

University of Barishal
Department of Computer Science and Engineering

Course Title: Computer Networks

Course Code: CSE-3105

3rd Year 1st Semester (B.Sc.) Final Examination

Admission Session: 2020-2021

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)~~ Define ICMP and explain how it is used in error reporting and diagnostics. 5
- b) What is the difference between IPv6 link-local and unique local addresses? Provide examples. 4
- c) Define: bandwidth, ping, jitter 3
- ~~2.a)~~ You are transmitting a 5000-byte datagram over a link with MTU = 1500 bytes. Calculate how many fragments are created and show offset values. 5
- b) Explain the process of flow control in TCP using the sliding window mechanism. 4
- ~~c)~~ What is tunneling in IPv6? Give an example scenario where tunneling is required. 3
- ~~3.a)~~ Define subnetting. An organization is assigned the block 172.30.0.0/16. It wants to create 256 subnets. 6
- i) Find the subnet mask
- ii) Find the number of addresses in each subnet
- iii) Find the first and last addresses in subnet 10
- iv) Find the first and last addresses in subnet 256
- ~~b)~~ What is symmetric key encryption? Compare symmetric and asymmetric encryption with 3 examples.
- ~~c)~~ Write any two advantages and disadvantages of using IPv6 over IPv4. 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) What is NAT? How can NAT help in address depletion? Explain with the necessary diagram. 5
- c) Explain the responsibilities of the session and transport layer in the Internet model? 4
- ~~5.a)~~ Derive the routing table for the following Fig. 1. Also, show the forwarding process if a packet arrives at R1 with the destination address 180.70.65.140. 5

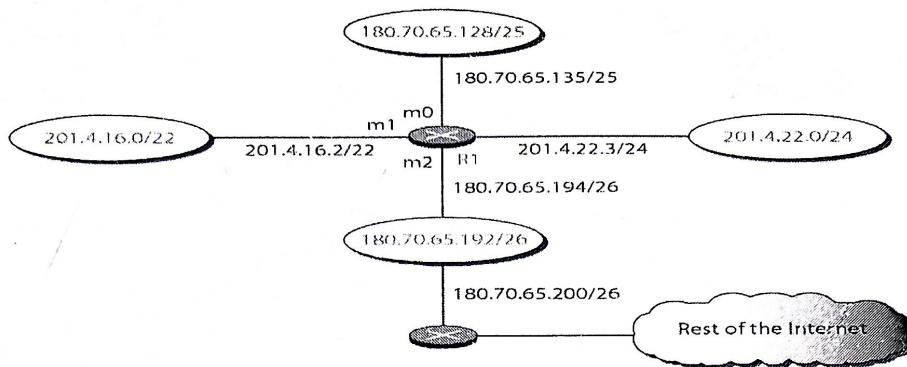


Fig. 1

- b) What is CIDR? How does CIDR contribute to address aggregation? 4
- c) Briefly describe: Destination-based forwarding and Source-based forwarding. 3
- 6.a) What is Distance Vector Routing? Use distance vector algorithm to construct routing table for node C in the Fig. 2. 5

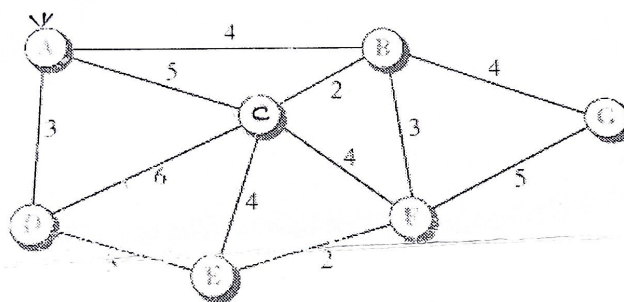


Fig. 2

- b) What is congestion? Explain the slow start algorithm used in TCP congestion control with a suitable example. 4
- c) What is the difference between a public IP and a private IP? Provide examples of each. 3
- 7.a) Describe Diffie-Hellman key exchange. Let $p = 23$, $g = 5$. Alice picks $a = 6$, Bob picks $b = 15$. Find the shared key. 5
- b) A switch uses a filtering table; a router uses a routing table. Can you explain the difference? 3
- c) Define Network Security. Differentiate between spoofing and sniffing attacks. 4
- 8.a) What is HMAC? How does it ensure message integrity? Does it encrypt the message content? 5
- b) Explain the process of creating and verifying a digital signature using asymmetric key cryptography. Use a step-by-step example involving a sender and a receiver. 5
- c) Alice uses a mobile app to hide messages in image pixels. Is this encryption or steganography? Explain. 2