

5TH SEMESTER MATHEMATICS (HONOURS)

ASSIGNMENT, CC-XI
TOTAL MARKS - 20

1. Let d_1 and d_2 are two metrics defined on a non-empty set A . Then whether d is a metric on A , where d is given by (5)
$$d(x, y) = \min\{d_1(x, y), d_2(x, y)\}, \forall x, y \in A$$

2. If d_1 and d_2 are two metrics on a non-empty set A , prove that $d = d_1 + d_2$, (5)
defines another metric on the set A .

3. In which case $[0, 1]$ is a neighbourhood of the point 0, explain with justification.

Case 1 In the Euclidean line. (5)

Case 2 In \mathbb{R} , the set of all real numbers along with the discrete metric d .

4. Let $A = \{(x_1, x_2) \in \mathbb{R}^2 : x_2 = a \text{ constant}\}$.
Check whether A is open and A is closed (5)
in \mathbb{R}^2 endowed with Euclidean metric.