Registration no: | | | | | | | | | | |

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M.Sc.I
FMCC701

7th Semester Regular Examination 2017-18
Topology
Branch: M.Sc.I (MC)
Time: 3 Hours
Max Marks: 70
Q. CODE: B625
Answer Question No.1 which is compulsory and any five from the rest.
The figures in the right hand margin indicate marks.

Q1 **Answer the following questions:** **(2 x 10)**

a) Define Subspace and Hereditary Property.
b) Define limit point and derived set.
c) Consider **X** ={x, y, z} , Ʈ= { φ ,{x}, {y, z}, X}, Y = {p, q, r}, **V** ={ φ ,{r}, {p, q},Y} . **(X. Ʈ)** and **(Y,V)** are two topological spaces. Consider the map . (i) f(x) =r, f(y)= p, f(z)=q discuss continuity and openness.
d) Define 1^{st} and 2^{nd} countable base.
e) Define Homeomorphism.
f) Define Continuity with an example.
g) Define open map, closed map, define topological property.
h) Define Hausdorff space with an example.
i) Define locally connected set with an example
j) Define Compactness.

Q2 **a)** Let **X** be a non-empty set **Ƒ** a family of subsets of X such that **(5)**

[F:1] : φ ∈Ƒ, X∈Ƒ

[F:2] : $F_1 \in$ Ƒ, $F_2 \in$ Ƒ $\Rightarrow (F_1 U F_2) \in$ Ƒ

[F:3] : $F_i \in$ Ƒ, **for all i∈I** $\Rightarrow \bigcap F_i \in$ Ƒ **for all i ∈ I**

Then there is an unique topology **Ʈ** on **X** s. t. the **Ʈ** closed subsets are precisely the members of **Ƒ.**

b) Let (X, **T**) be a topological space and let a be a subset of X. the set A is **T** - open iff A contains a **T** - neighborhood of each of its points. **(5)**

Q3 **a)** The **(X,Ʈ)** be a topological space and let A ⊂ X. Then A is a Ʈ-closed iff A' ⊂ A. **(5)**
b) Let (**Y, V**) be a subspace of (**X,Ʈ**). If (**Z,W**) is a subspace of (**Y, V**) then (**Z,W**) is also a subspace of (**X,Ʈ**). **(5)**

Q4 **a)** Let **X, X*, X** be topological spaces and let** $f : X \to X^*$, and $g : X^* \to X^{**}$ **(5)**
Be continuous. Show that the composition map $gof : X \to X^{**}$

b) Consider the topological space **(X,$\mathcal{T}$)** where X= { x, y, z} and **(5)**

$\mathcal{T}$ = { φ , {x},{x,y}, {x,z}, X} Find the derived sets of A = {y, z} and B={z,x.}

Q5 **a)** Let (X, **T**) and (Y,**V**) be two topological spaces . A mapping $f : X \to Y$ is continuous iff for every V-closed set F, $f^{-1}[F]$ is T-closed. **(5)**

b) Let (X,$\mathcal{T}$) and (Y, **V**) be two topological spaces. A mapping X to Y is **$\mathcal{T}$-V** closed iff $\overline{f[A]} \subset f[\bar{A}]$ for every A ⊂ X . **(5)**

Q6 **a)** Show that homeomorphism is an equivalence relation in collection of all topological space. **(5)**

b) A topological space(X,T) is connected iff it has no non-empty proper subsets which are both T-open and T-closed. **(5)**

Q7 **a)** If C is connected set and **C⊂E⊂$\bar{C}$** then E is connected set. **(5)**

b) If E is a subset of a subspace **(Y,$\mathcal{T}_y$)** of a topological space **(X,$\mathcal{T}$)** then E is $\mathcal{T}_y$- connected set iff E is **$\mathcal{T}$**-connected . **(5)**

Q8 **a)** Let **(Y,$\mathcal{T}_y$)** be a subspace of a topological space **(X,T)** and let $A \subset Y$ then A is T-compact iff A is $\mathcal{T}_y - \textit{compact}$. **(5)**

b) Continuous image of compact sets are compact. **(5)**