[This question paper contains 4 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 1628 A

Unique Paper Code : 42347610

Name of the Paper : Computer Networks

Name of the Course : B.Sc. (Programme) DSE

Semester : VI

Duration : 3 Hours Maximum Marks : 75

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. The paper has **two** sections.
3. **All** questions in **'Section A'** are compulsory.
3. Attempt any **five** questions from **'Section B'**.
4. Parts of a question must be answered together.

SECTION A

1. (a) What is a WAN in computer networks? Explain with an example. 2

(b) Which layer provides 2
i. user services such as electronic mail, remote file access and transfer.
ii. transmission of bit streams across Physical media.

(c) What is zero compression in IPv6 Colon Hexadecimal Notation? Write the address AB0F:0:0:0:0:0:0:C8 using Zero compression. 2

P.T.O.

(d) In which mode of communication can data flow in one direction only? Give an example. 2

(e) List different characteristics of a data communication system. 2

(f) How will you differentiate between a single-bit error with a burst error? explain with an example. 3

(g) What is the bandwidth-delay product of a link with a bandwidth of 50 kbps and a one-way transit time of 300 msec? Calculate the optimum window sizes for a sliding window protocol for the link. 3

(h) Briefly explain how a repeater extends a LAN. Is it an analog or a digital device? 3

(i) What is byte stuffing? How does it solve the problem of resynchronization after an error occurs? Given the output after byte-stuffing: FLAG A B ESC ESC C ESC ESC ESC FLAG ESC FLAG D F FLAG. What is the original data? 3

(j) In which type of communication, the media needs to be dedicated between devices. How is it better than the others? 3

SECTION B

(Attempt any five)

2. (a) Explain OSI reference model and compare it with TCP/IP model. 6

(b) Differentiate the following transmission technologies: 4

1. Broadcasting
2. Point to Point

3. (a) Explain the four characteristics and five components of a data communication system diagramatically. 6

(b) For each of the following four networks, discuss the consequences if a connection fails. 4

i. Seven devices arranged in a bus topology
ii. Six devices arranged in a star topology (not counting the hub)
iii. Ten devices arranged in a mesh topology
iv. Five devices arranged in a ring topology

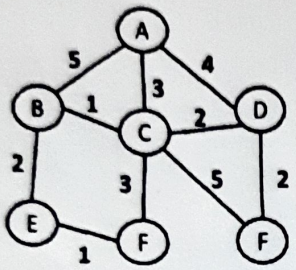
4. (a) Write short notes on :- 6

i. Radio transmission
ii, Microwave transmission
iii, Infrared wave transmission

(b) Write down the comparison between fiber-optics and twisted-pair cable. 4

5. (a) Suppose that a message 1100 1001 0011 1010 is transmitted using Internet Checksum (4-bit word). What is the value of the checksum? What kind of errors will not be detected by this Checksum? Give an example. 6

(b) Given the following network topology, construct a sink tree for router A keeping the optimality principle in mind. 4



6. (a) Create a system of 3 LANs with 4 bridges. the bridges (B1 to B4) connect the LAN as follows: 6
i. B1 connects LAN1 and LAN2
ii. B2 connects LAN1 and LAN3
iii. B3 connects LAN2 and LAN3
iv. B4 connects LAN1, LAN2 and LAN3
Choose B1 as the root bridge. Show the forwarding and blocking ports after applying the spanning tree procedure.

(b) Which one has more overhead, a router or a switch? Explain your answer. 4

7. (a) Assume you are given the assignment of setting three different computer labs with 100 machines, 48 machines, and 53 machines in each lab. You talked to the network administrator and was given 128.198.63.0/24 subnet for these three labs. What are the three subnets address and three gateway IP addresses you would like to assign to those three subnets? What is the broadcast address for these three subnets? 6

(b) Distinguish between the data and the control connection in the File Transfer Protocol. 4

8. (a) What are connection-oriented and connectionless services? Explain each with an example? 6

(b) Explain the connection between a Web page and HTML. 4

9. (a) Differentiate the following: 6
i. Flow control and Error control
ii. Switches and Gateways

(b) Why is caching an important optimization for web access? Describe the steps taken by a browser to determine whether to use an item from its cache or not. 4

Comp. Sc.