


National University of Computer and Emerging Sciences, Lahore Campus

	Course Name:	Computer Networks	Course Code:	CS3001
	Degree Program:	BS (CS)	Semester:	Fall 2021
	Exam Duration:	60 Minutes	Total Marks:	37
	Paper Date:	04-December-2021	Weight	15%
	Section:	ALL	Page(s):	5 + 1 (Rough Page)
	Exam Type:	Mid-II		

Name: _____ Roll No. _____ Section: _____

- Instruction/Notes:**
- Attempt all questions in the space provided on the question paper.
 - Space for rough work is provided at the end of the paper.
 - Even if you do use additional rough sheets, they should **NOT** be attached with final paper.

Problem 1: Answer the following multiple-choice questions by filling the following table. [1+1+1+1+1 = 5 Marks]

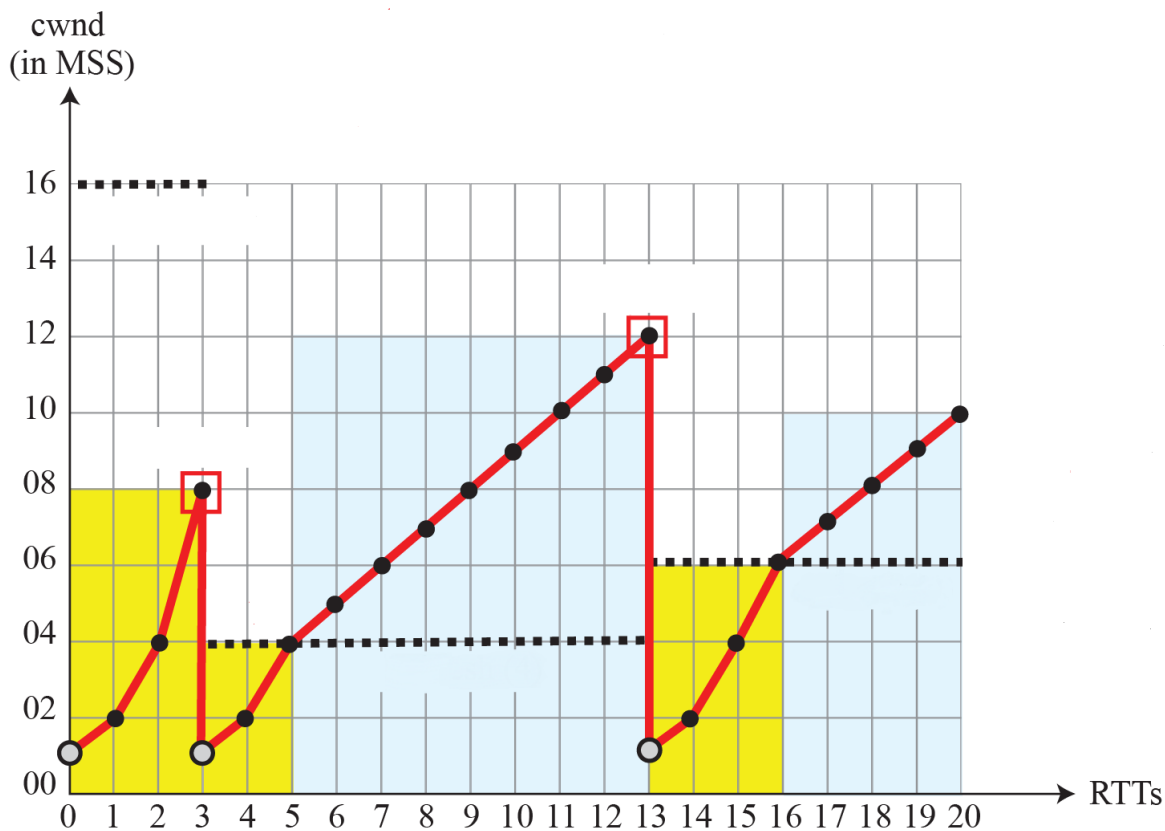
Any answers outside the table will NOT be marked.

1	D
2	C
3	D
4	B
5	B

- 1.1.** In IP(v4) header, at the received end, which field is used to pass on the payload to the correct next layer protocol?
- A. ver
 - B. Type of Service
 - C. Flags
 - D. Upper Layer
- 1.2.** The sending rate in TCP is adjusted according to the
- A. Congestion Window (cwnd)
 - B. Receive Window (rwnd)
 - C. Minimum of (cwnd , rwnd)
 - D. Urgent Data Pointer
- 1.3.** The first 8 bits of IPv4 datagram will be ----- if all optional fields are included in header of datagram.
- A. 01000101
 - B. 01001101
 - C. 01001100
 - D. 01001111
- 1.4** The size of an IPv4 header is:
- A. Less than 20 bytes
 - B. At least 20 bytes
 - C. Always greater than 20 bytes
 - D. 40 bytes exactly
- 1.5** Size of source and destination port address of TCP header respectively are _____
- A. 16-bits and 32-bits
 - B. 16-bits and 16-bits
 - C. 32-bits and 16-bits
 - D. 32-bits and 32-bits

Problem 2: Refer to the diagram / chart below, please answer the following questions:

[1+1+1+1+1+5=10 Marks]



a) Which of the below option(s) is/are true? [Encircle the correct option(s) clearly]

i) The above diagram depicts TCP Tahoe only

ii) The above diagram depicts TCP Reno only

iii) The above diagram depicts TCP Vegas only

iv) The above diagram depicts all, i.e. TCP Tahoe, Reno & Vegas

b) What happened at transmission round 3 (i.e. at RTT = 3), i.e. state the reason / event?

Time-Out

c) What happened at transmission round 5 (i.e. at RTT = 5), i.e. state the reason / event?

ssth reached

d) What happened at transmission round 13 (i.e. at RTT = 13), i.e. state the reason / event?

3 duplicate ACKs received

e) What happened at transmission round 16 (i.e. at RTT = 16), i.e. state the reason / event?

ssth reached

f) Which state is the TCP in between transmission rounds (RTT)

(i) 0 & 3 Slow Start

(ii) 3 & 5 **Slow Start**

(iii) 5 & 13 **Congestion Avoidance**

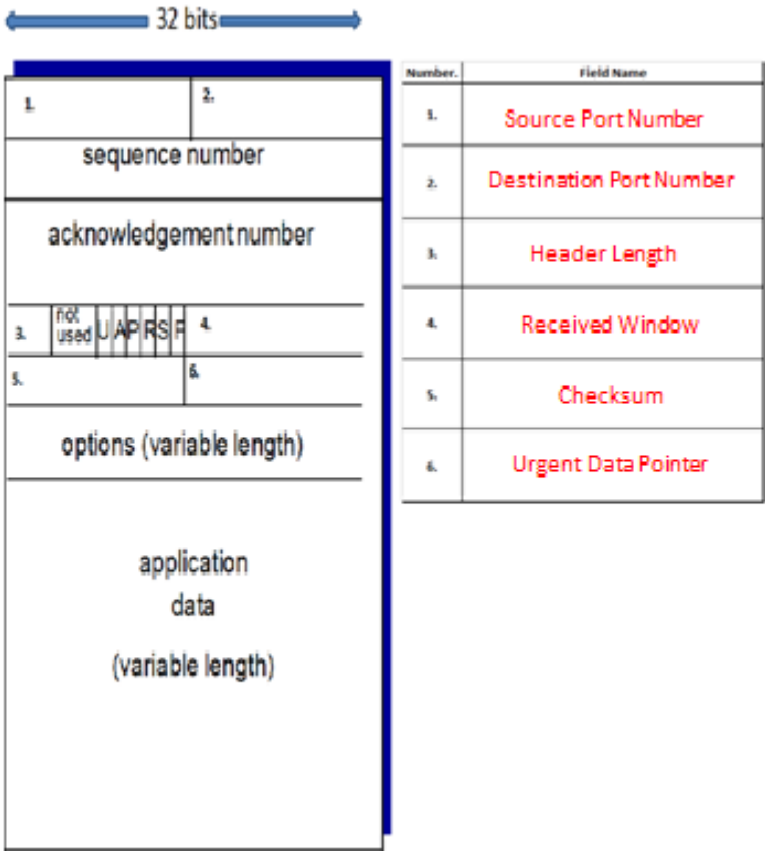
(iv) 13 & 16 **Slow Start**

(v) 16 & 20 **Congestion Avoidance**

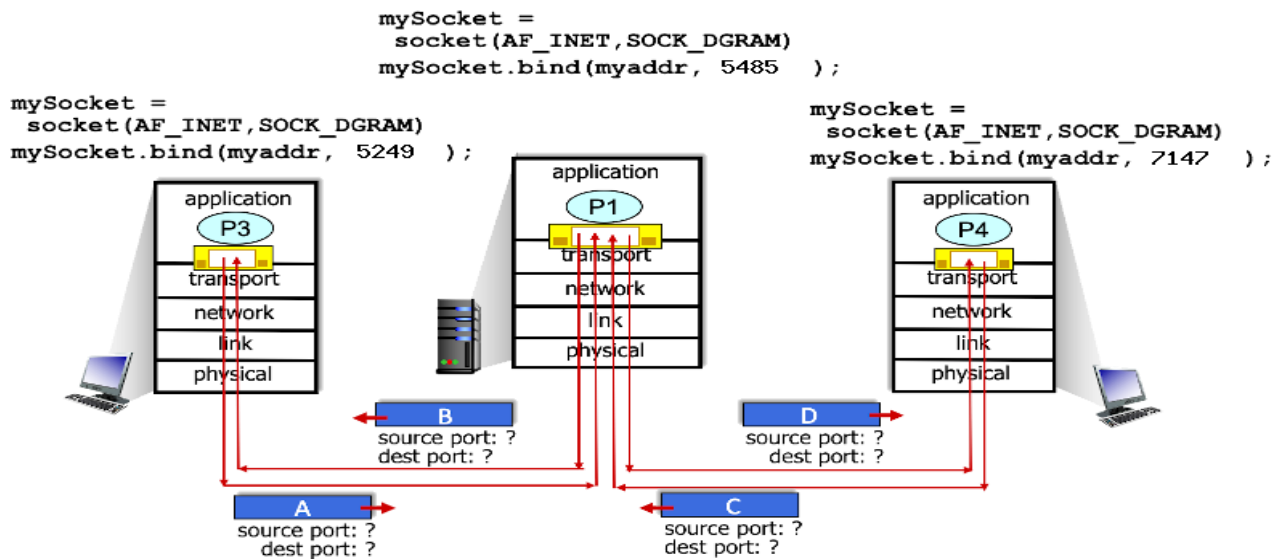
Problem 3: An organization is granted a block of addresses starting with 132.100.24.0/23 (512 addresses). The organization needs to have four sub-blocks of addresses to use in its four subnets. Sub-blocks are designed in such a way that 1st one can accommodate 256 addresses, 2nd can accommodate 128 addresses and remaining two sub-blocks can accommodate 64 addresses each (including network address and broadcast address). With reference to this scenario, answer the following: **[2+2+2+2 = 8 Marks]**

- a) Write the subnet mask for each sub-block.
Subnet mask for the 1st sub-block: **255.255.255.0**
Subnet mask for the 2nd sub-block: **255.255.255.128**
Subnet mask for the 3rd sub-block: **255.255.255.192**
Subnet mask for the 4th sub-block: **255.255.255.224**
- b) Write the Network (subnet) ID and broadcast ID for 2nd and 4th sub-blocks.
Network (subnet) ID for 2nd sub-block: **132.100.25.0/25**
Broadcast ID for 2nd sub-block: **132.100.25.127/25**
Network (subnet) ID for 4th sub-block: **132.100.25.192/26**
Broadcast ID for 4th sub-block: **132.100.25.255/26**
- c) Write the first and last host address for 3rd and 4th sub-blocks.
First host address for 3rd sub-block: **132.100.25.129/26**
Last host address for 3rd sub-block: **132.100.25.190/26**
First host address for 4th sub-block: **132.100.25.193/26**
Last host address for 4th sub-block: **132.100.25.254/26**
- d) Write the 25th and 50th host address for 1st and 3rd sub-blocks.
25th host address for 1st sub-block: **132.100.24.25/24**
50th host address for 1st sub-block: **132.100.24.50/24**
25th host address for 3rd sub-block: **132.100.25.153/26**
50th host address for 3rd sub-block: **132.100.25.178/26**

Problem 4: Refer to the below diagram of a TCP Segment, write the corresponding names of the missing fields (numbered 1. to 6.) in the table on the right side. [1+1+1+1+1+1 = 6]



Problem 5: In the scenario below, the left and right clients communicate with a server using UDP sockets. The same socket at the server is used to communicate with both clients. The Python code used to create the sockets is shown in the figure. Consider the four transport-layer packets A, B, C, and D shown in the figure below. **[1+1+1+1+1+1+1+1 = 8]**



A. What is the source port number for packet A?

The source port for packet A is port 5249.

B. What is the Destination port number for packet A?

The destination port for packet A is port 5485.

C. What is the source port number for packet B?

The source port for packet B is port 5485.

D. What is the Destination port number for packet B?

The destination port for packet B is port 5249.

E. What is the source port number for packet C?

The source port for packet C is port 7147.

F. What is the Destination port number for packet C?

The destination port for packet C is port 5485.

G. What is the source port number for packet D?

The source port for packet D is port 5485.

H. What is the Destination port number for packet D?

The destination port for packet D is port 7147.

Rough Work: