Shree H.N. Shukla College of science

M. Sc (Mathematics) (Sem. 2)

Test

MATH.CMT-1003: Topology-2

[Time: 2.30 Hours] [Total Marks: 70]

1 Answer any seven 7x2=14

(a) Every normal space is _____.

(b) Limit point of (0,1)∪(2,3) is_____in R with standard topology .

(c) [0,1) is open set in _____topology on R.

(d) Every locally compact Hausdroff space is______.

(e) Every closed subspace of compact space is ______.

(f) Any compact subspace of metric space is ____.

(g) If every infinite subset of X has limit point in X then X is____.

(h) Give example of compact set which is not finite. .

(i) Any compact Hausdroff space is ____.

(j) True or False: Any closed subset of ℝ is compact.

2 Answer any two 2x7=14

(a) State and prove tube lemma.

(b) Let X and Y be any topological spaces then show that X and Y are Compact if and only if X x Y are compact. 7

(c) $\mathcal{T}$ = { G ⊆ ℕ | ℕ - G is finite }∪Ø is topology on ℕ. Show that $\mathcal{T}$ be a topology on ℕ and $\mathcal{T}$ is Compact.

3

(a) Prove that any compact subset of Hausdroff space is closed. 5

(b) Show that ℝ is not compact. 4

(c) Give example of infinite set. Which is compact. 5

4 Answer of the following questions 2x7=14

(a) X and Y are locally compact if and only if X x Y are locally compact.

(b) Prove that $\mathbb{R}^n$ is complete metric space.

5 Answer of the following questions 2x7=14

(a) Y^x is uniform metric space then show that (Y,d) is complete metric space then Y^x is Complete.

(b) State and prove Lebesgue covering lemma.

Best of Luck