Roll Number:_____

Thapar Institute of Engineering & Technology, Patiala

Department of Computer Science and Engineering

MST

B. E. (Third Year): Semester-V (2022-23) ODD	Course Code: UCS413
Branch: CSE/COE	Course Name: Network Programming
27 Sept, 2022 (Tuesday)	Time: 1:00 P.M.
Duration: 2 Hours	Max Marks: 25
Name of Instructors: Dr. Surjit Singh, Dr. Ashima, Dr. Jayendra, Dr. Shashank, Dr. Satendra	

Note: *ALL questions are compulsory. Attempt ALL questions in a proper sequence. Questions having multiple parts should be attempted at one place. Without proper steps and justification (wherever required), no marks will be awarded. Write your programs in C. Assume missing data, if any, suitably.*

Q1	**i).** Explain briefly the **byte ordering**. Find out the **output** of following code considering the machine to be little-endian. int a = 340; char *p P = (char*)&a printf ("%d", *P); printf ("%c", *P); **ii).** Explain two **byte manipulation** functions that are used to convert the host address "**a.b.c.d**" into network byte order with examples.	1+2 2
Q2	How connection in TCP is different from the association, in the context of SCTP protocol, explain with the help of state transition diagram of SCTP.	2.5+2.5
Q3	In a **TCP** Socket based **server side program**, we have one listening socket (created by socket() function) and multiple data communication sockets (returned by accept() function). Create a TCP server-side socket program in which client sends any string to server and server returns the number of characters in the string back to the client. At server side, listening socket and data communication sockets should be multiplexed on the same **fd_set** by using **select**() system call. Assume maximum **TWO** client may connect to the server. Assume following program flow on client side: Create socket →create server addr → Call connect() → Take string input from user → send string to server using send() →receive result from server using recv() → print result → exit. *No need to write client side application.*	5
Q4	**i).** Discuss the prototype of the functions used to **fetch** and **modify** the socket options. **ii).** Why **SO_BROADCAST** and **SO_DEBUG** socket options are not used in TCP and UDP protocol, respectively? **iii).** Why do we use **struct sctp_initmsg** and **struct sctp_event_subscribe** structure in SCTP? Write the C statement to update the socket options on client side for multiple streams in SCTP.	2 1 1+1
Q5	**i).** The following is the content of a UDP header in hexadecimal format. **B3260035001C001C** **a.** What is the source port number? **b.** What is the destination port number? **c.** What is the total length of the user datagram? **d.** What is the length of the data? **ii).** An IP packet of size **1600 bytes** passes through network segment before it reaches its destination. The header size of this packet is **30 bytes**. The maximum size of an IP packet in intermediate network (**MTU**) is **1400 bytes**. How the IP packet would be fragmented in a router. Find packet size, byte range, More Fragment (MF) bit and offset for each fragment.	2 3