **10**

**Q. No. 2.** Explain the Boundary-Fill algorithm with an example **10**

**OR**

Explain about Matrix representation and Homogenous Coordinates **10**

**PAPER: INF 2056 (ADVANCED DATA STRUCTURE)**

**Q. No. 1.** Write a C++ program to implement Priority Queue using circular linked list **10**

**OR**

What is AVL tree? Construct an AVL tree with the following key values.

90 , 16 , 82 , 7 , 121 , 56 , 1 , 63 , 77 , 23 , 212 , 31 , 95 , 92 **10**

**Q. No. 2.** Arrange the following values in ascending order using Heap sort algorithm.

65 , 89 , 4 , 8 , 12 , 64 , 11 , 75 , 89 , 30 , 27, 97 , 5 , 88 , 29 **10**

**OR**

Explain the Insertion operation on B Tree with a suitable example. **10**

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# Gauhati University

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# Centre for Distance and Online Education

## ASNWERSCRIPT FOR HOME ASSIGNMENT

**Roll Number (8 digit):** .....
*(GUCDOE Enrollment No)*

**G.U. Registration No.:** .....

**Programme Name:** .....

**Semester:** .....

**Paper Title:** .....

**Paper Code:** .....

**Name of the Study Centre:**.....

**N.B.: Please note that the Name of the Candidate should not be mentioned anywhere. If found, the asnwer script will not be evaluated.)**