[This question paper contains 8 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 4511 **G**

Unique Paper Code : 32341303

Name of the Paper : Computer Networks

Name of the Course : **B.Sc. (Hons) Computer Science**

Semester : III

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. **Section A** is compulsory and carries 35 marks.
3. Attempt **any** 4 Questions from Section B.

Section A

1. (a) What is telecommunication? Assume six devices are arranged in a mesh topology. How many cables are needed? How many ports are needed for each device? (1+2)

P.T.O.

(b) What is QPSK? Give a constellation diagram for 4-QAM. (1+1)

(c) Give any two services provided by the following layers :

(1) Physical Layer

(2) Application Layer (4)

(d) Given a noiseless channel with a bandwidth of 3000 Hz transmitting a signal with two signal levels, calculate the maximum bit rate. (2)

(e) Consider a synchronous TDM system with n input lines. Given that the duration of input frame is T, explain the working of this system with a diagram. (2+1)

(f) Draw the digital waveforms to represent the following encoding schemes for the data 10101011. Assume that the last signal level is positive.

(1) NRZ-I

(2) Manchester Encoding (4)

(g) Explain the principle behind the working of optical fiber cable? (2)

(h) What is Flow Control? (1)

(i) Differentiate between packet switching and circuit switching. Give one application of each. (2+1)

(j) Briefly describe piggybacking? What happens if the receiver wants to acknowledge a frame without any data to be sent to the original sender? (1+1)

(k) What is the result of applying zero compression on the following IPv6 address FE80:0000: 0000:0000: 0000:BC21:0000:FFFF (1)

(l) Distance vector routing suffers from "count to infinity problem". Briefly discuss the count to infinity problem with an example. (2)

P.T.O.

(m) Enumerate the three parts of a Uniform Resource Locator? Give a suitable example. (3)

(n) What is the purpose of MF and DF flag bits with respect to IP header? (2)

(o) What is the significance of using guard bands? (1)

Section B

2. (a) A bit string, 0110111101111011111101 is to be transmitted at Data Link Layer, what is the string actually transmitted after bit stuffing? (2)

(b) What is subnetting? A router in an organization receives a packet with the destination address 190.240.34.95. If the subnet mask is / 19. Find the subnet address. (3)

(c) Give any three differences between virtual circuit and datagram subnet. (3)

(d) State the optimality principle. (2)

3. (a) Differentiate between:

(i) Microwave and Infrared (3)

(ii) FSK and PSK (2)

(iii) Gateway and Router (2)

(b) What are the three address categories to which an IPv6 address may belong? Explain each of them briefly. (3)

4. (a) Generate even parity Hamming Code for data bits 1100100. Show the steps. (3)

(b) Differentiate between Static and Dynamic Routing Algorithms with the help of an example. (3)

(c) Explain the working of the Selective Repeat Protocol with the help of a flow diagram for the following scenarios.

P.T.O.

(i) Successful communication

(ii) Lost acknowledgment (2+2)

5. (a) Describe the User Datagram Protocol header with the help of a diagram. (5)

(b) Briefly describe the one persistent, non-persistent and p-persistent CSMA protocols. (3)

(c) Name the protocols associated with the following port numbers:

(i) 80

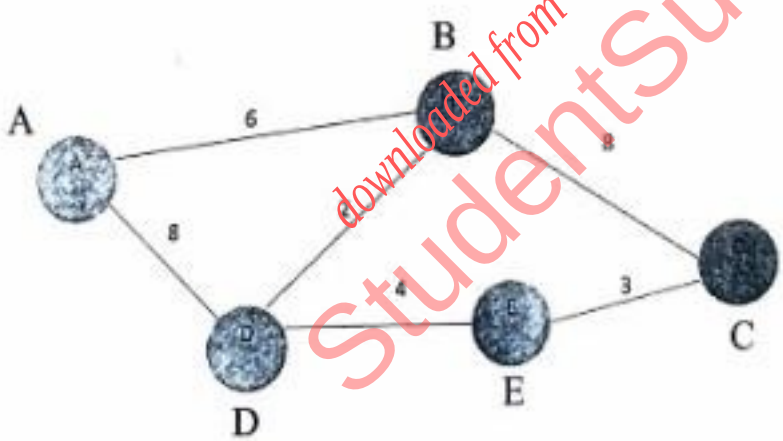
(ii) 23 (2)

6. (a) Differentiate between Bit Rate and Baud Rate with a suitable example. (2)

(b) What is the significance of ARP and RARP protocols? (2)

(c) In reference to digital signals, baseline wandering makes it difficult for the receiver to decode the signal correctly. Justify. (2)

(d) A given network was built with the routers in the network represented as nodes A, B, C, D and E. The edges in the graph represent the communication link between the routers. Each edge is labelled by the cost of traversing the link. Using Dijkshtra's shortest path algorithm, find shortest path from A to C.



(4)

P.T.O.

7. (a) Explain the process of connection establishment and connection release process used for Transmission Control Protocol. (3+2)

(b) To detect a d-bit error you need a distance d+1 code. Justify the statement. (3)

(c) What is the use of options field in the Internet Protocol Header? Explain with the help of an example (2)