YMCA UNIVERSITY OF SCIENCE AND TECH., FARIDABAD

M.Sc EXAMINATION (UNDER CBS), Dec-2017

TOPOLOGY(MT 511)

Time-3 Hrs **M.Marks:75**

NOTE: 1.It is compulsory to answer the questions of Part -1.

1. *Answer any four questions from Part -2 in detail.*

Part 1

Q1 All Part 1 Questions are compulsary

a) Define the term open cover and sub cover.
b) Define Co countable topology and co finite topology.
c) Show that any discrete space is locally compact
d) State Urysohn's Lemma.
e) Show that two open subsets of a topologicals space are separated iff they are disjoint.
f) Show that $\overline{A \cap B} \subseteq \overline{A} \cap \overline{B}$
g) Define stronger and weaker topologies.
h) Give example of T_1 space which is not T_2.
i) Define completely regular space and tychonov space.
j) Define derived set and dense set. [1.5*10=15]

Part 2 (Attempt any four)

Q2(a)Let X be a topological space ,let $A \subseteq X$ *then* $A \cup D(A)$ is a closed set of X. [7]

Q2(b) Give an example of a topological space that is not second countable [8]

Q3(a) Prove that components of totally disconnected space are its points. [7]

Q3(b) Define locally compact space and show that every compact topological space is locally compact .Is the converse true? Justify. [8]

Q4(a) Prove that every compact subset of Hausdroff space is closed. [7]

Q4(b) State and prove Tietzes Extension Theorem. [8]

Q5(a) Prove that a normal space is completely regular iff it is regular. [7]

Q5(b) Show that the closure of a connected set is connected. [8]

Q 6(a) State and prove Heine Borel Theorem. [7]

(b) Show that intersection of two topologies is also a topology. [8]

Q7(a) Prove that the product of any non empty class of totally disconnected space is totally disconnected. [7]

Q7(b) Prove that complete regularity is a topological property. [8]