Shahjalal University of Science and Technology
Institute of Information and Communication Technology
BSc (Engg.) in Software Engineering
3rd Year 1st Semester Final Examination, June 2019 (Session: 2016-17)
Course Code: CSE 323   Course Title: Computer Networking
Credits: 3.0   Time: 3 hrs   Total Marks: 100

Group A
[Answer all the questions]

1. Answer any FIVE [5x2=10]

a) Define Network and Network Protocol.
b) What is CSMA/CA? Where is it used?
c) Draw a figure that shows various components of an optical fiber.
d) Compare fiber optic cabling with UTP cabling.
e) Show with a block diagram the Ethernet frame format including the size of each field.
f) What is the purpose of subnetting?
g) Write the names of PDUs in Transport, Network and Datalink Layers.
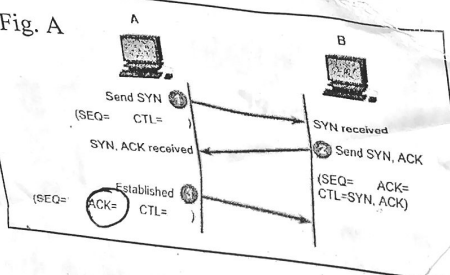h) State the function of IMAP protocol.

2. Answer any FOUR [4x5=20]

a) Write Ethernet transmission process (CSMA/CD). How is random backoff algorithm used in it?
b) Write the purpose and function of Address Resolution Protocol (ARP). Write two disadvantages of ARP.
c) How does twisting of a twisted pair cable eliminate noise effect?
d) Explain the differences between cut-through and store and forward switching.
e) How are Internet Protocol of Network layer and UDP of Transport layer related? Explain.
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.

3. Answer any TWO [2x10=20]

a) 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: 1+2+2+1+2+2
  i) For creating subnets, how many bits must be borrowed from the host address bits?
  ii) What is the subnet mask for these subnets, written in decimal?
  iii) What is the CIDR notation for the last (11th) subnet's network address?
  iv) In total, how many host addresses will be lost for this subnetting process?
  v) What is the range of host addresses for the last (11th) subnet?
  vi) Suppose you have 2 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.

b) i) What is the purpose of cladding in an optical fiber? Discuss its density relative to the core?
  ii) What are the differences between Circuit-Switch and Packet-Switch?   4+3+3
  iii) Explain the method of Datagram approach.

c) i) Why do you think that for video streaming UDP is a good choice that TCP?
  ii) Consider the 3-way handshake protocol shown in the Fig. A. Fill up the values of missing fields.   2+4+4
  iii) Consider the TCP congestion and flow control operation shown in the Fig. B. Fill up the missing values. Draw the figure for additional two steps.
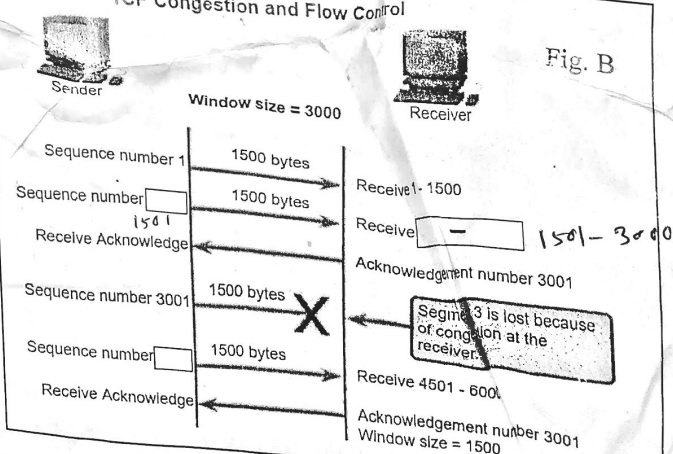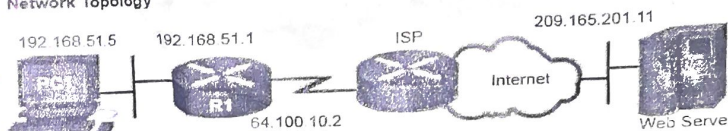

Fig. A

Fig. B

Answer any FIVE [5x2=10]

a) What are the goals of IPv6 design?

b) What is a floating route? Give an example.

c) What is the difference between classful and classless routing?

d) What do you understand by 10BaseT?

e) Give the hierarchical classification of dynamic routing protocols and give example of each class.

f) Suppose a router R1 needs to reach all of the remote networks: 10.15.0.0/27, 10.20.0.0/27, 10.25.0.0/27 and 10.35.0.0/27. The networks can be reached through a single interface of the router. Calculate a summary network and prefix.

g) Write two advantages and two disadvantages of NAT.

h) What is port forwarding? Give a simple example.

5. Answer any FOUR [4x5=20]

a) What is inter-VLAN routing? Differentiate between Router-on-a-Stick and Switch-based method of inter-VLAN routing.

b) When a packet arrives on a router interface, the router examines the IP header, identifies the destination IP address, and proceeds through the router lookup process. Write the steps that comprises the lookup process.

c) How fast is the Fast Ethernet? Explain the standard 100Base-FX.

d) What is an ACL? In what layers of OSI model does an ACL work? Write three functions of ACLs.

e) Show the leasing operation between a DHCP client and DHCP server with a figure and write. Write in brief the function of each message. What is the reason to broadcast the DHCPREQUEST message?

f) Consider the following topology where router R1 is NAT enabled. Write source IP address, source port number, destination IP address, destination port 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

192.168.51.5   192.168.51.1   ISP   209.165.201.11   Internet   64.100.10.2   Web Server

6. Answer any TWO [2x10=20]

a) Consider the routing table shown in following figure. Answer the following questions:

  i) What is an ultimate route? Give example from the given figure.

  ii) Define level 1 parent route and level 2 child route and give example of each.

  iii) Write the names of different parts of the route with the destination network 192.168.1.0 shown in the figure.

  iv) What is the name of the last route shown in the figure? What does it mean?

  v) Draw the network topology from the routing table shown in the figure.

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Gateway of last resort is 0.0.0.0 to network 0.0.0.0

     192.0.2.0/24 is variably subnetted, 2 subnets, 2 masks
C       192.0.2.0/30 is directly connected, Serial0/0/1
C       192.0.2.64/26 is directly connected, FastEthernet0/1
D    192.168.1.0/24 [90/2172416] via 192.168.2.1, 00:01:36, Serial0/0/0
C    192.168.2.0/24 is directly connected, Serial0/0/0
C    192.168.3.0/24 is directly connected, FastEthernet0/0
D    192.168.5.0/24 [90/2172416] via 192.168.2.1, 00;01:36, Serial0/0/0
S*   0.0.0.0/0 is directly connected, Serial0/0/1
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b) i) Name two popular routing algorithms? Find out the shortest path for every node from 'a' using any routing algorithm for the following figure.   6+4
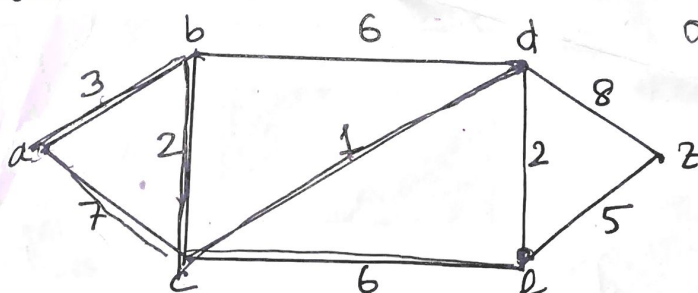
  ii) Write short notes on Gigabit Ethernet and SONET.

c) i) What is a VLAN?

  ii) How can the VLANs improve security?

  iii) Why does VoIP service in a network should be installed under a VLAN?

  iv) What is the difference between trunk and access ports?

  v) What is the purpose of Dynamic Trunking Protocol?