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 APRIL - 2022
SEMESTER - II
20PAMCT2005 - Topology

Total Duration : 3 Hrs. **Total Marks : 60**

Section A

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

1. State and prove Minkowski's Inequality.
2. Let X be a second countable space. Show that any open base for X has a countable subclass which is also an open base.
3. Show that every sequentially compact metric space is totally bounded.
4. Show that every compact Hausdorff space is normal.
5. Prove that any continuous image of a connected space is connected.
6. Let A be a subset of the topological space X; let D(A) be the set of all limit points of A. Then prove that $\bar{A}$= A∪D(A)
7. Prove that every sequentially compact metric space is compact.
8. Show that the product of any non-empty class of Hausdorff spaces is a Hausdorff space.

Section B

Part A

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

9. Show that every closed and bounded subspace of the real line is compact.
10. State and prove Tychonoff's theorem.
11. Let X be a normal space, and let A and B be disjoint closed subspaces of X. Prove that there exists a continuous real function f defined on X, all of whose values lie in the closed unit interval [0,1], such that $f(A)$=0 and $f(B)$=1.
12. Prove that the product of any non - empty class of connected space is connected.

Part B

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

13. Let X and Y be metric spaces and f a mapping of X into Y. Prove that f is continuous if and only f^{-1} (G) is open in X whenever G is open in Y.

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