

Shahjalal University of Science and Technology

Department of Computer Science and Engineering

3rd year 2nd Semester Final Examination—December 2020 (Session 2017-18)Course No.—**CSE 361**Course Title—**Computer Networking**Time—**5 Hours**Credit: **3.00**Total Marks#**30**

(Answer All the Questions)

Group A1. Answer the following **Five** Questions.

5 × 1 = 5

- (a) What is the default subnet masks of Class A and Class C networks?
- (b) What is the Loopback address?
- (c) Write the IP address 222.1.1.20, subnet mask 255.255.255.192 in CIDR notation.
- (d) What is a Man-in-the middle attack?
- (e) What is the purpose of class E address?

2. Answer the following **Two** Questions.

2 × 2.5 = 5

- (a) Define the runt frame and jumbo frame. How will the NIC detect these type of frames?
- (b) Define cancellation techniques for noise minimization with proper example.

3. An organization needs at least 5 subnets with the network address fixed as X.Y.Z.0 where X, Y, Z are 8 bit integers. Design the subnets and represent in schematic diagram with following specifications (any 2 subnets): subnet address, broadcast address, host IP addresses.

5

Group B1. Answer the following **Five** Questions.

5 × 1 = 5

- (a) What is RFI?
- (b) HTTP and POP use the _____ as their layer 4 (transport) protocol.
- (c) _____ protocol is used to resolve the IP address of any host like www.sust.edu
- (d) True or False? If False, write the correct statement: End systems, or hosts, communicate with each other using either server or client models.
- (e) True or False? If False, write the correct statement: Both UDP and TCP require that the applications recognize their own data formats.

2. Answer the following **Two** Questions.

2 × 2.5 = 5

- (a) Is Fiber cable affected by RFI or EMI? List some merits of using fibre.
- (b) What is the difference between Integrated services (IntServ) and Differentiated services (DiffServ)?

3. What is VLAN? What are the benefits of implementing VLANs? Explain two different types of VLAN.

5

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Group A

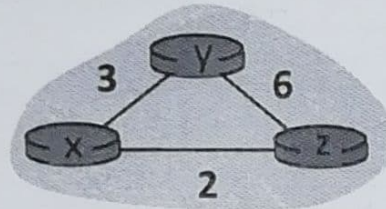
1. Answer the following **Five** Questions. 5 × 1 = 5
 - (a) What is the EMI?
 - (b) Name the PDUs generated by presentation and data-link layers.
 - (c) A layer-4 firewall CANNOT block which type of traffic? [HTTP/ICMP/TCP]
 - (d) TFTP and SNMP use the _____ their layer 4 (transport) protocol.
 - (e) What is HTTP and what port does it use?
2. Answer the following **Two** Questions. 2 × 2.5 = 5
 - (a) Explain the collision handle technique in CSMA/CD used by IEEE 803.
 - (b) What is the broadcast and network address for host 222.129.199.222/21?
3. Explain TCP 3-Way Handshake Process. 5

Group B

1. Answer the following **Five** Questions. 5 × 1 = 5
 - (a) The reason why does IP use the time-to-live (TTL) field in the IP datagram header is _____.
 - (b) Name the PDUs generated by application and transport layers.
 - (c) Primary benefit of using connection-oriented protocol like TCP is _____.
 - (d) True or False? If False, write the correct statement: IP is a connection-oriented protocol.
 - (e) True or False? If False, write the correct statement: A single program may have several open sockets at any time.
2. Answer the following **Two** Questions. 2 × 2.5 = 5
 - (a) Contrast between the client-service and P2P service model. Name some common applications.
 - (b) Why is it said that FTP sends control information “out-of-band”?
3. An IPv4 datagram has arrived with the following information in the header (in hexadecimal): 0x45 00 00 54 00 03 58 50 20 06 00 00 7C 4E 03 02 B4 0E 0F 02. Answer the followings: 5
 - Is the packet fragmented?
 - What is the size of the data?
 - How many more routers can the packet travel to?
 - What is the identification number of this packet?

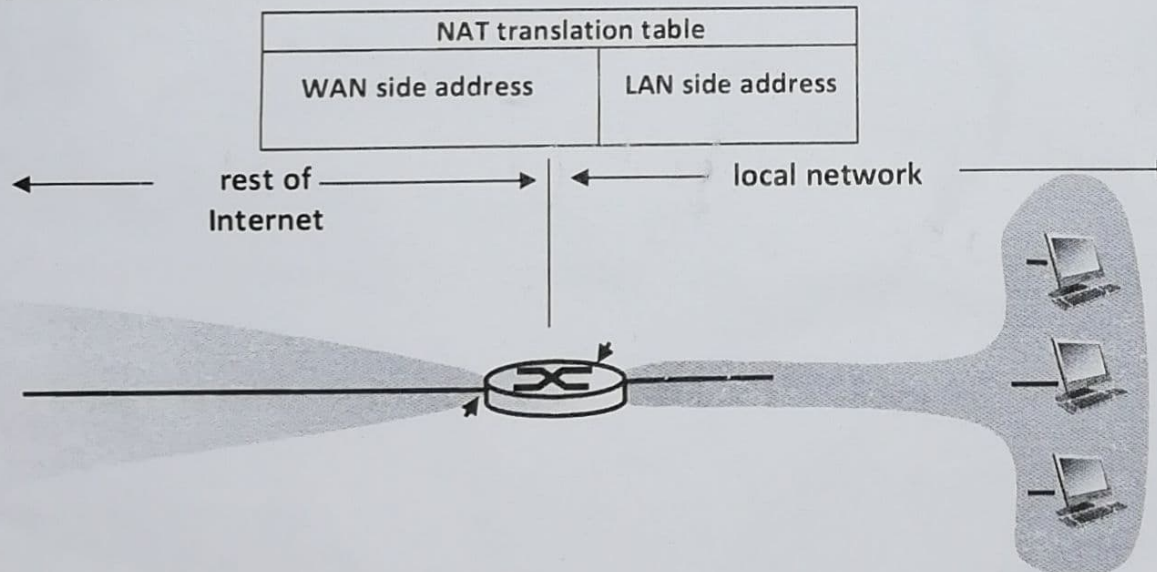
Answer the following Questions:

- Q1. Compare and contrast Link-state and Distance-vector routing algorithms. (4)
- Q2. Elaborate: RIP, OSPF, BGP, DHCP. (2)
- Q3. Consider the following three node topology. Compute the distance tables after the initialization step and after each iteration of a synchronous version of the distance-vector algorithm. (10)



Q4. Consider the network setup in the following figure. Suppose that the ISP assigns the router the address 24.34.112.235 and that the network address of the home network is 192.168.1/24.

- a. Assign addresses to all interfaces in the home network. (2)
- b. Suppose each host has one ongoing TCP connection, all to port 80 at host 128.119.40.86. Provide the three corresponding entries in the NAT translation table. (3)



Shahjalal University of Science and Technology
Department of Computer Science and Engineering
3rd Year 2nd Semester Final Examination, Dec 2019 (Session: 2016-17)
Course Code: CSE 361 Credits: 3 Course Title: Computer Networks
Time: 3 hrs Total Marks: 100

Group A
[Answer all the questions]

1. Answer any FIVE.

5*2=10

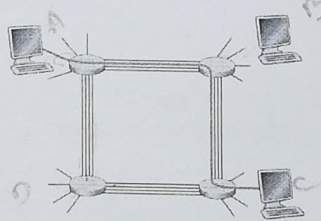
- a) What are the two most important network-layer functions in a datagram network?
- b) What is a loopback address? What is default gateway?
- c) How many host addresses are available on the **192.168.10.128/26** network? Change the mask to a prefix length: **255.255.255.192**
- d) What is the minimum and maximum size of an Ethernet Frame?
- e) Suppose you want to send the data bits 101110 in an Ethernet frame. The value of generator is 1011 and number of CRC bits is 3. Calculate the CRC and write the bit sequence that will be sent.
- f) A client residing on a host with IP address 112.12.5.9 sends a message to the corresponding server residing on a host with IP address 158.32.49.75. If the well-known port is 161 and the dynamic port is 52500, what are the pair of socket addresses used in this communication?
- g) Find the network address and the broadcast address of **123.56.77.55/29**.
- h) What is static route?

2. Answer any FOUR.

4x5=20

- a) Consider the circuit-switched network in the following figure where there are 4 circuits on each link. Label the four switches **A, B, C** and **D**, going in the clockwise direction.

- i) What is the maximum number of simultaneous connections that can be in progress at any one time in this network? (2.5)
- ii) Suppose that all connections are between switches **A** and **C**. What is the maximum number of simultaneous connections that can be in progress? (2.5)

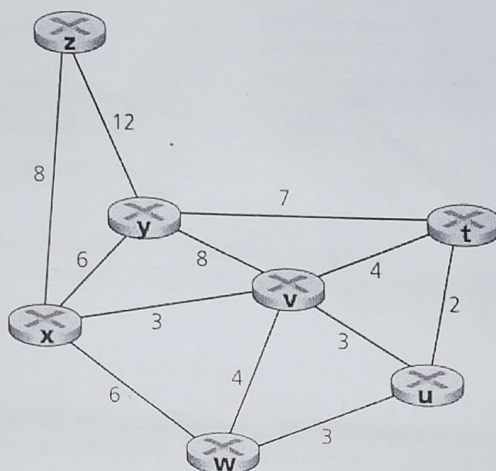


- b) Assume that Bob uses an e-mail client (a mail reader) such as Outlook to send an e-mail to Alice who uses a Web-based e-mail account (such as Gmail). The IP address of Alice's mail server is initially unknown to Bob's mail server. List all the transport and application layer protocols that are involved from the time when Bob sends the e-mail to the time when Alice reads it. Clearly indicate in which part of the transfer of the e-mail these transport/application layer protocols are used. (5)
- c) i) What are the primary functions of MAC sub layer? (1.5)
ii) Write the basic functions of ARP. What are the issues of ARP? (3.5)
- d) Suppose there are three routers between a source host and a destination host. Ignoring fragmentation, an IP datagram sent from the source host to the destination host will travel over how many interfaces? How many forwarding tables will be indexed to move the datagram from the source to the destination? Explain with a figure. (5)
- e) i) Consider the count-to-infinity problem in the distance vector routing. Will the count-to-infinity problem occur if we decrease the cost of a link? Why? How about if we connect two nodes which do not have a link? (2.5)
ii) Compare and contrast the advertisements used by RIP and OSPF. (2.5)
- f) Suppose you want to visit the URL <http://cse.sust.edu>. Explain step by step how IP address of the web server is obtained using Domain Name Service. (5)

3. Answer any TWO.

2x10=20

- a) i) List six access technologies. Classify each one as home access, enterprise access, or wide-area wireless access. (5)
 ii) Consider transferring a Web page from a server to a client using HTTP with Non-persistent connections. Explain the steps between the client and the server. (5)
- b) Suppose your organization uses the network address of 10.100.128.0/17. The network needs to be partitioned into 11 subnets. Answer the following questions: (10)
- For creating subnets, how many bits must be borrowed from the host address bits?
 - What is the subnet mask for these subnets, written in decimal?
 - What is the CIDR notation for the last (11th) subnet's network address?
 - In total, how many host addresses will be lost for this subnetting process?
 - What is the range of host addresses for the last (11th) subnet?
 - Suppose you have two more networks each with 2 hosts only and therefore you want to further divide the first subnet of the above 11 subnets, so that, only two usable IP addresses remain in each sub-sub-net. Write the network address along with the subnet-mask in decimal of such a sub-sub-net.
- c) Consider the following network. With the indicated link costs, use Dijkstra's shortest-path algorithm to compute the shortest path from *x* to all network nodes. Show how the algorithm works by computing a table. (10)



Group B

[Answer all the questions]

4. Answer any FIVE.

5*2=10

- What is Multicasting?
- What is Classless Addressing?
- What is the *gateway of last resort*?
- What is CSMA/CA? Where is it used?
- What is the Class of the address 132.56.8.6? What is the *net id* and *host id* of this address?
- What is the difference between a virus and a worm?
- What is the function of web proxy server?
- What is Administrative Distance?

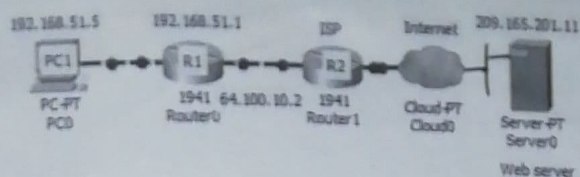
5. Answer any FOUR.

- i) Consider that an application wishes to pass real time traffic. Which transport protocol should it use – TCP or UDP? Justify your answer, explaining the implications of using each of the two protocols. (3)
 ii) What is the difference between a recursive query and an iterated query in the DNS? (2)
- i) What is NAT? Will NAT be obsolete once IPv6 is fully deployed? (3)
 ii) Why DHCP is required in a Network? (2)
- Consider the following topology where router R1 is NAT enabled. Write source IP address, source port number, destination IP address, destination port (5)

number for the following communication cases. Choose port numbers from your own where necessary.

- i) PC1 to R1
- ii) R1 to Web server
- iii) Web server to R1
- iv) R1 to PC1

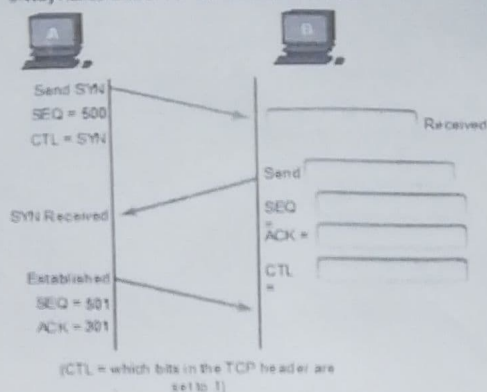
Network Topology



- d) i) Fill in the boxes with suitable descriptors.

(2.5)

3-Way Handshake of TCP Establishment Session



- ii) How TCP controls the flow in a congested network?

(2.5)

- f) Explain how states are managed using cookies with appropriate figures.

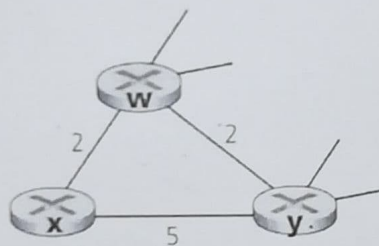
(5)

6. Answer any TWO.

- a) i) Compare between LS and DV algorithms.

(2)

ii) Consider the network fragment shown below. x has only two attached neighbors, w and y . w has a minimum-cost path to destination u (not shown) of 5, and y has a minimum-cost path to u of 6. The complete paths from w and y to u (and between w and y) are not shown. All link costs in the network have strictly positive integer values.



- i) Find x 's distance vector for destinations w , y , and u .

(6)

ii) Find a link-cost change for either $c(x,w)$ or $c(x,y)$ such that x will inform its neighbors of a new minimum-cost path to u as a result of executing the distance-vector algorithm.

(2)

- b) You are given a block of IPv4 addresses of 120.124.80.0/24. You need to create 3 subnets: one subnet with 110 addresses, one subnet with 40 addresses and one subnet of 9 addresses. Create an efficient subnetting plan and find out the following for each subnet:

- i) The subnetwork address and subnet mask.

(6)

- ii) The first host, last host and broadcast address for each subnet.

(3)

- iii) How many host addresses will be lost for this subnetting process?

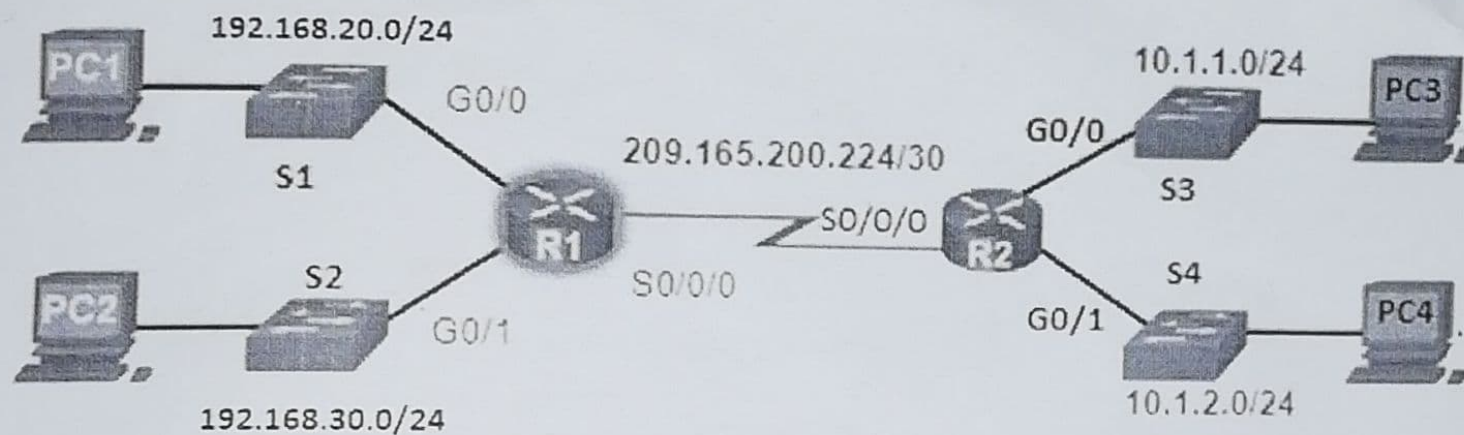
(1)

- c) i) Explain the Router Boot-up process.

(3)

- ii) Fill up the table using the information given in the following figure.

(7)



Device Name	Interface	IP Address	Default Gateway
PC1	NIC	?	?
PC4	NIC	?	?
R1	G0/0	?	N/A
	G0/1	?	N/A
	S0/0/0	?	N/A
S2	VLAN1	?	?
R2	G0/0	?	N/A
	G0/1	?	N/A
	S0/0/0	?	N/A
S3	VLAN1	?	?

Shahjalal University of Science & Technology

Department of Computer Science & Engineering

3rd Year 2nd Semester Final Examination' 2018 (Session: 2015-16)

Course No: CSE 361, Title: Computer Networking

Credits : 3.0 Full Marks : 100 Time : 3 Hours

Group A (answer ALL the questions)

Q1. Answer any TEN

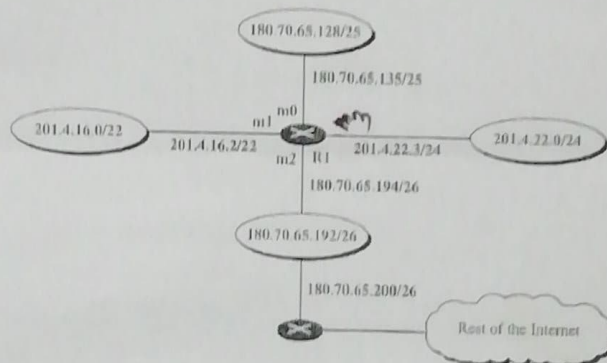
10*1

- Expand the IPv6 address to its original- 0:15:1:12:1213
- If an IP address uniquely defines a host on the internet, then what does a port address do?
- Assume five devices are arranged in a full mesh topology. How many cables are needed?
- If you are to connect a PC to switch, which cable (Crossover or Straight-through) would you use?
- Write a link-local address.
- What is the difference between pure ALOHA and slotted ALOHA?
- 11100010.23.14.227 - Is it a valid IPv4 address? Why?
- Name a path vector routing protocol.
- What is meant by "maximum burst size" for a network?
- What is a trap message?
- If the cipher text for the plain text "GAME" is "MAEG", then which types of cipher it is?
- Which encapsulation is used in dynamic VPN?
- Show the traffic profile for VBR.
- To assign IP addresses automatically to devices from an address pool, which protocol is used?
- Correct the sentence: "Both ARP request and reply is broadcast message."

Q2. Answer any FOUR

4*5

- What is "two node instability problem" in Link State routing protocol? How this problem can be solved?
- Construct a routing table for R1 for the following topology and write the forwarding process if a packet arrives at R1 with destination address 180.70.65.140.

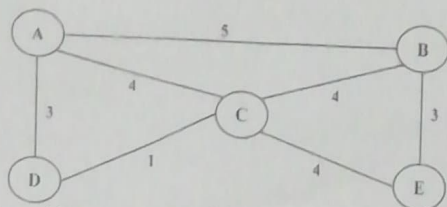


- Describe the open loop congestion control mechanisms in brief.
- Suppose Lily and Mily are about to start a transmission. They want to generate a session key using Diffie-Hellman algorithm. If they use $g = 7$ and $p = 23$, then find the symmetric key K for the session.
- Assume Bill received a cipher text "26" which John sends him using RSA encryption. Here, $p = 11$, $q = 7$, $e = 13$ and $d = 37$. Decrypt the cipher text into plain text.
- Use FLISM to find out the followings of the given network address, 172.16.5.0/20 with 2 sub-network of 850 host and 256 hosts.
 - How many subnets can be configured?
 - What are the network addresses of those subnets?
 - What is the 5th host address of 3rd subnet?
- What is anycast address? Find wildcard mask for 192.16.7.3/26. Why classless addressing was introduced over classful addressing?

Q3. Answer any TWO

2*10

- Define SONET and SDH. Write down the main functions of network management system.
- How SMI and MIB supports SNMP?
- Suppose, you have an IT firm in Varsity Gate named VGIT. Recently, you have owned another company in Surma named SIT. You also own the IP 204.15.5.0/24. Both of your companies have two branches (IT, Admin) each. The IT and admin branches of VGIT have 64 and 14 PCs respectively. On the other hand, SIT has 7 and 28 PCs in admin and IT branches respectively. You can afford at least two routers. Is it possible to manage the whole topology with the current IPs? If yes, then find the network address, first usable IP, last usable IP for each network; if no, then explain the difficulties and calculate how many IPs are lacking.
- Show the formation of routing table for node A in OSPF for the following topology.



ii. Describe how ARP maps logical address to physical address?

4

Group B (answer ALL the questions)

Q4. Answer any TEN

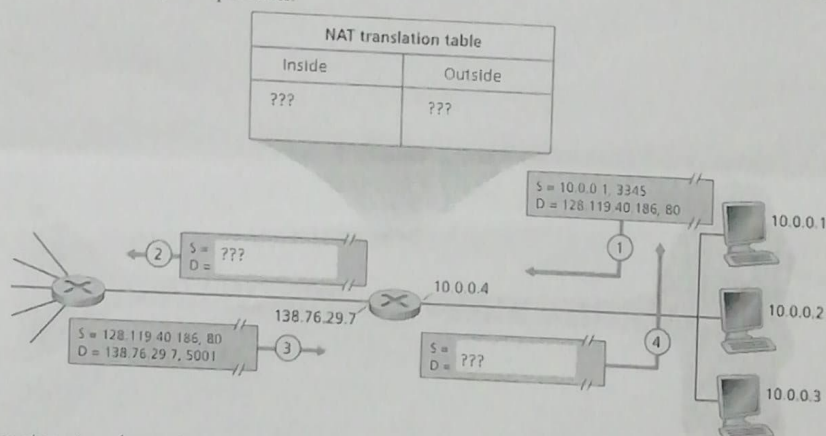
- Abbreviate the IPv6 address- FDEC:0074:0000:0000:0000:B0FF:0000:FFF0
- Give example of a physical address.
- Which types of LAN standard/ specifications are defined by IEEE 802.11?
- What is an access point?
- Write a site-local address.
- Name different types of Cipher.
- What is proxy ARP?
- Find the Caesar cipher text for the word "CSE".
- How many host bit is there in the network 172.16.9.15/27?
- Fill in the blank: RIP sends periodic updates every _____ seconds.
- Correct the sentence: *Open Shortest Path First* is a path vector routing protocol.
- What is the size of message digest in SHA-1?
- What is the purpose of *tracert* command?
- What is a jitter in a network?
- What is a one-password?

10*1

Q5. Answer any FOUR

- What does NAT do? Assume the following scenario of four consecutive messages of a transmission. Construct the following NAT table and fill up the question marks with proper addresses. Please draw the whole figure to answer your question.

4*5



- Write the steps to select private and public keys using RSA algorithm. Assume John wants to send the plain text "5" to Bill using asymmetric key encryption. John chooses $p = 11$, $q = 7$, $e = 13$ and $d = 37$. Find the cipher text using RSA algorithm.
- Find out the network address, gateway address, broadcast address, subnet mask and available host address range of the following IPv4 address: 192.16.5.5/25
- What is weighted fair queuing? Name two techniques for shaping traffic to improve QoS. Find the aggregated Network address for the following networks: 192.18.10.0/22, 192.18.14.0/26 and 192.18.8.0/25
- What is the access method of wireless LAN? Differentiate between circuit-switched network and packet-switched network.
- What is VLAN? Write the loop-back address. Why *ping* and *ifconfig* commands are used?
 - Determine the type of following Ethernet addresses:
1) 4A:30:10:21:10:1A and 2) 47:20:1B:2E:08:EE

Q6. Answer any TWO

- What is VPN? Which encapsulation and encryption methods are used to apply static VPN?
 - What are the techniques for transition from IPv4 to IPv6?
 - Write short note on any two from the following: i) HTTP ii) DNS iii) FTP
- Define the following attacks: Dictionary attack and man-in-middle attack.
 - How salting is applied on fixed password?
 - What is message digest? What are the main criteria for hash function?
- Describe ICMP query messages in brief.
 - List all types of IGMP messages. Change the multicast IP address 238.212.14.7 to an Ethernet multicast physical address. [Hint: An Ethernet multicast physical address is in the range from 01:00:5E:00:00:00 to 01:00:5E:7F:FF:FF]

Term Test 2
Course Code: CSE 365
Course Title: Computer Networking
Department of Computer Science and Engineering
Time: 30 min Total Marks: 20

- | | | |
|----|---|---|
| ✓1 | Explain why IP is called a <u>connectionless</u> and <u>best-effort</u> delivery service. | 5 |
| ✓2 | Create 1100 Subnets with a slash 8 prefix. /19 | 5 |
| ✓3 | How the routers build their routing tables? Explain with example. | 5 |
| ✓4 | Briefly explain the most important features of TCP. | 5 |

Term Test 1
Course Code: CSE 361
Course Title: Computer Networking
Department of Computer Science and Engineering
Time: 30 min Total Marks: 20

- | | | | |
|---|--|-----|-----|
| 1 | c. Define Intranets and Extranets with examples. | 2.5 | 2.5 |
| | d. What are the functions that may be provided by a network protocol? | | |
| 2 | Explain the four basic characteristics of a reliable network architecture. | | 5 |
| 3 | c. What are the network protocol requirements? | 2.5 | 2.5 |
| | d. State the benefits of using a layered model? | | |
| 4 | Briefly describe the responsibilities of data link sublayers. | | 5 |