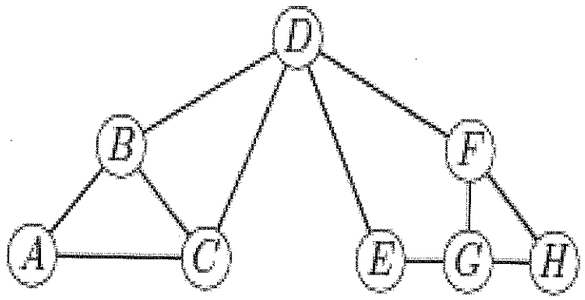
ii. Given the following graph



Suppose that you want to find a path from A to H. Write down the resulting path as a sequence of vertices if you use:

a. Breadth-first search. [4]
b. Depth-first search using recursion [3]
c. Depth-first search using stack-based implementation [3]

Question 5

i. Suppose a certain flight **XXX** is fully booked an hour prior to departure. Because of the possibility of cancellations,
   a. Which data structure would you suggest for the airline to maintain of standby passengers hoping to get a seat? [4]
   b. Explain your choice [8]
   c. Explain how a standby person can be let to board the plane give your answer in a) [8]

END OF EXAMINATION

BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF SCIENCE EDUCATION

DEPARTMENT OF EDUCATIONAL TECHNOLOGY

BACHELOR OF SCIENCE EDUCATION IN COMPUTER SCIENCE

CS213 /EDT213: DATA STRUCTURES AND ALGORITHMS

TIME: 3 HOURS JAN 2025

INSTRUCTIONS

Answer **ALL the questions.** Each question carries **20** marks.
The question paper has **5** questions

Question 1

i. Define the following terms as used in Data structures and algorithm analysis
   a. Data Encapsulation [2]
   b. Data Structure [2]
   c. Big Oh Notation [2]
   d. A storage structure representation in auxiliary memory [2]
ii. Explain how reference counters work in elimination of dangling reference [5]
iii. Explain the dynamic memory allocation and freeing in C++ giving sample code [7]

Question 2

i. Write the algorithm to iinserting a node at the end of the list in a double linked lists [10]
ii. Write an algorithm deletes the top element of a linked stack and assigns it to the variable ITEM. [10]

Question 3

i. Convert 2*3/(2-1)+5*3 into postfix form [7]
ii. Draw the Binary search tree of the following data set: [7]
    14 15 4 9 7 18 3 5 16 4 20 17 9 14 5
iii. Write a C++ code of a dequeuer function [6]

Question 4

i. Write an algorithm of delete operation on a queue [10]