EE/5/T/513.1/2017(S)

B. ELECTRICAL ENGG. (EVENING) EXAMINATION, 2017

(5^{th} Year, 1^{st} Semester, Supple)

ADVANCED COMPUTING TECHNIQUES

Time: Three Hours | Full Marks: 100

(50 marks for each part)

Use a separate answer-script for each part.

PART- I

Answer ***any three*** questions.

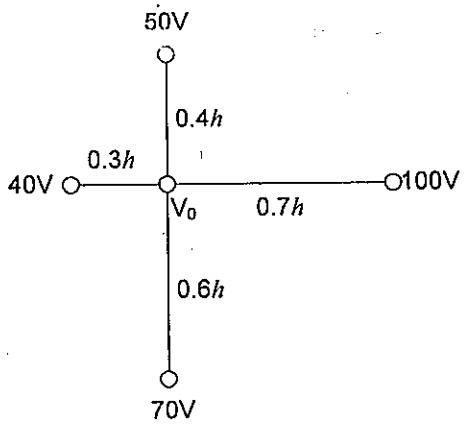
Two marks are reserved for neat and well organized answers.

1. a) Deduce the FDM equations in a two dimensional system with unequal nodal distances. 7

   b) Explain three basic finite difference schemes. 9

2. a) Explain the method of 'Acceleration of Convergence by relaxation.' 6

   b) Find the voltage V_0 as shown in figure below. 10

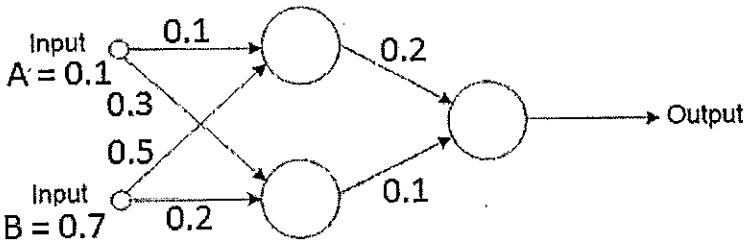


3. a) Discuss in brief how discretization can be done using FEM.

   b) 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. 10

4. a) Explain the importance of choice of weights in ANN. 4

b) Consider the network as shown in figure below : 12



Assuming that the neurons have a sigmoidal activation function, perform training with target value 1.0 and comment on the result after a second forward pass.

5. a) Distinguish between (i) Crisp Set, (ii) Fuzzy Set and (iii) Membership Function with respect to Fuzzy Logic. 6

b) Give the scheme of implementing a Fuzzy Logic Controller in a car. The input parameters can be (a) speed, (b) acceleration and (c) distance to destination. The output will be power flow to the engine. 10

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B. ELECTRICAL ENGINEERING (EVENING) EXAMINATION, 2017
(5^{th} year, 1^{st} Semester, Supplementary)

SUBJECT: - SPECIAL PAPER – I
ADVANCED COMPUTING TECHNIQUES

Time: Three hours

Full Marks: 100
(50 marks for this part)

Use a separate Answer-Script for each part

No. of Questions		PART -II Answer any Three (Two marks reserved for well organized answers)	Mark
6)		Solve the following LP problem using Simplex Algorithm Maximize $Z = 3x_1 + 5x_2$ Subject to $x_1 + x_2 \geq 2$ $x_2 \leq 6$ $3x_1 + 2x_2 = 18$ $x_1, x_2 \geq 0$	(16)
7)	a)	Discuss the Newton's method of solving the non-linear optimization problems.	(8)
	b)	Minimize $f(x_1, x_2) = x_1 - x_2 + 2x_1^2 + 2x_1x_2 + x_2^2$ starting from the point $x_1 = (0,0)$. Use Cauchy's Steepest Descent method.	(8)
8)	a)	Write the K-T conditions for the following function: Maximize $3x_1^2 - 2x_2$ Subject to $2x_1 + x_2 = 4$ $x_1^2 + x_2^2 \leq 19.4$ $x_1 \geq 0$	(8)
	b)	Use the method of Lagrange multipliers to maximize x^3y^5 subject to the constraint $x + y = 8$.	(8)
9)		Perform Two iterations of the non-linear simplex algorithm to *Minimize* $f(x_1, x_2) = (x_1^2 + x_2 - 11)^2 + (x_1 + x_2^2 - 7)^2$ The initial simplex is formed by the points X_1 = (0, 0), X_2 = (2, 0) and X_3= (1, 1) and the parameters of the algorithm are, α =1, β= 0 .5 and γ = 1.5, where the notation have their usual meanings. Permissible error for convergence, $\varepsilon = 10^{-3}$.	(16)

(please turn over)

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SUBJECT: - SPECIAL PAPER – I
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Full Marks: 100

Time: Three hours (50 marks for this part)

10)	a)	Discuss the Marquardt's method for solving the non-linear optimization problems	(8)
	b)	Briefly discuss simulated annealing	(8)