(3 hours)   **Total Marks: 80**
Please check whether you have got the right question paper.
N.B. 1. Question No. **1** is **compulsory**
2. Attempt any **Three** out of remaining
3. Assume suitable data if **necessary** and **justify** the assumptions
4. Figures to the **right** indicate full marks

Q1. [A] Explain McCulloch-Pitts model using example.   **05**

[B] Describe crossover points with example.   **05**

[C] Describe with example support, core, normality, crossover points, & α-cut for   **05**
a fuzzy set.

[D] A neuron with 4 inputs has the weight vector w = [1 2 3 4]^t. The activation   **05**
function is linear, that is, the activation function is given by f(net) = 2 * net. If
the input vector is X = [4 2 3 1]^t , then find the output of the neuron.

Q2 [A] Describe Hebbian Learning rule with an example.   **10**

[B] Describe any five defuzzification methods with example.   **10**

Q3 [A] Describe with example linearly separable and non-linearly separable pattern   **10**
classification.

[B] Prove the following   **10**
i)   For unipolar continuous activation function
$$f'(net) = O(1 - O)$$
ii)   For bipolar continuous activation function
$$f'(net) = \frac{(1 - O^2)}{2}$$ where O is output.

Q4 [A] Explain with example max-min composition and max-product   **10**
composition.
[B] Describe Binary SVM in brief   **10**

Q5 [A] Describe in brief Single Solution Particle Swarm Optimization.   **10**

[B] What is Elitism? Explain the steps in Genetic Algorithm with a suitable   **10**
Example.

Q6   Describe the methods (**any two**)   **20**
a. Artificial Immune Models
b. Character Recognition
c. Natural Immune System.

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(**Time: 3hrs**)   (**Marks 80**)

1. Question No 1 is compulsory.
2. Attempt any three out of the remaining five questions.

Q1. (a) Briefly explain the concept of additive increase/multiplicative decrease mechanism of TCP.   05

(b) Identify the various issues associated with resource allocation?   05

(c) What are the deciding parameters for OSPF routers to become neighbours?   05

(d) Explain with examples multicast, unicast and anycast addresses in IPV6.   05

Q2. (a) An autonomous university currently has 4 departments of engineering housed in one building with five floors, one floor dedicated to each branch, and a server room, office and central computing facility on the first floor. Two additional programmes viz, Pharmacy and MCA have been approved for the university, which would be housed in a separate building 1 km away. The laboratory structure of each floor in the new buildings would be similar. The university has been granted the IP address 220.57.24.0 via a 10 Mbps leased line. Design subnets so that each building is assigned a different subnet. Private IP addressing can be used for providing logical separation between the different departments. Give the design details for the backbone layer, distribution layer and access layer of the campus network. Include the details for IP-addressing in your design.   12

Q2. (b) Discuss best practices of campus area network design   08

Q3. (a) What is VPN? How does the IPSec procotol help to setup a VPN?   10

Q3. (b) Explain in detail the resource allocation model of TCP. How does the router centric design differ from the host-centric one?   10

Q4.   (a) Explain the differences between the source initiated and receiver initiated MAC protocols by giving examples.   10

Q4. (b) Explain the exposed terminal problem with an example. What are the effects of exposed terminal problem in ad- hoc wireless networks? How is it handled?   10

Q5. (a) What are the objectives of an effective WAN design? Describe the different WAN Transport Technologies.   10

Q5. (b) Discuss the functions of the data center access layer and aggregation layer.   10

Q6.   Write short notes on: (any two):
         i)   WLAN Design   iii) Virtualization technologies   20
         ii)   Fair queuing mechanism   iv) Software Defined Networking

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Hours:03   Marks: 80

N.B.1) Question No.1 is compulsory.

    2) Attempt any three questions out of remaining five questions.

    3) Assume suitable data whenever required but justify the same.

    4) Assumptions made should be clearly stated.

1. (a) Explain Readers -Writers synchronization problem in Distributed operating system   10

    (b) Explain and analyze Raymond's tree based algorithm   10

2. (a) Describe two phase commit protocol of fault tolerance   10

    (b) ExplainDistributed Database System. What is the serializability condition in DDBS?   10

3. (a) Write a note on cloud OS   10

    (b)Define Real Time System. Explain types of real time task with example   10

4. (a) Write the Ho-Ramamurthy's centralize deadlock detection algorithm   10

    (b) Explain priority inversion in RTOS   10

5. (a) Write classifications of agreement problems in Distributed system   10

    (b) Explain different issues of load Distribution   10

6. (a) What are the ways of implementing backward error recovery? Explain in detail.   10

    (b) Explain Rate monotonic scheduling algorithm in RTOS   10

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