Unit 3 - Week 1:

Assignment 1

The due date for submitting this assignment has passed. As per our records you have not submitted this assignment.

Due on 2019-03-13, 23:59 IST.

1) Which one of the following statements is TRUE?
   a. Law of contradiction is followed by both Crisp and Fuzzy sets.
   b. Law of contradiction is followed by neither Crisp set nor Fuzzy set.
   c. Law of contradiction is followed by Fuzzy set but not Crisp set.
   d. Law of contradiction is followed by Crisp set but not Fuzzy set.

   No, the answer is incorrect.

   Accepted Answers:
   a.

   Score: 0

2) Fig. A shows triangular membership function distribution of a Fuzzy set.

   The value of membership ($\mu$) corresponding to $x = 8.0$ is found to be equal to
   a. 0.7
   b. 0.6
   c. 0.8
   d. 0.9
3) The membership function distribution of a fuzzy set is assumed to follow a Gaussian distribution with mean \( \mu = 200 \) and standard deviation \( \sigma = 50 \). Its 0.7-cut is approximately found to be as follows:

- a. (110.8567, 289.1433)
- b. (157.7699, 242.2300)
- c. (150.0000, 250.0000)
- d. (120.3356, 279.6644)

No, the answer is incorrect.
Score: 0
Accepted Answers: b.

4) Let us consider a fuzzy set \( \mathcal{A}(x) = \{(x_1,0.3),(x_2,0.4),(x_3,0.5),(x_4,0.6)\} \). Its complement \( \overline{\mathcal{A}(x)} \) determined as follows:

- a. \( \{(x_1,0.6),(x_2,0.5),(x_3,0.4),(x_4,0.3)\} \)
- b. \( \{(x_1,0.4),(x_2,0.3),(x_3,0.6),(x_4,0.5)\} \)
- c. \( \{(x_1,0.7),(x_2,0.6),(x_3,0.5),(x_4,0.4)\} \)
- d. \( \{(x_1,0.1),(x_2,0.2),(x_3,0.3),(x_4,0.4)\} \)

No, the answer is incorrect.
Score: 0
Accepted Answers: c.

5) Let us consider two fuzzy sets:

\[ \mathcal{A}(x) = \{(x_1,0.2),(x_2,0.3),(x_3,0.4),(x_4,0.5)\} \]
\[ \mathcal{B}(x) = \{(x_1,0.3),(x_2,0.4),(x_3,0.5),(x_4,0.6)\} \]

Their intersection \( (\mathcal{A} \cap \mathcal{B})(x) \) is determined as

- a. \( \{(x_1,0.3),(x_2,0.4),(x_3,0.5),(x_4,0.6)\} \)
- b. \( \{(x_1,0.2),(x_2,0.3),(x_3,0.4),(x_4,0.5)\} \)
- c. \( \{(x_1,0.5),(x_2,0.3),(x_3,0.1),(x_4,0.2)\} \)
- d. \( \{(x_1,0.3),(x_2,0.2),(x_3,0.4),(x_4,0.5)\} \)
Let us consider a fuzzy set \( \mathcal{A}(x) = \{ (x_1, 0.01), (x_2, 0.04), (x_3, 0.09) \} \). Its DILATION is determined as:

- a. \( \{ (x_1, 0.1), (x_2, 0.4), (x_3, 0.9) \} \)
- b. \( \{ (x_1, 0.4), (x_2, 0.1), (x_3, 0.9) \} \)
- c. \( \{ (x_1, 0.9), (x_2, 0.4), (x_3, 0.1) \} \)
- d. \( \{ (x_1, 0.1), (x_2, 0.2), (x_3, 0.3) \} \)

Let us consider two fuzzy sets as follows:

\[
\mathcal{A}(x) = \{ (x_1, 0.2), (x_2, 0.3), (x_3, 0.4) \}
\]

\[
\mathcal{B}(x) = \{ (x_1, 0.4), (x_2, 0.5), (x_3, 0.6) \}
\]

Their bounded sum, \( \mathcal{A}(x) \oplus \mathcal{B}(x) \) is represented as follows:

- a. \( \{ (x_1, 0.6), (x_2, 0.3), (x_3, 0.4) \} \)
- b. \( \{ (x_1, 0.2), (x_2, 0.3), (x_3, 0.4) \} \)
- c. \( \{ (x_1, 0.6), (x_2, 0.8), (x_3, 1.0) \} \)
- d. \( \{ (x_1, 0.2), (x_2, 0.2), (x_3, 0.2) \} \)
Let us consider two fuzzy sets as follows:
\[ A(x) = \{(x_1, 0.2), (x_2, 0.3), (x_3, 0.4)\} \]
\[ B(x) = \{(x_1, 0.4), (x_2, 0.5), (x_3, 0.6)\} \]

Their algebraic difference, \( A(x) - B(x) \) is determined as follows:

a. \( \{(x_1, 0.2), (x_2, 0.3), (x_3, 0.4)\} \)

b. \( \{(x_1, 0.2), (x_2, 0.2), (x_3, 0.2)\} \)

c. \( \{(x_1, 0.4), (x_2, 0.5), (x_3, 0.6)\} \)

d. \( \{(x_1, 0.6), (x_2, 0.8), (x_3, 1.0)\} \)

No, the answer is incorrect.
Score: 0
Accepted Answers:
a.

9) Which one of the following statements is TRUE?

a. Concepts of probability and membership values are defined based on crisp only.

b. Concepts of probability and membership values are defined based on fuzzy only.

c. Concepts of probability and membership values are defined based on crisp fuzzy sets, respectively.

d. Concepts of probability and membership values are defined based on fuzzy crisp sets, respectively.

No, the answer is incorrect.
Score: 0
Accepted Answers:
c.

10)
Let us consider two fuzzy sets as follows:
\[
A(x) = \{(x_1, 0.2)\} \quad B(x) = \{(x_1, 0.4)\} \\
\{(x_2, 0.3)\} \quad \{(x_3, 0.6)\}
\]

Their Algebraic sum, \( A(x) + B(x) \) is determined as follows:

a. \( \{(x_1, 0.52)\} \quad \{(x_2, 0.65)\} \quad \{(x_3, 0.76)\} \)
b. \( \{(x_1, 0.6)\} \quad \{(x_2, 0.8)\} \quad \{(x_3, 1.0)\} \)
c. \( \{(x_1, 0.2)\} \quad \{(x_2, 0.3)\} \quad \{(x_3, 0.4)\} \)
d. \( \{(x_1, 0.4)\} \quad \{(x_2, 0.5)\} \quad \{(x_3, 0.6)\} \)

No, the answer is incorrect.
Score: 0
Accepted Answers:
a.