b) What do you mean by the "Two-Node Loop Instability" problem with distance vector routing? Explain with necessary diagrams. Also, provide a solution to the problem. 4

c) Briefly define subnetting and supernetting. How do the subnet mask and supernet mask differ from a default mask in classful addressing? 3

7.a) Define the type of attack in each of the following cases: 3

i) Ranchoddas Shyamaldas Chanchad breaks into the Virus's office to obtain a copy of the next exam

ii) *Stuart* gives a check for USD 500 to buy a used book. Later *Fin* finds out that the check was cashed for USD 5000

b) Difference between Cryptography and Steganography. Use the additive cipher with k = 3 to encrypt the plaintext "BU". Then decrypt the message to get the original plaintext. 4

c) When Diffie-Hellman algorithm is effective compared with RSA in public-key cryptography? Let's assume that, Alice wants to establish a shared secret with Bob and they agree on a prime number, p and a base, g in advance. For our example, let's assume that p = 9 and g = 7. Now, calculate the shared secret using Diffie-Hellman algorithm. 5

8.a) What is RSA algorithm? Alice wants to send message a to Bob. Then Bob need to select keys. Suppose, Bob chosen p = 7 and q = 13 in the RSA algorithm. Now, find the value of d. Also, encrypt the message *"BU"* using Bob's public key so that he can only decrypt. For simplicity, do the encryption and decryption character by character. 4

b) How message authentication code (MAC) works? Does it provide Confidentiality? Justify your answer. 4

c) Describe about the shift cipher and transposition ciphers with example. 4

b) Define physical, logical and socket address. 3

c) Depict the frame format of standard Ethernet. 3

4.a) In an IPv4 datagram, the value of total-length field is $(00A0)_{16}$ and the value of the header-length (HLEN) is $(5)_{16}$. How many bytes of payload are being carried by the datagram? What is the efficiency (ratio of the payload length to the total length) of this datagram? 3

b) Derive the routing table for the following Fig. 2. Also, show the forwarding process if a packet arrives at R1 with the destination address 180.70.65.140. 3

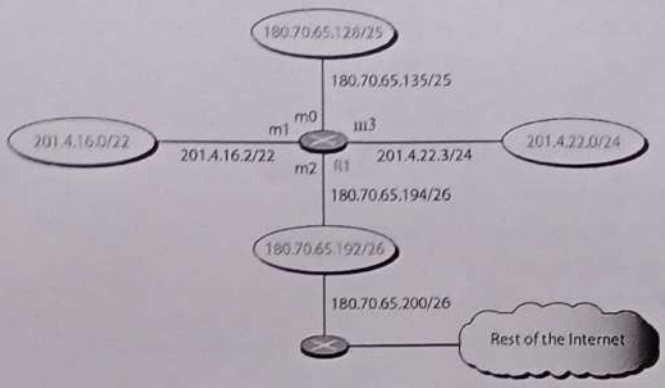
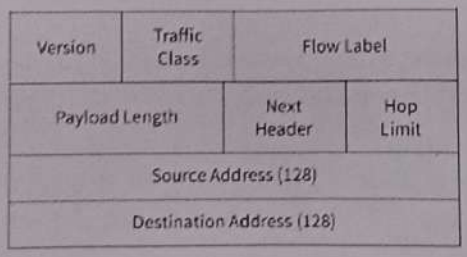


Fig. 2

c) It is possible to share a single public IP address on a Local Area Network (LAN) using a form of Network Address Translation (NAT). Explain how this accomplished by clearing stating the type of addresses used in the LAN; how the NAT device functions address mappings, any issues that may appear and measure taken by the NAT device to resolve the issue. 6

5.a) The following shows the IPv6 datagram format. Compare it with IPv4 datagram format. 5



b) What are the policies of congestion control in TCP? Explain any of them with necessary diagram. 5

c) A switch uses a filtering table; a router uses a routing table. Can you explain the difference? 2

6.a) Define Routing Protocol. Use Dijkstra's algorithm to find the shortest path tree and the forwarding table for node A in the Fig. 3. 5

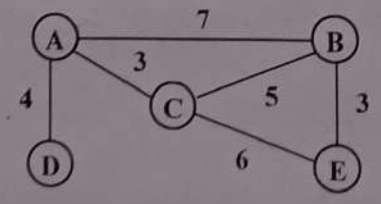


Fig. 3

University of Barishal

Department of Computer Science and Engineering

Course Title: Computer Networks

Course Code: CSE-3105

3rd Year 1st Semester Final Examination

Admission Session: 2018-2019

Time: 03 Hours **Marks:** 60

N.B.: Answer any **FIVE** questions out of the followings. All parts of each question must be answered consecutively. Right side of the question shows the maximum marks.

1.a) Determine one or more layers of OSI model to perform the following task. 5

i) Format and code conversion services
ii) Establishes, manages, and terminates sessions
iii) Ensures reliable transmission of data
iv) Log-in and log-out procedures
v) Provides independence from differences in data representation

b) What is port address? From Fig. 1, Assume that the communication is between a process running at computer A with port address ***m*** and a process running at computer D with port address ***n***. Show the contents of packets and frames at the network, data link, and transport layer for each hop. 4

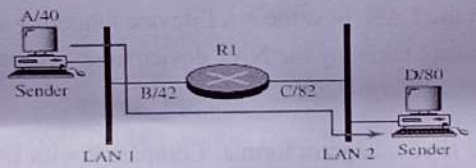


Fig. 1

c) If the data link layer can detect errors between hops, why do you think we need another checking mechanism at the transport layer in OSI model? 3

2.a) Consider sending 4000-byte IP datagram (including the 20 bytes IP header) into a link that has an MTU of 1400 bytes. Determine the values of the length field and the offset field in each fragment. 5

b) Explain the advantages of IPv6 when compared to IPv4. In which transition strategy do we need to encapsulate IPv6 packets in the IPv4 packets? 4

c) What do you mean by loopback interface? An organization is assigned the block 2000:1456:2474/48. What is the CIDR notation for the blocks in the first and second subnets in this organization? 3

3.a) You are given the following network address and subnet mask: 6

Network address: 192.168.10.0

Subnet mask: 255.255.255.224

i) How many subnets?	ii) How many hosts?
iii) What are the valid subnets	iv) Fill in the table below

Meaning	Subnet 1	Subnet 2	Subnet 3	Subnet 4	Subnet 5	Subnet 6
Subnet address						
First valid host						
Last valid host						
Broadcast address						