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.(Appl.Maths) - END SEMESTER EXAMINATIONS APRIL - 2023
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. Justify that a function is continuous iff inverse image of every open set is open.
2. Interpret in a topological space X and A, a subset of X, the following properties holds:
   (i) $\bar{A} =$ A ∪ D
   (ii) A is closed ⇔ A ⊇ D(A)
3. State and prove Lindelof's theorem.
4. Show that the continuous image of a compact space is compact.
5. Describe with a proof that a metric space is compact iff it is complete and totally bounded.
6. Is every closed and bounded subspace of R^n is compact? Justify.
7. Show that the product of any nonempty class of Hausdorff spaces is Hausdroff space.
8. Prove that all finite dimensional Euclidean and Unitary spaces are connected.

Section C

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

9. State and Prove Cantor's Intersection theorem.
10. Determine every separable metric space is second countable.
11. State and Prove Tychonoff's theorem.
12. (i) Assert that property of connectedness is preserved by continuous mapping.
    (ii) Deduce that a compact Hausdorff space is totally disconnected iff it has an open base whose sets are also closed.

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

13. Deduce Urysohn's Lemma.

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