Date: 16-12-2025

GAUHATI UNIVERSITY
CENTRE FOR DISTANCE AND ONLINE EDUCATION

HOME ASSIGNMENT

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

Semester - I (Session: 2025-2026, July-August)

***Guidelines for Submission*:**

1. Learners who have been admitted in the Academic Session (2025-26, July-August) 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 : 20th January, 2026.**

PAPER: INF 1016 (ADVANCED CONCEPTS IN OBJECT ORIENTED PROGRAMMING)

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

Q. No. 1. Explain with appropriate examples why Object-Oriented Programming is better than Procedural Programming. **10**

OR

Explain how the concept of Constructor is important in Object-Oriented Programming with appropriate examples. Discuss different types of constructor in case of C++ programming with examples. **10**

Q. No. 2. Explain different fundamental steps for designing a system using Object-Oriented process with appropriate examples. **10**

OR

Explain different steps of performing Object-Oriented Analysis with appropriate examples . **10**

PAPER: INF 1026 (ADVANCED COMPUTER ORGANIZATION AND ARCHITECTURE)

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

Q. No. 1. Describe the time sequence of operation for adding two N-bit numbers using a serial adder, highlighting what happens during each clock cycle with the help of an example. **10**

OR

What is a serial adder, and how does it fundamentally differ from a parallel adder in terms of hardware? Identify the three primary components required to construct a basic serial binary adder. Explain the role of the Full Adder (FA) and the D Flip-Flop (D-FF) in a serial adder circuit. **10**

Q. No. 2. Define instruction pipelining and explain how it increases the CPU's throughput. Using the classic 5-stage pipeline (IF, ID, EX, MEM, WB) as an example, describe the operation occurring in the first two stages. **10**

OR

Identify and describe the three main types of pipeline hazards (data, control/branch, structural) that can reduce the effectiveness of a pipeline. Briefly explain a common hardware technique used to mitigate one of these hazards. **10**

PAPER: INF 1036 (OPERATING SYSTEM)

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

Q. No. 1. How can you select the best fit process scheduling algorithm in different situations? Give your own opinions. **10**

OR

Explain different distributions of Linux. Which Linux distribution is best for the beginners? Give your opinions. **10**

Q. No. 2. Is it possible to have a deadlock involving only a single process? Explain your answer. What is the optimistic assumption made in the deadlock-detection algorithm? How can this assumption be violated? **5 + 5 = 10**

OR

How is virtual memory related to paging? What are the problems occurs in a system without virtual memory? **5 + 5 = 10**

PAPER: INF 1046 (MATHEMATICAL FOUNDATIONS OF COMPUTER SCIENCE)

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

Q. No. 1. Draw following types of Graphs where number of vertices of each type of graph must be **10**

a) Simple graph,
b) Asymmetric digraph,
c) Simple symmetric weighted digraph,
d) Complete symmetric digraph,
e) Isomorphic graphs

OR

Define Euler Graph. Discuss all the theorems on Euler Graph with appropriate examples. **10**

Q. No. 2. Explain perfect matching with a suitable example. Prove that perfect matching is not possible in a bipartite graph having different number of vertices in the bipartition. **10**

OR

A group consists of 5 girls and 6 boys. In how many ways can a term of 5 members be selected if the team has **2 + 4 + 4 = 10**

(i) no girl ?
(ii) at least one boy and one girl?
(iii) at least 2 girls?

PAPER: INF 1056 (ADVANCED DATABASE MANAGEMENT SYSTEM)

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

Q. No. 1. Explain the advantages and limitations of Relational model with appropriate examples. **10**

OR

Explain E-R Diagram. Draw an appropriate E-R diagram for a Student Management System with the following Entities. **10**

STUDENT, COURSE, DEPARTMENT, FACULTY, RESULT

Q. No. 2. Explain with appropriate examples how an E-R model can be converted into corresponding tables or relations. **10**

OR

What are the problems caused by Data Redundancy? Explain with appropriate exampleshow Normalization can control Data Redundancy in Relational databases. **10**

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