M.Sc. 3rd Semester Examination, 2011

COMPUTER SCIENCE

[Elective]

PAPER—COS-304

Full Marks : 50

Time : 2 hours

Answer any **four** questions

The figures in the right-hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable

Illustrate the answers wherever necessary

(*Fuzzy Set Theory*)

1. (*a*) Define complement of a fuzzy set.   2

   (*b*) Describe product of a fuzzy set with a crisp number.   2

(c) What do you mean by support of a fuzzy set ? 2

(d) Define α-level/α-cut set. 2

(e) Give an example of a trapezoidal number. 2

2. (a) Define fuzzy extension principle in n dimensional universe. 2

(b) Let f is a fuzzy mapping, ordered pairs from $X_1 = \{-1, 0, 1\}$ and $X_2 = \{-2, 2\}$ to $Y = \{-2, -1, 2, 3\}$ and $f(x_1, x_2) = x_1^2 + x_2$. Let $\widetilde{A}_1$ and $\widetilde{A}_2$ be two fuzzy sets on X_1 and X_2 respectively such that $\widetilde{A}_1 = 0.5/-1 + 0.1/0 + 0.9/1$ and $\widetilde{A}_2 = 0.4/-2 + 1/2$.

Using extension principle derive $f(\widetilde{A}_1, \widetilde{A}_2)$. 5

(c) Write short notes on : fuzzy t-norm. 3

3. (a) What is fuzzy relation ? 2

(b) Briefly, describe fuzzy max-min composition. 2

(c) Let $X = \{x_1, x_2\}$, $Y = \{y_1, y_2\}$, $Z = \{z_1, z_2, z_3\}$. Let $\widetilde{R}$ be a fuzzy relation,

$$\widetilde{R} = \begin{array}{c} \\ x_1 \\ x_2 \end{array} \begin{array}{c} y_1 \quad\ y_2 \\ \begin{bmatrix} 0 \cdot 5 & 0 \cdot 4 \\ 0 \cdot 7 & 0 \cdot 3 \end{bmatrix} \end{array}$$

and $\widetilde{S}$ be a fuzzy relation,

$$\widetilde{S} = \begin{array}{c} \\ y_1 \\ y_2 \end{array} \begin{array}{c} z_1 \quad\ z_2 \quad\ z_3 \\ \begin{bmatrix} 0 \cdot 6 & 0 \cdot 2 & 0 \cdot 4 \\ 0 \cdot 3 & 0 \cdot 1 & 0 \cdot 5 \end{bmatrix} \end{array}$$

then using fuzzy max-min composition compute $\widetilde{R}_0 \widetilde{S}$.   4

(d) Describe fuzzy logic and fuzzy proposition.   2

4. (a) What is inference in propositional logic ? Define generalized Modus Tollens (GMT). 2 + 3

(b) Given that :

(i) $C \vee D$

(ii) $\sim H \Rightarrow (A \wedge \sim B)$

(iii) $(C \lor D) \Rightarrow \sim H$

(iv) $(A \land \sim B) \Rightarrow (R \lor S)$

can ($R \lor S$) be inferred from the above ?   3

(c) Define concentration and dilation of a fuzzy set $\widetilde{A}$.   2

5. (a) Define :   4

   Antecedent, Consequent, Tautology, Contradiction.

   (b) Prove that the following proposition is tautology :   3

   $$[(p \to q) \land (q \to r)] \to (p \to r)$$

   (c) Briefly, describe fuzzy rule based system.   3

6. (a) What is Hard Computing ? Describe the features of hard computing.   2

   (b) Write down advantages and disadvantages of Genetic Algorithm.   4

(Continued)

(c) Discuss briefly, Ranking selection, Tournament selection and Roulette-Whell selection in Genetic Algorithm. 4

7. (a) Write down, characteristics of neural networks. 3

   (b) Briefly, describe single layer perceptron model. 3

   (c) Write short notes on : 4

      (i) Supervised learning

      (ii) Unsupervised learning.

Or

Write down the basic steps of Simulated Annealing.

[*Internal Assessment* : 10 Marks]

(*Mobile Computing*)

1. (a) Define wireless area protocol. 3

   (b) What is the difference between 2·5 G and 3G ? 3

    (c) What is SIM ? Write the function of SIM.   2 + 2

2. (a) Define amplitude modulation process.   2

    (b) Define IMEI, IMSI and TMSI. 2×3

    (c) What is PSK ?   2

3. (a) Define mobile IP. Describe "agent discovery" process briefly.   2 + 2

    (b) Define MAC. Explain different type of 802·11 protocol briefly.   1 + 3

    (c) What is "Bluetooth" ?   2

4. (a) Write the application of satellite system.   3

    (b) What is XCDR ?   2

    (c) Write the advantage of WLAN.   2

    (d) Define CSMA.   3

5. (a) Define Time Division Multiplexing Process.   3

    (b) What is MEO and LEO ? $1\frac{1}{2} \times 2$

    (c) What is Roaming ?   2

    (d) Write the difference between IPv4 and IPv6.   2

6. (a) Define the following term : $1\frac{1}{2} \times 4$

       (i) BSS

       (ii) BSC

       (iii) BTS

       (iv) AUC.

    (b) What is hidden terminal and expond terminal ? $1\frac{1}{2} \times 2$

    (c) What is protocol ?   1

[*Internal Assessment* : 10 Marks]

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