Total No. of Questions : 05] [SET-A] [Total No. of Printed Page : 01

**FINAL EXAMINATION – JULY 2017**

**MASTER OF SCIENCE (M.Sc. MATHEMATICS)**

**First Year – Second Semester**

**Topology – II**

**2M.Sc. 3**

**Time : 3 Hours** **Max Marks : 70**

**Min. Marks : 25**

**Note :-** **Solve any two parts from each question. All questions carry Equal marks.**

Q.1. (a) Prove that all Metric spaces are $T_4$.
(b) Prove that every Tychnoff space is $T_3$.
(c) State and prove Urysohn's lemma.

Q.2. (a) Prove that every second countable space is first countable.
(b) Prove that a closed subset of a compact space is compact.
(c) Prove that every second countable space is Lindeloff.

Q.3. (a) Prove that every locally compact Hausdorff space is regular.
(b) State and prove stone – Cech compactification.
(c) Prove that every sequentially compact topological space is countably compact.

Q.4. (a) Prove that a metric space is compact iff it is complete and totally bounded.
(b) Prove that every compact metric space is complete.
(c) The topological product of a countable family of metrizable space is metrizable.

Q.5. (a) State and prove Tychonoff theorem.
(b) Prove that a product space is connected iff each coordinate space is connected.
(c) Prove that Matrisability is a countably productive property.

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