(iv) Port Address

(v) URL

[This question paper contains 8 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 7380 **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.

Section A

1. (a) Consider a noiseless channel with a bandwidth of 4000 Hz transmitting a signal with eight signal levels. Calculate the maximum bit rate of the channel. (3)

(b) Differentiate between unicast, multicast, and broadcast communication. (3)

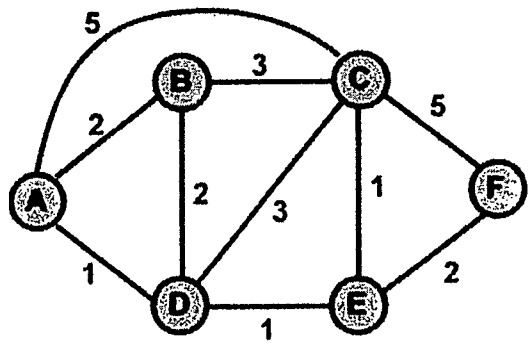
(c) Identify the OSI layer responsible for each of the following operations:

(i) Ensures reliable end-to-end message delivery between processes.

(ii) Responsible for moving packets from the source to the destination and enabling internetworking between networks.

(iii) Responsible for transmitting raw bits over a physical medium and defining the mechanical and electrical specifications of the interface. (3)

7. (a) Consider the following network with the indicated link cost. Using the shortest path Algorithm, find the shortest path from source node A to F. (5)



(b) Write short notes on the following: (2*5=10)

(i) LAN

(ii) WAN

(iii) MAN

(b) Describe wavelength division multiplexing. How it differs from the time division multiplexing technique. (2+3=5)

(c) Write the services provided by the physical and data link layer of the TCP/IP model. (3*2=6)

6. (a) Explain the purpose of byte stuffing in data link layer protocols. How does it differ from bit stuffing? (2+2=4)

(b) What is unguided media in data communication? What are the most commonly used types of unguided media in modern communication systems? (2+3=5)

(c) Briefly explain the following CSMA protocols: (3*2=6)

(i) 1-persistent

(ii) non-persistent

(d) Give any two differences between IPv4 and IPv6. (3)

(e) What is the full form of DNS? What is its use? (3)

(f) Compare the advantages and disadvantages of star topology when compared to mesh topology. (3)

(g) Describe the store-and-forward technique used in data communication. (3)

(h) What is bandwidth, and how would you calculate the bandwidth of a signal? Find the highest frequency when the lowest frequency is 1 kHz with a frequency range of 4 kHz. (3)

(i) Consider a noiseless channel with a bandwidth of 3000 Hz transmitting a signal with four signal levels. Calculate the maximum bit rate of the channel. (3)

(j) Describe routing and its use in the computer network. (3)

Section B

2. (a) Describe the differences between circuit switching and packet switching, using appropriate examples to illustrate each. (4)

(b) If a periodic signal is decomposed into five sine waves with frequencies of 100, 300, 500, 700, and 900 Hz, what is its bandwidth? Draw the spectrum, assuming all components have a maximum amplitude of 10 V. (2+3=5)

(c) What are the key differences between error detection and error correction? Discuss how the Hamming Code is used for single-bit error correction with an example. (6)

3. (a) Compare and contrast analog and digital transmission. (4)

(b) Give three differences between connectionless and connection-oriented services in networking. Give one example of each. (3+2=5)

(c) What do you mean by CS and CD in CSMA/CD protocol? Discuss the binary exponential back-off algorithm. (2+4-6)

4. (a) Differentiate between adaptive and non-adaptive routing algorithms. (4)

(b) What is the size (in bytes) of the minimum TCP header without options? List any four fields present in the TCP header and specify their purpose. (1+4=5)

(c) For Class A, Class B, and Class C IP addresses, specify their address ranges and default subnet masks. (6)

5. (a) Given an IP address of 192.168.1.0/26, how many subnets and hosts per subnet are possible? (4)

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CORRIGENDUM

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DURATION	:	3 Hour
Maximum Marks	:	90

Announcement for candidates

Serial No. be read as 7388 instead of 7380

Joint Registrar (Secrecy)