BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(END SEMESTER EXAMINATION)

CLASS: IMSc **SEMESTER : VII**
BRANCH: MATHEMATICS **SESSION : MO/2024**

SUBJECT: MA406 FUZZY MATHEMATICAL PROGRAMMING

TIME: 3 Hours **FULL MARKS: 50**

INSTRUCTIONS:

1. The question paper contains 5 questions each of 10 marks and total 50 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
***4*. Before attempting the question paper, be sure that you have got the correct question paper.**
5. Tables/Data hand book/Graph paper etc. to be supplied to the candidates in the examination hall.

			CO	BL
Q.1(a)	Find A – B(difference) for two fuzzy sets A={(a,0.2), (b,0.5), (c,0.6)} and B={(a,0.1),(b,0.4),(c,0.5)}.	[5]	1	1,2,3
Q.1(b)	Consider a fuzzy set A=x/(1+x) and x= {0, 1, …,10}. Is the fuzzy set A convex?	[5]	1	1,2,3
Q.2(a)	Consider a LPP as Max $Z=0.5x_1+0.6x_2$ Subject to: $x_1+x_2 \leq 401$ $2x_1+x_2 \leq 502$ $x_1, x_2 \geq 0$ Given $Z^0=140$, $Z^1=170, p_1=105$ and $p_2=110$. Using Werner's method construct the membership function for the objective function and constraints. Also graphically show the membership functions of both objectives and constraint.	[5]	2	1,2,3
Q.2(b)	Also formulate the FLPP of 2(a) by Verdegays method . Construct graphs and membership functions for the method.	[5]	2	1,2,3
Q.3(a)	Write a note on Zimmermann's approach.	[5]	3	1,2,3
Q.3(b)	Formulate the following LPP with Zimmermann's approach. Max Z=2x+3y Subject to: 3x-6y<=20 5x-2y<=30 x,y>=0 Let $b_0=7, p_0=2, p_1=3, p_2=4$. Construct the membership functions and graphs.	[5]	3	1,2,3
Q.4(a)	Discuss all the formulations involved in interactive fuzzy linear programming.	[5]	4	1,2,3
Q.4(b)	Compare and contrast between the various method used in interactive fuzzy linear programming.	[5]	4	1,2,3
Q.5(a)	Formulate the fuzzy LPP by Fullers method. Max Z=(4,6,9)x+(4,5,8)y Subject to (2,3,5)x+(2,4,6)y ≤(6,9,12) (2,4,5)x+(3,4,8)y ≤(4,7,11) x,y,z≥0	[5]	5	1,2,3
Q.5(b)	Define the PIS and NIS of the objective functions defined in Lai and Hwangs Method. Also explain the construction of membership functions and formulations by giving an example.	[5]	5	1,2,3

::::::28/11/2024:::::