

SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN
(AUTONOMOUS)

(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai — 600 044.

B.Sc. END SEMESTER EXAMINATIONS NOVEMBER-2022

SEMESTER - I

21UCGAT1001 - Discrete Mathematics

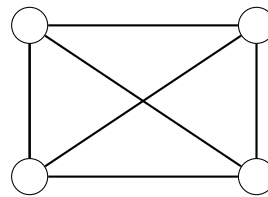
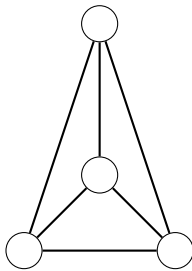
Total Duration : 2 Hrs 30 Mins.

Total Marks : 60

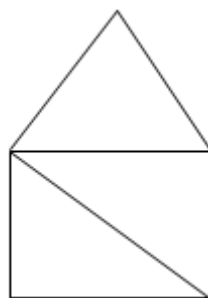
Section A

Answer any **SIX** questions ($6 \times 5 = 30$ Marks)

1. Define Conjunction and Disjunction with truth tables.
2. Show that (i) $\neg \neg P \iff P$ (ii) $(P \rightarrow Q) \vee (Q \rightarrow P)$
3. Prove that the Composition of functions is associative.
4. Let $A = \{1, 2, 3\}$ and $B = \{1, 4\}$ and consider the relation R such that " $<$ " then find R , R^c and R^{-1} .
5. (i) Define Group.
(ii) Check whether $(\mathbb{Z}_5, +_5)$ is an abelian group of order 5.
6. Examine whether the following pairs of graphs G_1 , G_2 given below are isomorphic or not.



7. State the properties of Hamiltonian Graph.
8. Find the minimum spanning tree for the following graph.



Contd...

Section B

Answer any **THREE** questions ($3 \times 10 = 30$ Marks)

9. (i) Define Tautology with truth table
(ii) Construct the truth table for $P \vee (Q \wedge R) \iff (P \vee Q) \wedge (P \vee R)$
10. Using Characteristic functions, prove that
$$A \cup (B \cap C) = (A \cup B) \cap (A \cup C)$$
11. State and prove cancellation laws of group.
12. Prove that a connected graph G is Eulerian iff all the vertices are of even degree.
13. Explain Dijkstra's Algorithm for shortest path with example.
