

Registration No :

--	--	--	--	--	--	--	--	--	--

Total Number of Pages : 02

M.Tech
P1PGCC01

1st Semester Regular/Back Examination 2019-20
COMPUTATIONAL METHODS AND TECHNIQUES

BRANCH : APPLIED ELECTRO & INSTRUMENTATION ENGG, AUTOMATION AND ROBOTICS, BIOTECH., CAD / CAM ENGG, CHEMICAL ENGG., CIVIL ENGG., COMMUNICATION ENGG, COMMUNICATION SYSTEMS, COMPUTER ENGG, COMPUTER SCIENCE, COMPUTER SCIENCE AND ENGG, COMPUTER SCIENCE AND TECH., CONSTRUCTION TECH. AND MANAGEMENT, DESIGN AND DYNAMICS, ELECTRI & ELECTRO ENGG (POWER SYSTEM ENGG), ELECTRICAL AND ELECTRO ENGG, ELECTRICAL ENGG., ELECTRICAL POWER SYSTEM, ELECTRO & COMM. ENGG, ELECTRO & INSTRUMENTATION ENGG, ELECTRO AND TELECOMMUNICATION ENGG, ENERGY SYSTEMS ENGG, ENVIORN ENGG., ENVIRONMENTAL SCIENCE AND ENGG, GEOTECHNICAL ENGG, HEAT POWER & THERMAL ENGG, HEAT POWER ENGG, INDUS. POWER CONTROL AND DRIVES (PT), INDUSTRIAL ENGG, INDUSTRIAL ENGG & MANAGEMENT, INDUSTRIAL METALLURGY, INFORMATION TECH., MACHINE DESIGN, MECH. ENGG (THERMAL & FLUID ENGG), MECH. ENGG., MECH. SYSTEM DESIGN, MECH. SYSTEMS DESIGN & DYNAMICS, METALLURGICAL AND MATERIALS ENGG, NANO TECH., PLASTIC ENGG, POLYMER NANOTECH., POWER AND ENERGY ENGG, POWER ELECTRO, POWER ELECTRO & DRIVES, POWER ELECTRO AND ELECTRICAL DRIVES, POWER ELECTRO AND POWER SYSTEMS, POWER ENGG AND ENERGY SYSTEMS, POWER SYSTEM ENGG, POWER SYSTEMS, PRODUCTION ENGG, PRODUCTION ENGG AND OPERATIONAL MGT, SIGNAL PROCESSING AND COMMUNICATION, SIGNAL PROCESSING AND ENGG, SOIL MECHANICS, SOIL MECHANICS & FOUNDATION ENGG, STRUCTURAL & FOUNDATION ENGG, STRUCTURAL ENGG, SYSTEM DESIGN, TEXTILE CHEMICAL PROCESSING, THERMAL & FLUID ENGG, THERMAL ENGG, THERMAL POWER ENGG, TRANSPORTATION ENGG, VLSI & EMBEDDED SYSTEMS, VLSI & EMBEDDED SYSTEMS DESIGN, VLSI DESIGN & EMBEDDED SYSTEMS, WATER RESOURCE ENGG, WATER RESOURCE ENGG AND MANAGEMENT, WIRELESS COMMUNICATION TECH.

Max Marks : 100

Time : 3 Hours

Q.CODE : HRB581

Answer Question No.1 (Part-1) which is compulsory, any EIGHT from Part-II and any TWO from Part-III.

The figures in the right hand margin indicate marks.

Part-I

Q1 Only Short Answer Type Questions (Answer All-10) (2 x 10)

- a) Define ANN with example.
- b) What are the salient features of Kohonen's self organizing learning algorithm?
- c) Discuss Hebbian learning rule.
- d) What is a termination criterion in perception training algorithm if the given sample is not linear?
- e) What is the appropriate choice of learning rate in perception training algorithm?
- f) Explain Fuzzy Set.
- g) What is the output of the neural network if the output node has:
 - Binary sigmoidal filter
 - Bipolar sigmoidal filter
 Input: [0.9 -0.7 0.3] Weight: [-0.5 0.9 0.1] Bias=0.35

- h) How many bits are needed to encode a binary chromosome if size of population is fixed at 30?
- i) Let two fuzzy sets,
 $A = \{(x_1, 0.5), (x_2, 0.7), (x_1, 0)\}$,
 $B = \{(x_1, 0.8), (x_2, 0.2), (x_1, 1)\}$.
 Calculate $A \cap B$ and $A \Delta B$.
- j) Differentiate between supervised learning, and unsupervised learning.

Part-II

Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve) (6 x 8)

- a) Discuss on Gaussian Function.
- b) Discuss the NLP
- c) Define and explain Karmakar's Algorithm
- d) Discuss the optimization technique to ensure minimum elevation angle within coverage area.
- e) Apply the fuzzy Modus Ponens to deduce Customer is very satisfied in fuzzy set given:
 Premise no 1: IF service is good Then customer is satisfied.
 Premise no 2: Service is very good.
 Consider the fuzzy rule, R: IF service is good THEN customer is satisfied.
 Related universes are service rating = {a, b, c, d, e} and satisfaction grade = {1,2, 3, 4, 5} where Both the sequence are in ascending order. good service = {(a, 1), (b, 0.8), (c, 0.6), (d, 0.4), (e, 0.2)}
 satisfied = {(1, 0.2), (2, 0.4), (3, 0.6), (4, 0.8), (5, 1.0)}
- f) Define and discuss on Dual Affine, and Primal Affine.
- g) Discuss the basic architecture of fuzzy system.
- h) Discuss the optimization technique to ensure minimum elevation angle within coverage area.
- i) Discuss the Hopfield Model with proper examples.
- j) Discuss in details on Antilock Breaking System(ABS)
- k) Define Computational Methods
- l) Explain Crisp Set.

Part-III

Only Long Answer Type Questions (Answer Any Two out of Four)

- Q3** Obtain the necessary condition for the optimum solution of the following **(16)**
 $\min f(x_1, x_2) = 3e6x_1 + 10 + 2e2x_2 + 15$ subject to
 $x_1 + x_2 = 7,$
 $x_1, x_2 \geq 0$
- Q4** a) Explain in detail on Artificial Bee Colony (ABC) algorithm with suitable example the **(8)**
 b) Discuss the structure and application of GRG Method **(8)**
- Q5** Use simplex method to: **(16)**
 maximize $z = 2x_2 + 3x_3$ subject to
 $x_1 + 3x_3 \leq 10, x_1 + x_2 \leq 5, x_1, x_2, x_3 \geq 0$
- Q6** Assume a feed forward network is presented with a input pattern [-1,1] and the target **(16)**
 output is +1. Learning rate $\eta = 0.6$ and momentum $\alpha = 0.25$. $[V_{11} V_{21}] = [0.6 - 0.1]$
 $[V_{12} V_{22}] = [-0.3 0.4]$. $[W_1 W_2] = [0.4 0.1]$.
 Find the updated synaptic weight values after one epoch of training.