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PRESIDENCY UNIVERSITY BENGALURU

SCHOOL OF ENGINEERING

MAKE UP EXAMINATION - JULY 2024

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| **Semester : 4** | **Date : 09-07-2024** |
| **Course Code : MEC3013** | **Time : 9:30 AM -12:30 PM** |
| **Course Name : Soft Computing Techniques** | **Max Marks :100** |
| **Program : B.Tech.** | **Weightage :50%** |

**Instructions:**

1. *Read all questions carefully and answer accordingly.*
2. *Question paper consists of 3 parts.*
3. *Scientific and non-programmable calculator are permitted.*
4. *Do not write any information on the question paper other than Roll Number.*

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| **PART A** | | | |
| **ANSWER ANY 4 QUESTIONS 5Q X 2M=10M** | | | |
| 1 | Soft Computing is an unconventional method of decision-making. Can you list a few characteristics of Soft Computing which make it so unconventional? | (CO 1) | [Knowledge] |
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| 2 | The domain of Soft Computing comprises various methods and techniques. Can you give two examples of Soft Computing with a neat block diagram? | (CO 2) | [Knowledge] |
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| 3 | Every human decision usually starts from a state of confusion. Define Fuzzy Logic with a small illustration. | (CO 2) | [Knowledge] |
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| 4 | Define soft computing technology and list few techniques. | (CO 1) | [Knowledge] |
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| 5 | Define an artificial neural network. | (CO 2) | [Knowledge] |
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| 6 | Name some activation functions used in ANN. | (CO 2) | [Knowledge] |
| 7 | What is a back propagation NN? | (CO 1) | [Knowledge] |
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| **PART B** | | | |
| **ANSWER ANY 5 QUESTIONS 5Q X 10M=50M** | | | |
| 8 | Soft Computing is a technique which doesn’t give an actual precise solution. How would you relate Parking a Vehicle to the domain of Soft Computing. Enumerate your views briefly. | (CO 2) | [Comprehension] |
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| 9 | Fuzzy Sets usually consists of objects with a degree of belongingness to a particular set. How would you represent this membership of a given object? Explain with an illustration. | (CO 3) | [Comprehension] |
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| 10 | Evolution is method by which the world selects the best possible outcome. Can you relate the concept of evolution and develop a mathematical algorithm to explain the evolution. Explain in detail every stage of selection process. | (CO 2) | [Comprehension] |
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| 11 | Nature selects the fittest slowly steadily giving ‘n’ opportunities to improve and rectify. Nature’s selection process highly random. How would you simulate the same process of selection? | (CO 3) | [Comprehension] |
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| 12 | Consider any 10 random customer reviews whose value lies between 1 to 10 and generate a fuzzy set for good ratings using a triangular membership function. | (CO 2) | [Comprehension] |
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| 13 | Genetic algorithm is a mathematical simulation of Gene and Evolution Theory. Can you explain 4 basic stages of evolution with a biological example? | (CO 2) | [Comprehension] |
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| 14 | Optimization is basically minimizing or maximizing the outcome with what’s available. Explain the concept of maxima and minima with a sample plot. Also explain local and global minima and maxima. | (CO 3) | [Comprehension] |
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| **PART C** | | | |
| **ANSWER ANY 2 QUESTIONS 2Q X 20M=40M** | | | |
| 15 | Consider the following two sets such that one set A contains all positive integers below 10 and other set B contains positive even numbers less than 20.  Determine:   * 1. Union,   2. Intersection,   3. Complement of A,   4. Set Difference (A-B) and (B-A)   5. Symmetric Difference.   Draw relevant Venn diagram. | (CO 4) | [Application] |
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| 16 | Consider 5 members of a family Rama, Sita, Dasharatha, Kusha, Lava whose ages are 55, 50, 89, 23, and 24 respectively. Compute the membership value for each family member for a fuzzy set M for all family members who are Senior Citizens. | (CO 4) | [Application] |
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| 17 | Image classification system developed by Google usually runs on ANN. Simulate an ANN with 1 input, output and hidden layer respectively. Assume any relevant data necessary. Use a step activation function. Run the Network for 4 iterative cycles. | (CO 4) | [Application] |
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