Jatiya Kabi Kazi Nazrul Islam University

Dept. of Computer Science and Engineering

B.Sc. (Engg.) 1st Year 1st Semester Final Examination-2023

Course Code & Title: 06131103 (Discrete Mathematics)

Time: 3 Hours **Marks: 5×12=60**

[Answer any 5 questions from the following]

1 a. What is subset and duality of a set? Give proper example of these. 4

b. What do you mean by partition of a set? Find all partitions of set S={1,2,3}. 4

c. Define finite set and infinite set. 2

d. Show that A={2,3,4,5} is not a subset of B = {x: x ∈ N, x is even } 2

2 a. What is the use of relation in database? 2

b. Let M be the relation {(1,2),(1,3),(2,3),(2,4),(3,1)} and N be the relation {(2,1),(3,1),(3,2),(4,2)}. Find $M^o N$ 4

c. Determine (p∧q) → (r ↔ s) and [(p⊕q) ∧ (p⊕r)]∨(s → q) are logically equivalent or not. 6

3 a. Discuss about different types of relations with proper example. 5

b. Write the negation of each statement as simply as possible: 3

i. If she works , she will earn money

ii. He swims if and only if the water is warm.

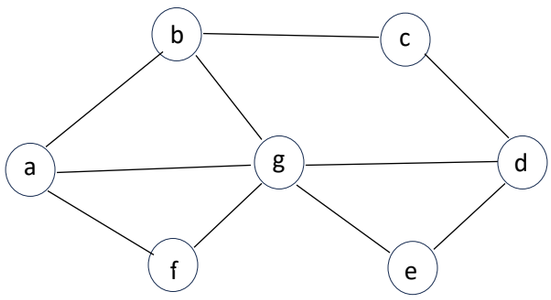
iii. If it snows, then they do not drive the car.

c. Define function, composition of function, one-to-one and onto function. 4

4 a. Differentiate between precedence graph and undirected graph. 2

b. Show that K_5 is a non-planer graph. 4

c. Find out the chromatic number of the following graph: 6



Also assign color to each of the vertex.

5 a. What do you mean by complete binary trees? 2

b. Construct a binary search tree for the following data sequence: 15, 10, 2, 17, 8, 9, 5, 6, 3, 7, 4, 6 and 20. Then delete the data elements 5 and 20 and draw the resultant tree. 5

c. What is the result of the following postfix expression? 4, 2, *, 1, ↑, 8, 3, −, 8, 4, 1, *, −. Also draw an ordered rooted tree from the given expression. 5