

7351

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(ii) DNS

(iii) HDLC

(iv) WWW

(v) Router

(vi) Unguided Media

[This question paper contains 8 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 7351

J

Unique Paper Code : 2342573601

Name of the Paper : Computer Networks

Name of the Course : B.A. (Prog.) /B.Sc. (Phy. Sc.)
/B.Sc. Maths. Sc. (NEP-
UGCF)

Semester : VI

Duration : 3 Hours

Maximum Marks : 90

Instructions for Candidates

1. Write your Roll. No. on the top immediately on receipt of this question paper.
2. Section A (Question No. 1) is compulsory.
3. Attempt any four questions from Section B (Questions 2 to 7).
4. All questions in Section B carry equal marks.
5. Parts of a question must be answered together.

(1000)

P.T.O.

Section A

1. (a) Describe the notion of transmission impairment. Briefly discuss the difference between distortion and attenuation. (1+2=3)
- (b) Consider a noiseless channel with a bandwidth of 3000 Hz transmitting a signal with two signal levels. Calculate the maximum bit rate of the channel. (3)
- (c) Discuss the concept of byte stuffing used for framing. (3)
- (d) Assume six devices are arranged in a mesh topology. How many cables are needed? How many ports are needed for each device? (3)
- (e) Give three key differences between UDP and TCP. (3)
- (f) What are the periodic signals, and why are they commonly used in analog transmission? (3)

(c) Briefly explain the following CSMA protocols:

(3+3=6)

- (i) 1-persistent
 - (ii) p-persistent
6. (a) What is the role of the HTTP protocol in data communication? (3)
 - (b) Discuss the count to infinity problem in distance vector routing. (4)
 - (c) Describe the structure of an IPv4 address, discuss why IPv6 was introduced, and mention the address length in IPv6. (8)
7. (a) What is the Point-to-Point Protocol (PPP)? (3)
 - (b) Write short notes on the following: (2*6=12)
 - (i) Switch

- Link between C and D: Cost 3
- Link between C and E: Cost 7
- Link between D and E: Cost 2

Using the Shortest Path Algorithm (Dijkstra's algorithm), illustrate the step-by-step process of determining the shortest path from router A to router E. (8)

5. (a) What does the following address mean, and when are they used? (3)

(i) 0.0.0.0

(ii) 127.xx.yy.zz

(iii) 156.76.255.255

- (b) What are the advantages and disadvantages of using optical fiber as a medium for transmission? (6)

- (g) What is flow control? How is it handled at the data link layer? (3)
- (h) What is subnetting? A network on the internet has a subnet mask of 255.255.240.0. What is the maximum number of hosts it can handle? (3)
- (i) List different parts of a URL. Give an example. (3)
- (j) In IPv4 addressing, what are the identifiers (starting bit patterns and address ranges) for Class A, Class B, and Class C addresses? (3)

Section B

2. (a) In a bus topology with n devices, how many cable links are necessary assuming full-duplex communication? Additionally, how does this number of links compare to what is required in star topology and ring topology? (4)

- (b) What are the differences between Packet switching and Circuit switching? (5)
- (c) Consider a coding scheme with two legal codewords: 01010 and 10101. (2)
- (i) Calculate its Hamming distance. (2)
- (ii) How many bit errors can be detected by this code? (2)
- (iii) How many bit errors can be corrected by this code?
3. (a) Briefly discuss the concept of multiplexing. Differentiate between time division and frequency division multiplexing. (2+2=4)
- (b) Describe the structure of a TCP header. (5)
- (c) A message $M(x)$ 1101101101 is transmitted using the CRC method. The generator polynomial is $x^3 + 1$.

- (i) Compute the transmitted bit string, which includes the message and CRC. (3)
- (ii) Suppose that the fifth bit from the left is inverted during transmission. Show that this error is detected at the receiver's end. (3)
4. (a) List different layers of the OSI model. What are the main tasks of the Data Link Layer and Network Layer? (3+2+2=7)
- (b) Consider a network comprising five routers labelled as A, B, C, D, and E. The interconnection and its associated costs are as follows:
- Link between A and B: Cost 2
 - Link between A and C: Cost 4
 - Link between B and C: Cost 1
 - Link between B and D: Cost 5