Name: Enrolment no:	UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Semester Examination, December 2021

Course: Fuzzy Logic and Application **Semester: 1st**

Program: M.Tech-CSE **Time 03 hrs.**

Course Code: CSAI7004P **Max. Marks: 100**

SECTION A

1. Each Question will carry 4 Marks. **(5Qx 4M = 20 Marks)**

S. No.	Question	Marks	CO
Q 1	Given two fuzzy sets A and B defined over universe of discourses X and Y , respectively. A = {(20, 0.2),(25, 0.4),(30, 0.6),(35, 0.6),(40, 0.7),(45, 0.8), (50, 0.8)}, B = {(1, 0.8),(2, 0.8),(3, 0.6),(4, 0.4)} Find A × B	**4**	**CO1**
Q 2	Explain membership function. Draw membership function.	**4**	**CO2**
Q 3	Define max min transitivity of a binary fuzzy relation.	**4**	**CO3**
Q 4	Draw the profile of membership function for a fuzzy set called “Tall men”. Take your own values for different heights.	**4**	**CO4**
Q 5	Define Reflexivity and symmetry of a binary fuzzy relation on a single set.	**4**	**CO2**

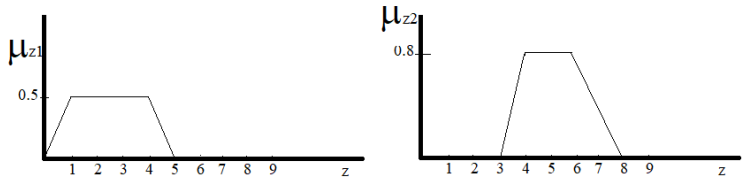
SECTION B

1. Each question will carry 10 marks. **(4Qx 10M = 40 Marks)**

Q 6	Compare fuzzification with defuzzification. Explain different types of Defuzzification methods.	**10**	**CO1**
Q 7	Describe significance of fuzzy dynamic programming for Travelling Sales Man problem. (Justify your answer with example).	**10**	**CO2**
Q 8	Describe proposition, connectives and tautologies with examples.	**10**	**CO3**
Q 9	Draw a block diagram of a possible fuzzy logic control system. Explain briefly about each block.	**10**	**CO4**
	OR		
	Suppose R(x,y) and S(x,y) are two relations defined over crisp sets A and B such that x∈A and y∈B $R = \begin{vmatrix} 1 & 0 & 0 \\ 1 & 1 & 1 \\ 0 & 1 & 1 \end{vmatrix}$, $S = \begin{vmatrix} 0 & 0 & 0 \\ 1 & 0 & 1 \\ 0 & 0 & 1 \end{vmatrix}$ Find i. R∪S, ii. R∩S, iii. $\bar{R}$	**10**	**CO2**

Section C

1. Each Question carries 20 Marks. **(2Qx 20M = 40 Marks)**

Q 10	Using Centroid method estimate defuzzified value (Z^*) of following given fuzzy sets, demonstrate each steps;;  **Fuzzy Set 1** **Fuzzy Set 2**	**20**	**CO2**
Q 11	Let X be the universe of commercial aircraft of interest: $\boldsymbol{X}$ = {$\boldsymbol{a10}$, $\boldsymbol{b52}$, $\boldsymbol{b117}$, $\boldsymbol{c5}$, $\boldsymbol{c130}$, $\boldsymbol{f4}$, $\boldsymbol{f14}$, $\boldsymbol{f15}$, $\boldsymbol{f16}$, $\boldsymbol{f111}$, $\boldsymbol{kc130}$} Let $\boldsymbol{A}$ be the fuzzy set passenger class aircraft: $\boldsymbol{A}$ = {$\boldsymbol{0.3/f16}$, $\boldsymbol{0.5/f4}$, $\boldsymbol{0.4/a10}$, $\boldsymbol{0.6/f14}$, $\boldsymbol{0.7/f111}$, $\boldsymbol{1.0/b117}$, $\boldsymbol{1.0/b52}$ } Let $\boldsymbol{B}$ be the fuzzy set of cargo: $\boldsymbol{B}$ = {$\boldsymbol{0.4/b177}$, $\boldsymbol{0.4/f111}$, $\boldsymbol{0.6/f4}$, $\boldsymbol{0.8/f15}$, $\boldsymbol{0.9/f14}$, $\boldsymbol{1.0/f16}$ } Find the values of the operations performed on these fuzzy sets. The operations are union, intersection, and complement.	**20**	**CO3**
	OR		
	Illustrate the about Job-Shop Scheduling with Expert Systems. (Use suitable example)	**20**	**CO4**