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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATIONS-2022

B.Tech-VIII Semester (ECE)

COURSE CODE: 18B1WEC851 MAX. MARKS: 25

COURSE NAME: Soft Computing Techniques

COURSE CREDITS: 3 MAX. TIME: 1 Hour 30 Min

Note: *All questions are compulsory. Marks are indicated against each question in square brackets.*

Q1. Using Mamdani approach, design a controller to determine the wash time of a domestic washing machine. Assume the input is dirt and grease on cloths. Use three descriptors for input variables and five for output variables. Derive the set of rules for controller action and defuzzification. Show that if the cloths are soiled to a larger degree the wash time will be more. **(5)**

Q2) Maximise the function $f(x) = x^2$, where x value range from 0 to 31 using Genetic Algorithm. **(5)**

Q3) Consider two crisp sets

A= {2,4,6,8} and B= {3,7,8,9}.

Let R and S be two separate relations on Cartesian product of A X B, defined over two crisp sets $a \in A$ and $b \in B$.

R = {(a,b) / a = b - 1} and S = {(a,b) / b = a}. Find the following

(i) $R \cup S$

(ii) $R \cap S$ **(3)**

Q4) Write short notes on **(6)**

(i) Convolutional Neural Network

(ii) Recurrent Neural Network

(iii) Long Short Term Memory Neural network

Q5) Consider the two fuzzy sets $\underset{\sim}{A} = \left\{\frac{1}{100} + \frac{0.8}{200} + \frac{0.5}{300} + \frac{0.2}{400}\right\}$ and $\underset{\sim}{B} = \left\{\frac{1}{100} + \frac{0.8}{200} + \frac{0.5}{300} + \frac{0.2}{400}\right\}$

For lambda cut λ=0.2 find

(i) $\overline{\underset{\sim}{A}} \cup \overline{\underset{\sim}{B}}$ **(3)**

(ii) $\overline{\underset{\sim}{A}} \cap \overline{\underset{\sim}{B}}$ **(3)**