

Please check that this question paper contains 09 questions and 02 printed pages within first
10 minutes.

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MORNING

Uni. Roll No.

12 MAY 2023

Program/ Course: **B.Tech. (Sem. 5th)**
Name of Subject: **Discrete Mathematics**
Subject Code: **PCIT-110**
Paper ID: 16441

Time Allowed:3 Hours

Max. Marks:60

NOTE:

- 1) **Parts A and B are Compulsory**
- 2) **Part C** has Two Questions Q8 and Q9. Both are compulsory, but with internal choice.
- 3) Any missing data may be assumed appropriately.

Part – A

[Marks: 02 each]

Q1.

- a) What do you meant by Pigenhole concept?
- b) List the closure properties of relation.
- c) Differentiate between inclusion and exclusion principle.
- d) What is the difference between a cycle and Hamiltonian cycle?
- e) Which is better Kruskal or Prims ?
- f) Compare monoid and ring.

Part – B

[Marks: 04 each]

Q2.Explain the different properties of groups and show that $G= \{ 1,2,3,4,5,6 \}$ is a group.

Q3. Discuss the various types of relations with an example of each.

Q4.Compare between propositional and Predicate Logic.

Q5. Consider an electronic circuit having several nodes with connections between them. Is it possible to print that circuit on a single board such that none of the connections cross each other i.e. they do not overlap or intersect? Explain with the help of planarity of graphs.

Q6. Illustrate the difference between Hamiltonian and Eulerian circuits with an example.

Q7. Compare between Floyd Warshall and Kruskal Algorithm.

Part – C**[Marks: 12 each]**

Q8. Assume a group of 100 students, 72 can speak English, 43 can speak Punjabi. Based on this data, provide answer to following

1. Find number of student who can speak English only.
2. Find number of student who can speak Punjabi only
3. Find number of student who can speak both Punjabi and English

OR

Write the meaning of Cardinality of a Set, finite set, infinite set, proper subset, Universal set.

Q9. Write short notes on a) Partial order relations b) Chromatic number c) Hashing functions

OR

Explain the various applications of Graph Theory. Also distinguish between Isomorphic and homomorphic graphs
