Sr. No. 7677

Exam Code: 211004
Subject Code: 4289

M.Sc(Mathematics) - 4th sem.

(2519)

Paper: MATH-582

Topology-II

Time allowed: 3 hrs. **Max. Marks: 100**

NOTE: Attempt TWO questions from each unit. All questions carry 10 marks each.

UNIT I

1. Prove that a space is completely normal if and only if it is hereditarily normal.
2. Prove that every metric space is completely normal hausdorff.
3. Prove that a continuous closed image of a normal space is normal.
4. Prove the Tietze Extension Theorem for Normal Spaces.

UNIT II

5. Prove that a subset of the real line with the usual topology is compact if and only if it is closed and bounded.
6. Prove that every regular Lindelof space is normal
7. Prove that every compact hausdorff space is T_4.
8. Prove that closed subsets of compact sets are compact and compact subsets of hausdorff spaces are closed.

PTO

UNIT III

9. Prove that a first countable countably compact space is sequentially compact.
10. Prove that a metric space is sequentially compact if and only if it has Bolzano Weierstrass Property.
11. Prove that a topological space is locally compact if and only if there is an open base at each point whose members have compact closures.
12. Prove that product of compact sets is compact.

UNIT IV

13. Prove that a completely regular hausdorff space is homeomorphic to a subspace of a compact hausdorff space.
14. Prove that every continuous map from a Tichonov space to a compact T_4 space has a continuous extension to its Stone Cech compactification.
15. Prove that any compactification of a Tichonov space is a quotient space of its Stone Cech Compactification.
16. Prove that a regular T_1 space with a σ-locally finite base is metrizable.

UNIT V

17. Prove that a subset A of a topological space X is closed if and only if no net in A converges to a point of the complement of A in X.
18. What is a subnet? Give an example. Prove that a point x in a topological space X is a cluster point of a net S in X if and only if there is a subnet of S converging to x in X.
19. Prove that a filter on a set X is an ultrafilter if and only if for any subset A of X, either A or its complement in X is a member of the filter.
20. Prove that every filter is contained in an ultrafilter.

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