Ref. No: **Ex/EE/T/424A/2018**

B.E. ELECTRICAL ENGINEERING FOURTH YEAR SECOND SEMESTER - 2018

SUBJECT: - ADVANCED COMPUTING TECHNIQUES

Full Marks: 100

Time: Three hours **(50 marks for this part)**

Use a separate Answer-Script for each part

No. of Questions		PART -I Answer any Three (Two marks reserved for well organized answers)	Marks
1)		XYZ Corporation manufactures two electrical products: air-conditioners and large fans. The assembly process for each is similar in that both require a certain amount of wiring and drilling. Each air conditioner takes 3 hours of wiring and 2 hours of drilling. Each fan must go through 2 hours of wiring and 1 hour of drilling. Du ˙ g the next production period 240 hours of wiring time are available and up ω 140 hours of d ng time may be used. Management decides that to ensure an adequate supply of air conditioners for a contract, at least 20 air conditioners should be produced. Because XYZ incurred an oversupply of fans in the preceding period; management also insists that no more than 80 fans be produced during this production period. Each air conditioner sold yields a profit of Rs 25. Each fan assembled may be sold for an Rs 15 profit. Formulate and solve this Linear Program (LP) production mix situation to find the best combination of air conditioners and fans that yields the highest profit. (Do not use graphical method of solving LP problem.)	(16)
2)	a)	Explain gradient direction is the direction of steepest ascent? In this regard, also explain Cauchy's Steepest Descent Method in connection to a Non Linear Programming problem.	(3+5)
	b)	Minimize the following function using Cauchy's Steepest Descent Method $f(x_1, x_2) = (x_1 - 7)^2 + (x_2 - 2)^2$ starting from the initial point $X_1 = (9,4)$.	(8)
3)	a)	Identify, whether the point (0,6) , (1.5,1.5) and (2,2) are optimal point of the problem: Minimize $x_1^2 + x_2^2 - 10x_1 + 4x_2 + 2$ Subject to $x_1^2 + x_2 - 6 \le 0$ $x_2 \ge x_1, x_1 \ge 0$	(8)
	b)	Illustrate the method of "Lagrange multiplier".	(8)
4)		Four persons A, B, C, D are to be assigned with four tasks 1, 2, 3, 4 such that the total number of hours needed to complete the jobs is minimum. No person can be assigned with more than one job. Solve the assignment problem using Branch and Bound method. Give necessary explanations. Number of hours by each of the persons to complete each of the four tasks is given below. *(please turn over)*	(16)

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Time: Three hours **(50 marks for this part)**

Persons	Jobs			
	1	2	3	4
A	9	5	4	5
B	4	3	5	6
C	3	1	3	2
D	2	4	2	6

5) a) Illustrate briefly the "genetic algorithm" optimization technique. (8)

b) Illustrate in brief the "simulated annealing" method of optimization. (8)

Ex/EE/T/424A/2018

BACHELOR OF ENGINEERING IN ELECTRICAL ENGINEERING EXAMINATION, 2018

(4th Year, 2nd Semester)

ADVANCED COMPUTING TECHNIQUES

Time: Three Hours Full Marks: 100

(50 marks for each part)

Use a **separate** Answer-script for each Part

PART-II

Answer ***any three*** questions

Two marks are reserved for neat and well organized answer script

1. What do you understand by "Finite Difference Method (FDM)"? Discuss (i) Forward (ii) Backward and (iii) Central Difference Scheme with respect to FDM. 16

2. a) A curve is represented by $y = x^2$ $(-1 \leq x \leq 1)$. Show how the choice of suitable elements can approximate the area under the curve with the help of FEM. Comment on the different elements and associated percentage error in estimating the area 12

   b) Highlight some of the areas where FEM can be applied 4

3. a) What is the significance of the term "Neural Network"? Highlight the basic concept behind the different types of Artificial Neural Network (ANN). 6

   b) Show how an ANN can be "Trained" using an algorithm of your choice. 5

   c) Elaborate the types of learning processes in ANN. 5

4. Differentiate between Crisp set and Fuzzy set with example. Elaborate some important Fuzzy set operations. What is "Membership Function" with respect to Fuzzy Logic? Mention one application of Fuzzy Logic Controller. 2+9+4+1

5. a) Formulate the scheme of a reactive power control that can be solved using Fuzzy Logic. 10

   b) Show the solving technique of the formulated problem in question 5(a) using Fuzzy Logic. 6

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