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.
M.Sc. END SEMESTER EXAMINATIONS NOVEMBER - 2022
SEMESTER - II
20PAMCT2005 - Topology

Total Duration : 2 Hrs 30 Mins.   Total Marks : 60

Section A

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

1. State and Prove Cauchy's inequality.

2. Show that any continuous image of a compact space is compact.

3. Relate that a metric space is compact if and only if it is complete and totally bounded.

4. Show that a topological space is a T^1 space if and only if each point is a closed set

5. Prove that a topological space X is disconnected if and only if there exists a continuous mapping of X onto the discrete two-point space 0,1.

6. Closed subspace of a normal space is normal Prove this statement.

7. Let X be a topological space. Then show that
        i) any intersection of closed sets in X is closed and
       ii) any finite union of closed sets in X is closed.

8. The product topology can be regarded as the weak topology generated by projections. Justify your answer.

Section B

Part A

Answer any **TWO** questions $(2 \times 10 = 20$ Marks)

9. Explain Tychonoff's Theorem.

10. State and Prove Urysohn's lemma.

11. Prove that a subspace of the real line R is connected if and only if it is an interval, in particular R is connected.

12. Examine the Kuratowski closure axioms.

Part B

Compulsory question $(1 \times 10 = 10$ Marks)

13. State and Prove Heine-Borel theorem.

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