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MTH645 Quiz 1 Solution

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MTH645 — Fuzzy Logic and Applications

Quiz 1 | Questions with Correct Answers

1. If $\mu A(x) = 0.4$ and $\mu B(x) = 0.7$, then $\mu A \cap B(x) = ?$

Correct Option: A (0.4)

Fuzzy intersection takes the minimum: min(0.4, 0.7) = 0.4.

2. The number of elements in the power set of a set with n elements is:

Correct Option: C (2^n)

Every element is either in or out of a subset, giving 2^n subsets.

3. What does $\mu A(x) = 0$ mean?

Correct Option: D (x does not belong to set A)

A membership value of 0 means the element is not a member of the set at all.

4. The cardinality of a fuzzy set A represents:

Correct Option: B (the sum of membership values of all elements in A)

Scalar cardinality of a fuzzy set = Σ $\mu A(x)$ over all elements.

5. Which of the following is not a valid membership value?

Correct Option: C (1.5)

Membership values always lie between 0 and 1, so 1.5 is invalid.

6. The membership function of the union represents:

Correct Option: D (the highest degree of belongingness among the two sets)

Fuzzy union takes the maximum of the two membership values.

7. A fuzzy set can be written as:

Correct Option: C ($A = \{(x, \mu A(x)) \mid x \quad U\}$)

A fuzzy set lists every element together with its membership value.

8. If a set A has 4 elements, how many subsets does it have?

Correct Option: A (16)

Number of subsets = $2^4 = 16$.

9. If μA(x) = 1, it means:

Correct Option: A (x definitely belongs to set A)

A membership value of 1 means full, definite membership.

10. The union of two fuzzy sets A and B is defined as:

Correct Option: D (μA B(x) = max(μA(x), μB(x)))

Standard fuzzy union uses the maximum operator.