Roll No. **Total No. of Pages : 02**

Total No. of Questions : 07

M.Sc. (Applied Math) (Sem.-3)

TOPOLOGY

Subject Code : MSM-301

M.Code : 75381

Time : 3 Hrs. **Max. Marks : 80**

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of EIGHT questions carrying TWO marks each.**
2. **SECTION - B & C have THREE questions in each section carrying SIXTEEN marks each.**
3. **Select atleast TWO questions from SECTION - B & C EACH.**

SECTION-A

1. Answer briefly :

a) Define Closure.

b) Define Exterior point.

c) Show that local compactness is not a hereditary property.

d) Define Arc-wise connected spaces.

e) Define Second axiom.

f) Define T_0 space.

g) State Urysohn's Lemma.

h) Prove or disprove : "*A subspace of a normal space is normal*."

SECTION-B

2. a) For any set E in a topological space, $c(E) = E \bigcup D(E)$.

   b) Prove that interior axioms are satisfied in any topological space.

3. a) Let Y be a subspace of X. Then Y is compact if and only if every covering of Y by sets open in X contains a finite sub-collection covering Y.

   b) Prove that the image of a compact space under a continuous map is compact.

4. a) Prove that the union of a collection of connected subspaces of X that have a point in common is connected.

   b) Prove that a finite Cartesian product of connected spaces is connected.

SECTION-C

5. Prove that the property of a space being T_0-space is preserved by one to one, onto , open maps and hence a topological property.

6. State and prove Tietze Extension theorem.

7. Every uncountable subset of a second axiom space contains a condensation point.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.