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PG/IVS/MTM-403/14

M.Sc. 4th Semester Examination, 2014

**APPLIED MATHEMATICS WITH OCEANOLOGY
AND COMPUTER PROGRAMMING**

*(Fuzzy Sets and Their Applications
and Soft Computing)*

PAPER—MTM-403

Full Marks : 50

Time : 2 hours

The figures in the right-hand margin indicate marks

GROUP – A

(Fuzzy Sets and Their Applications)

[Marks : 25]

Time : 1 hour

Answer Q. No. 1 and any three from the rest

(Turn Over)

(2)

1. Answer any *one* question : 2 × 1
 - (a) Explain Bellman and Zadeh's principle to find optimum decision. 2
 - (b) Give an example for each of convex and non-convex fuzzy set with membership function. 1 + 1
2. What are causes of uncertainty? What are random and non-random uncertainties? Give two examples for each type of uncertainty. 2 + 2 + 2
3. Show that for fuzzy subsets \tilde{A} , \tilde{B} and \tilde{C} 3 + 3
 - (i) $(\tilde{A} \cup \tilde{B})' = \tilde{A}' \cap \tilde{B}'$ hold.
 - (ii) $\tilde{A} \subseteq \tilde{B} \subseteq \tilde{C}$ implies $\tilde{A} \subseteq \tilde{C}$.
4. Define trapezoidal fuzzy number. Show that $[4, 7, 9, 11] - [5, 6, 7, 8] = [-4, 0, 3, 6]$, using α -cut of fuzzy set. 1 + 5
5. Describe the Zimmermann's approach to solve a fuzzy LPP. 6

(3)

6. Applying Verdegay's method, convert the following fuzzy LPP to equivalent crisp LPP. Then solve the reduced LPP : 6

$$\text{Max } Z = 3x_1 + 4x_2$$

sub. to the constraints

$$2x_1 + x_2 \leq 600 \text{ to } 650$$

$$x_1 + x_2 \leq 450 \text{ to } 500$$

[*Internal Assessment* : 5 Marks]

GROUP – B

(*Soft Computing*)

[*Marks* : 25]

Time : 1 hour

Answer Q. No. 7 and any two questions from the rest

7. Write down short notes of any two of the following : 2 × 2

(i) Hybride computing

(4)

(ii) Biological Neuron

(iii) Fuzzy logic.

8. Write down the working cycle of GA with flow chart. What are the advantages and disadvantages of GA? 5 + 3

9. (a) Present the model of single layer perceptron Network with learning rule.

(b) Verify the output of logical OR function by a single layer perceptron using initial weights $W = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$ and bias $b = -1$. 5 + 3

10. (a) Describe two important inference with clearly mention the purpose of used.

(b) Describe two stochastic operations cross-over and mutation for real coded GA. 4 + 4

[*Internal Assessment : 5 Marks*]
