



Student Name:
Student Number:
Serial Number:

**Final Exam, Second Semester: 2015/2016**  
**Computer Engineering Department**

<b>Course Title:</b> Computer Networks, Communication and computer Networks	<b>Date:</b> 14/06/2016
<b>Course No:</b> 630411,650522	<b>Time:</b> 2 hours
<b>Lecturer:</b> Eng.Sultan M. Al-Rushdan	<b>No. of pages:</b> 4

Instructions:

- **ALLOWED:** Non-programmable calculator, pens and drawing tools (**no red colour**).
- **NOT ALLOWED:** Papers, literatures and any handouts. Otherwise, it will lead to the non-approval of your examination.
- **Shut down** Telephones, and other communication devices.

Please note:

- Write your name and your matriculation number on every page of the solution sheets.
- All solutions together with solution methods (explanatory statement) must be inserted in the labelled position on the solution sheets.
- Support your answer with diagrams, equations and examples when possible
- You can submit your exam after the first hour.

**Question 1:** **(15 marks)**

**Chose the correct answer for the following questions.**

1- What is the default subnet mask for a class C network?

- A. 127.0.0.1      B. 255.0.0.0      C. 255.255.0.0      D. **255.255.255.0**

2- Which of the following is a disadvantage of wireless LAN?

- A. Slower data transmission      B. higher error rate  
C. interference of transmissions from different computers      D. **All of the above**

3- Which of the following device is used to connect two LANs when the two LANs use different protocols?

- A. hub      B. bridge      C. **router**      D. repeater

4- What device separates a single network into two segments but lets the two segments appear as one to higher protocols?

- A. Switch      B. **Bridge**      C. Gateway      D. Router

5- What protocol is used to find the hardware address of a local device?

- A. RARP      B. **ARP**      C. IP      D. ICMP

6- What is the address range of a Class B network address in binary?

- A. 01xxxxxx      B. 0xxxxxxx      C. **10xxxxxx**      D. 110xxxxx

7- Routers operate at layer \_\_\_\_\_. LAN switches operate at layer \_\_\_\_\_. Ethernet hubs operate at layer \_\_\_\_\_.

- A. 3, 3, 1      B. 3, 2, 1      C. **3, 2, 1**      D. 3, 3, 2

8- A receiving host has failed to receive all of the segments that it should acknowledge. What can the host do to improve the reliability of this communication session?

- A. Send a different source port number.      B. Restart the virtual circuit.  
C. Decrease the sequence number.      D. **Decrease the window size.**

9- Which protocol does DHCP use at the Transport layer?

- A. IP      B. TCP      C. **UDP**      D. ARP



10- What is the purpose of flow control?

- A. To ensure that data is retransmitted if an acknowledgment is not received.
- B. To reassemble segments in the correct order at the destination device.
- C. To provide a means for the receiver to control the amount of data sent by the sender.**
- D. To regulate the size of each segment.

11- Which of the following types of connections can use full duplex?

- 1. Hub to hub
  - 2. Switch to switch
  - 3. Host to host
  - 4. Switch to hub
  - 5. Switch to host
- A. 1, 2 and 4      B. 3 and 4      C. 3 and 5      **D. 2, 3 and 5**

12- Which fields are contained within an IEEE Ethernet frame header?

- A. Source and destination MAC address**
- B. Source and destination network address
- C. Source and destination MAC address and source and destination network address
- D. Port Number

13- What is the maximum number of IP addresses that can be assigned to hosts on a local subnet that uses the 255.255.255.224 subnet mask?

- A. 14      B. 15      C. 16      **D. 30**

14- in which routing strategy all possible routes are tried.

- A. Fixed routing      **B. Flooding routing**      C. Random routing      D. Adaptive routing

15- what fields are contained in TCP header

- A. Source and destination Ports.
- B. Acknowledgement number.
- C. Push and Urgent flages.
- D. All of the above.**

**Question 2:**

**(3 marks)**

Explain the dynamic window sizing congestion control used in TCP protocol.

- 1. set slow start threshold to half current congestion window
- 2. set window to 1 and slow start until threshold
- 3. beyond threshold, increase window by 1 for each RTT



**Question 3:** **(2 marks)**

what are the differences between TCP and UDP protocols, and list an application for each one.

TCP:- connection oriented, reliable communication over reliable and unreliable networks guaranteed to deliver data  
application: file transfer application, database transaction, etc....

UDP:- connectionless service for application level unreliable, delivery & duplication control not guaranteed.  
reduced overhead,  
application: video and Audio streaming, broadcasting etc...

**Question 4:** **(3 marks)**

What are the error control mechanisms (Automatic repeat Request – ARQ) used in HDLC protocols.

- 1- Stop and wait
- 2- Go back N
- 3- Selective reject

**Question 5:** **(2 marks)**

Explain the process of fragmentation used in IPv6.

- 1- Source (sender) perform route discovery.
- 2- Source finds the required route and the minimum PDU on any portion of the network.
- 3- Source fragment data according to Minimum PDU on the path
- 4- Receiver reassemble to data again.

**Question 6:** **(3 marks)**

IP provides a connectionless service between end systems, what are the advantages of connectionless services.

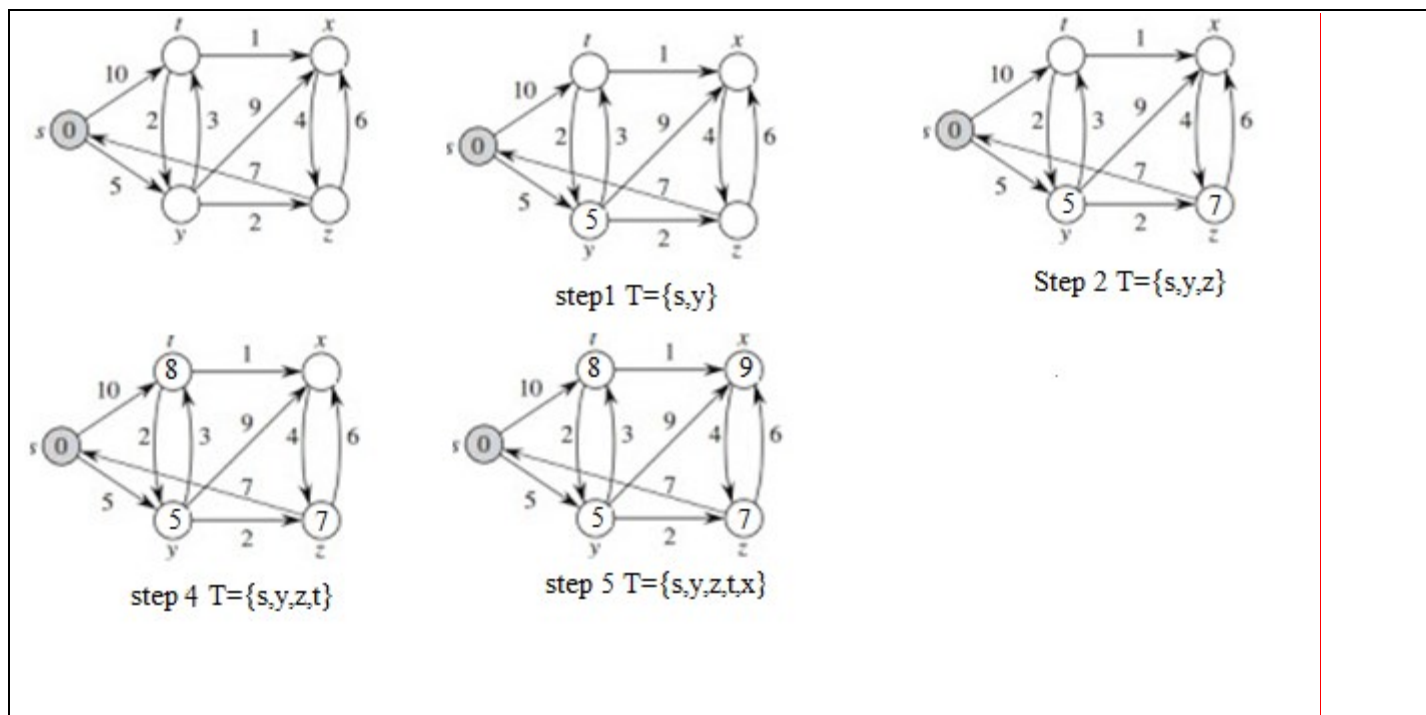
1. is flexible
2. can be made robust
3. does not impose unnecessary overhead

**Question 7:** **(2 marks)**

- 100Base-T4 :- Cat 3 UTP cable  
100 Base-TX :- Cat 5 UTP cable  
10 Base-2 :- Thin coaxial Cable  
100Base-FX :- Optical Fiber cables

**Question 8:** **(5 marks)**

Implement the Dijkstra's algorithm to find the shortest Path from node *s* to all other nodes.



**Question 9:** **(5 marks)**

Given the following table which represent the Round Trip Time (RTT) for some Data Packets, calculate the Smoothed Round Trip Time for the fourth packet (SRTT(4)), assuming  $\alpha=0.9$  then calculate the Retransmission Time Out (TRO) assuming  $\beta=1.7$  (Assume the  $SRTT(0)=RTT(1)$ ).

Packet Number (i)	1	2	3	4
RTT(i)	3	4	2	5

$$SRTT(K + 1) = \alpha \times SRTT(K) + (1 - \alpha) \times RTT(K + 1)$$

$$SRTT(1) = 0.9 \times SRTT(0) + 0.1 \times RTT(1) = 0.9 \times 3 + 0.1 \times 3 = 3$$

$$SRTT(2) = 0.9 \times SRTT(1) + 0.1 \times RTT(2) = 0.9 \times 3 + 0.1 \times 4 = 3.1$$

$$SRTT(3) = 0.9 \times SRTT(2) + 0.1 \times RTT(3) = 0.9 \times 3.1 + 0.1 \times 2 = 2.99$$

$$SRTT(4) = 0.9 \times SRTT(3) + 0.1 \times RTT(4) = 0.9 \times 2.99 + 0.1 \times 5 = 3.191$$

$$RTO(K + 1) = \beta \times SRTT(K + 1)$$

$$RTO(4) = 1.7 \times 3.191 = 5.4247$$