School of Basic and Applied Sciences

Mathematics

ETE - Jun 2023

Time : 3 Hours **Marks : 50**

Sem II - MSCM205 - Topology

Your answer should be specific to the question asked

Draw neat labeled diagrams wherever necessary

1.	Explain separable space with an example.	K1 CO3 ,CO4 (2)
2.	Write the statement of Urysohn's Lemma.	K2 CO4 ,CO5 (2)
3.	Explain homeomorphism in a topological space.	K2 CO2 ,CO3 (2)
4.	Write any two applications of Topology.	K2 CO6 ,CO5 (2)
5.	Define limit point with the help of an example.	K1 CO2 ,CO1 (2)
6.	Explain Separable spaces. Also, show that the property of being a separable space is not a hereditary property.	K4 CO3 ,CO6 (6)
7.	**Define derived sets. Also,** If the topology $\zeta = \{X, \phi, \{a\}, \{a, b\}, \{a, c, d\}, \{a, b, c, d\}, \{a, b, e\}\}$ is defined on X = $\{a, b, c, d, e\}$. Determine the derived sets of A=$\{c, d, e\}$.	K3 CO1 ,CO2 (5)
8.	Let (X,ζ) and (Y,ν) be topological spaces. Let $f: X \to Y$ be a bijective mapping. Then show that following statements are equivalent: (a) f is homeomorphism (b) f is continuous and open (c) f is continuous and closed.	K3 CO3 ,CO2 (5)
9.	Let $\zeta = \{\phi, \{a\}, \{b, c\}, X\}$ be a topology on X=$\{a, b, c\}$ and let $\upsilon = \{\phi, \{r\}, \{p, q\}, Y\}$ be a topology on Y=$\{p, q, r\}$. Find whether the mapping f, g, h on X into Y- 1. f(a)=p, f(b)=q, f(c)=r 2. g(a)=p, g(b)=r, g(c)=r 3. h(a)=r, h(b)=p, h(c)=q $\zeta - \upsilon$ continuous or not.	K3 CO2 ,CO3 (8)
10.		K4 CO5 ,CO2 (8)
11.	Show that the property of being a second countable space is a topological property.	K4 CO4 (8)