(b) Prove that every closed subset of a countably compact topological space is countable compact. **7**

Unit IV

7. (a) Prove that every second countable space is first countable. **8**

(b) Prove that :

(i) Every discrete topological space is first countable

(ii) Every usual topological space on **R**, set of reals, is first countable. **7**

8. (a) Prove that every T_2-space is T_1-space but converse may not be true. **8**

(b) Prove that topological property holds in T_1-spaces. **7**

Roll No. ....

FF-344

Dual Degree B.Sc. (Hons.)

EXAMINATION, May 2018

(Sixth Semester)

(Main & Re-appear)

MATHEMATICS

MAT418H

Elementary Topology

Time : 3 *Hours*] [*Maximum Marks* : 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. Define the following terms :

Well ordering theorem. I continum hypothesis, indiscrete and discrete topologies, lower and upper limit topology, left hand and right hand topology, cofinite and co-countable topology, A inclusion and p-exclusion topology, Adherent point, Base and subbase for a topology.

2. (a) Let (X, ρ) be a topological space, then a subfamily β of ρ is a base for ρ iff every s-open set can be expressed as the union of member of β. **8**

(b) Let (X, ρ) be a topological spaces and A be a subset of X. Then prove that $\overline{A} = A \cup D(A)$, D(A) denotes derived set of A. **7**

Unit II

3. Define continuity and homeomorphism on a topological spaces. If f be a one-one mapping from a topological space (X, ρ_x) onto a topological space (Y, ρ_y). Then fhe following statements are equivalent :

(i) f is open and continuous

(ii) f is homeomorphism

(iii) f is closed and continuous. **15**

4. (a) Prove that a topological space (X, ρ) is connected iff ϕ, X are the only sets which are both open as well as closed. **10**

(b) An open set in a usual topological space is connected set prove or disprove. **5**

Unit III

5. (a) Define compact space. Prove that every finite set in a topological space is compact. **8**

(b) Prove that usual topological space is not compact. **7**

6. (a) Prove that continuous image of a compact space is compact. **8**