CLASS: MCA   SEMESTER: IV
BRANCH: MCA   SESSION: SP/19

SUBJECT: MCA7309 SOFT COMPUTING

TIME: 3 Hours   FULL MARKS: 60

INSTRUCTIONS:
1. The question paper contains 7 questions each of 12 marks and total 84 marks.
2. Candidates may attempt any 5 questions maximum of 60 marks.
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.

Q.1(a)   Compare and contrast fuzziness and probability. What do you mean by core, support and normality [6]
         of a fuzzy membership function?
Q.1(b)   Consider three sets A = {a, b, c}, B = {x, y}, C= {p, q, r}. Compute the fuzzy relations R = A x B and S [6]
         = B x C. Also find the value of max-min composition R $_0$ S.

Q.2(a)   Consider the fuzzy rule R: If service is good then customer is satisfied. The universe of discourse for [6]
         service rate = {a, b, c, d, e} and satisfaction grade = {1, 2, 3, 4, 5} where the service rating a, b, c,
         d, e are in the descending order and the satisfaction grade 1, 2, 3, 4, 5 are in the ascending order.
         The sets are defined as follows:
         good-service={1.0/a+0.8/b+0.6/c+0.4/d+0.2/e}
         satisfaction-rate={0.2/1+0.4/2+0.6/3+0.8/4+1.0/5}
         Find the relation matrix for this rule according to Jadeh's interpretation.
Q.2(b)   What do you mean by defuzzification method? Discuss three defuzzification methods with suitable [6]
         example.

Q.3(a)   Design a flowchart and discuss every working steps of a simple Genetic Algorithm process.   [6]
Q.3(b)   What do you mean by the fitness of a chromosome? Explain the Roulette wheel selection procedure.   [6]

Q.4(a)   What will be the impact of cross over probability on the population in Genetic Algorithm?   [6]
Q.4(b)   Implement uniform crossover with mass technique (consider any random string as mask) on the   [6]
         following binary string to generate two offsprings.
         A : 0110100101 B : 0100110010

Q.5(a)   Define learning method. Explain different categories of learning with example.   [6]
Q.5(b)   Discuss architecture of single layer feed forward artificial neural network with suitable diagram.   [6]

Q.6(a)   Mathematically describe the method of computing error correction terms and weight updation phase   [6]
         in Back Propagation Neural Network model consisting of a single hidden layer. (Assume that the model
         consists of 6 input neurons, 3 hidden neurons and two output neurons).
Q.6(b)   Discuss how the choice of learning rate, momentum factor, initial weights influence the Back   [6]
         Propagation neural network?

Q.7(a)   Write down the procedure of BAM pattern association.   [6]
Q.7(b)   Mention the features of Adaptive Resonance Theory Net.   [6]

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