

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.Applicable Mathematics - END SEMESTER EXAMINATIONS - APRIL 2025
SEMESTER - II

20PAMCT2005 - Topology

Total Duration : 2 Hrs. 30 Mins.

Total Marks : 60

Section B

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

1. State and Prove Cantor's intersection theorem.
2. State and Prove Baire's theorem.
3. If f and g are continuous real functions defined on a metric space X , show that $f + g$ and αf are also continuous where α is any real number.
4. State and Prove Minkowski's Inequality.
5. Show that any continuous image of a compact space is compact.
6. State and Prove generalized Heine Borel theorem.
7. State and Prove Lebesgue's Covering Lemma.
8. Prove that: Every compact Hausdorff space is normal.

Section C

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

9. Let X and Y be metric spaces and f a mapping of X into Y . Show that f is continuous at x_0 if and only if $x_n \rightarrow x_0 \Rightarrow f(x_n) \rightarrow f(x_0)$.
10. i. Prove that $\mathcal{C}(X, R)$ is a closed subset of the metric space B .
ii. State and prove Cauchy's Inequality.
11. State and prove Tychonoff's theorem.
12. Prove the following.
 - i. The product of any non-empty class of Hausdorff spaces is a Hausdorff space.
 - ii. Every compact subspace of a Hausdorff space is closed.

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

13. State and prove Heine Borel theorem.
