

3Register Number															
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**SRM Institute of Science and Technology**  
**College of Engineering and Technology**  
**School of Computing**

**Batch -1 Set - A**

SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamil Nadu

**Academic Year: 2022-23 (ODD)**

Test: CLA-T2

Course Code & Title: 18CSC302J – Computer Networks

Year & Sem: III Year / V Sem

Date: 19-10-2022

Duration: 1 Period

Max. Marks: 25

**Course Articulation Matrix:**

S.No.	Course Outcome	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
1	CO2	2	3	-	2	1	-	-	-	2	1	-	3
2	CO3	2	3	-	3	1	-	-	-	2	1	-	3

**Part – A**

**(5 x 1 mark = 5 Marks)**

Instructions: 1) Answer ALL questions. 2) Write the correct answer in the answer booklet

Q. No	Question	Marks	BL	CO	PO	PI Code
1	SCTP allows _____ service in each association.  a) Single stream  <b>b) Multistream</b>  c) Double stream  d) None of the above	1	L1	2	1	1.6.1
2	If error occurs in the data transfer between the client and the server, the send and receive function will return  a) 0  b) 1  <b>c) -1</b>  d) 0 or 1	1	L2	2	1	1.6.1
3	RPC works between two processes. These processes must be _____  a) on the same computer  b) on different computers connected with a network  <b>c) on the same computer and also on different computers connected with a network</b>	1	L1	2	1	1.6.1

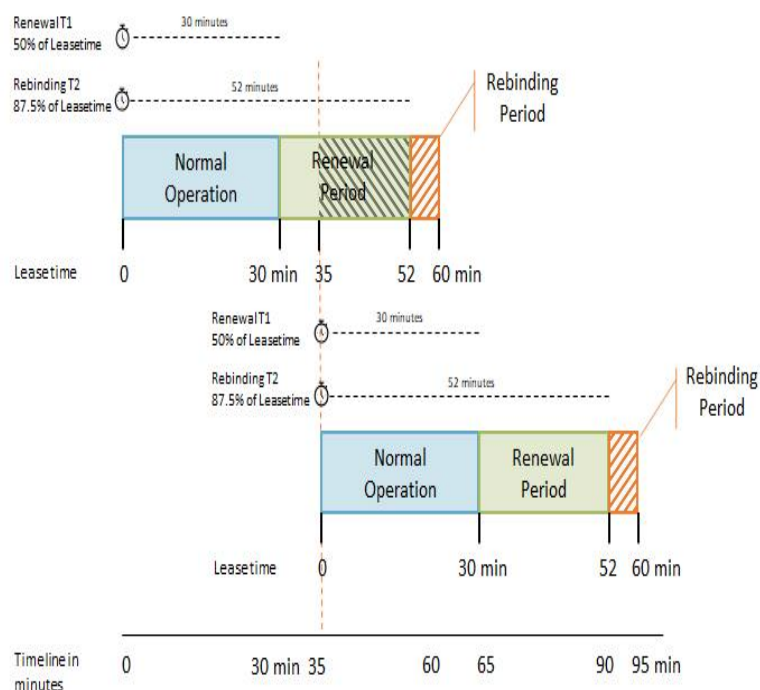
	d) on none of the computers					
4	<p>In the process of fetching a web page from a server , the HTTP request/response takes</p> <p>a) 2 RTT  <b>b) 1 RTT</b>  c) 4 RTT  d) 3 RTT</p>	1	L2	3	1	1.6.1
5	<p>The facilities available in the internet are</p> <p>(i) electronic mail  (ii) remote login  (iii)file transfer  (iv)word processing</p> <p>a. i, ii  <b>b. i, ii, iii</b>  c. i, ii, iv  d. ii, iii and iv</p>	1	L1	3	1	1.6.1



	request from the TELNET client to the TELNET server is carried through the tunnel provided by the SSH client and server. Any response from the TELNET server to the TELNET client is also carried through the tunnel provided by the SSH client and server.					
<b>(OR)</b>						
6 b.	<p>A receiver received a SCTP packet contains five different chunks such as chunk 1, chunk2 ... chunk 5. Chunk 1 the value of type field is 1. Chunk 2 is a data chunk and its flag bits B and E shows the value 1 and 0. Chunk 3 is a data chunk and its flag bits indicates the value of B is 1 and E is 1. Chunk 4 the value of type field is 0, flag bits value of B is 0 and E is 1.</p> <ol style="list-style-type: none"> <li>1. Identify the type of Chunk1 and give description for the same. What will be the value of flag field for the chunk1? (2)</li> <li>2. What is the value of Chunk2 type field and chunk 2 is a fragment or not? (2)</li> <li>3. What are all the data chunk is a fragment chunk 1, chunk2, chunk3 or chunk4? Give your justification for the same. (2)</li> <li>4. In SCTP Packets How the receiver knows there is a padding or not? Give your justification. (2)</li> <li>5. Chunk 5 carries no information. what will be the value of length field? (2)</li> </ol> <p><b>Answer:-</b></p> <ol style="list-style-type: none"> <li>1. Identify the type of Chunk1 and give description for the same. What will be the value of flag field for the chunk1? (2) <ul style="list-style-type: none"> <li>• The value of type field is 1. So chunk 1 is INIT chunk (initiation chunk).</li> <li>• Initiation chunk is the first chunk sent by an end point to establish an association</li> </ul> </li> <li>2. What is the value of Chunk2 type field and chunk 2 is a fragment or not? (2) <ul style="list-style-type: none"> <li>• Chunk 2 is a data chunk. So its value of type field will be 0.</li> <li>• Chunk 2 is fragment because The B (beginning) and E (end) bits together define the position of a chunk in a message that is fragmented for the chunk 2 beginning is 1 and end is 0.</li> </ul> </li> <li>3. What are all the data chunk is a fragment chunk 1, chunk2, chunk3 or chunk4? Give your justification for the same. (2)</li> </ol>	10	L2	2	2	2.7.1

	<ul style="list-style-type: none"> <li>• Chunk 2 and chunk 4 is fragmented.</li> <li>• Chunk 1 is INIT chunk</li> <li>• Chunk 2, 3, and 4 having value of B and F.</li> <li>• Chunk2 B=1 and E=0 it is the first fragment.</li> <li>• Chunk3 B=1 and E=1 no fragment.</li> <li>• Chunk4 B=0 and E=1 it is the last fragment.</li> </ul> <p>4. In SCTP Packets How the receiver knows there is a padding or not? Give your justification. (2)</p> <p>The length of the padding, if any, is not included in the calculation of the length field. This helps the receiver find out how many useful bytes a chunk carries. If the length field value is not a multiple of 4, the receiver knows there is padding.</p> <p>5. Chunk 5 carries no information. what will be the value of length field? (2)</p> <p>If a chunk carries no information, the value of the length field is 4 (4 bytes).</p>					
7 a.	<p>The DHCP mandates a minimum address lease of 24 hours. Can you imagine a situation in which DHCP's lease time causes inconvenience? Explain with an example.</p> <p><b>Answer:-</b></p> <p><b>Students needs to explain by considering their own scenario as an example given below.</b></p> <p><b>Scenario:</b></p> <p>If you have a coffee bar and you get 400 visitors a day. They stay on average 30 to 60 minutes and you have a DHCP Pool of 200 IP Address (192.168.0.10 – 192.168.0.210 for example).</p> <p>When you leave the DHCP Lease Time on the default 24 hours (1440 minutes) after 200 guest no other guest can use the free WIFI network. Because all the 200 IP Addresses are reserved for the first 200 guests.</p> <p>So, in this case you want to lower the DHCP Lease Time to one hour for example. This way the reservation is</p>	10	L3	3	2	2.7.1

released soon enough for the other guests:

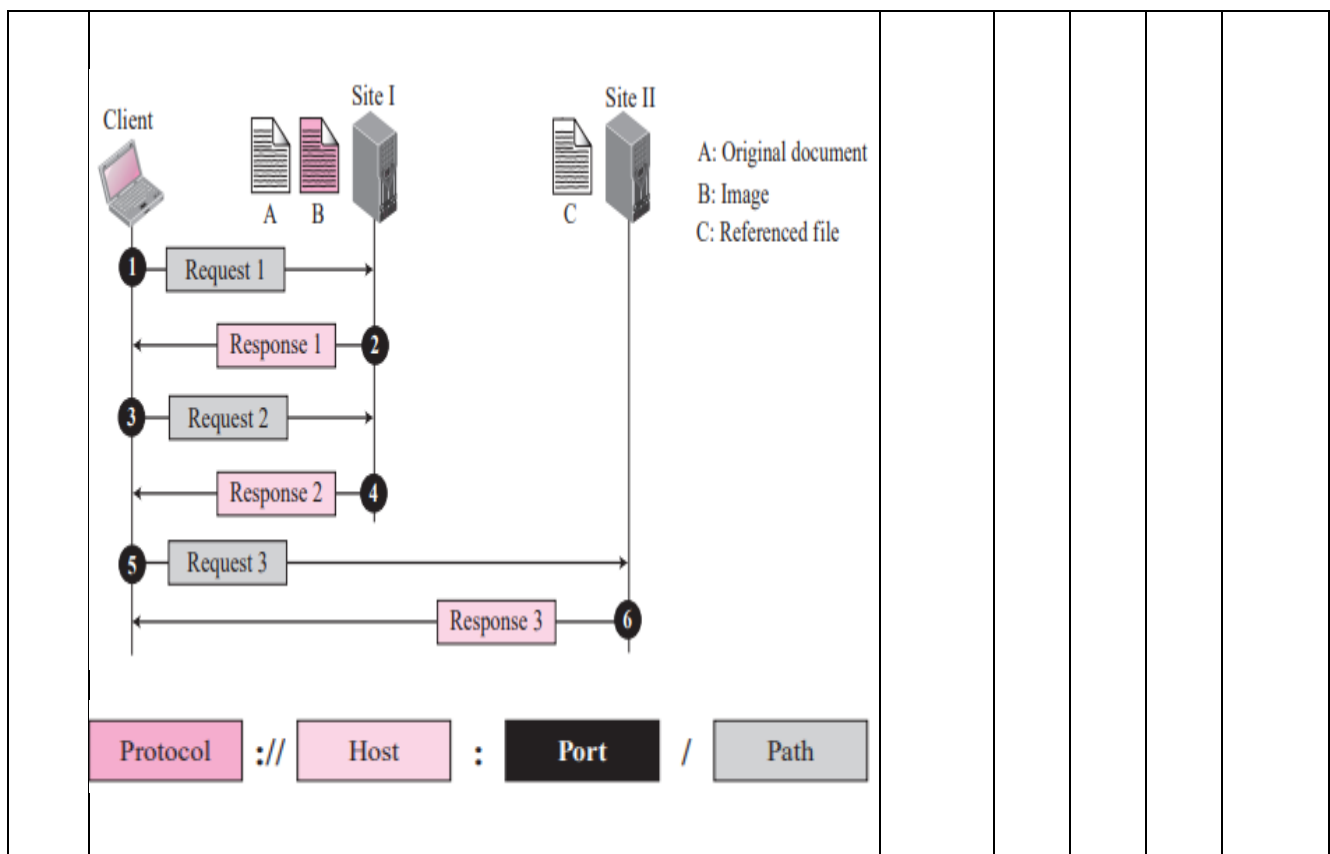


With a lease time one hour, the client will try to renew the lease after 30 minutes. At 35 min it contacts the DHCP server to extend/renew the lease. It's granted so the timers reset, a new lease is acquired for another 60 minutes. In total, the IP Address is reserved for 95 minutes. With 200 addresses available you can have 130 guests per hour on average on your network.

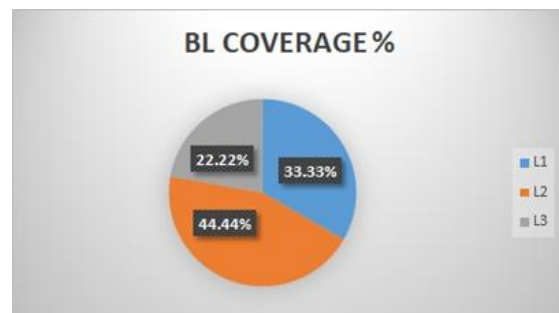
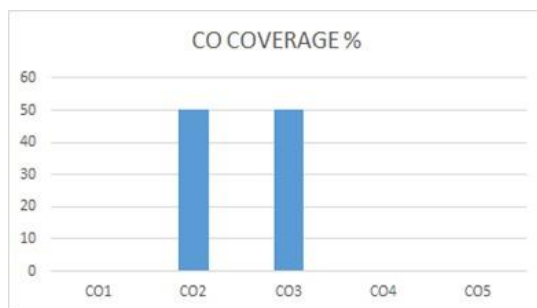
(OR)

7 b.	Assume you need to retrieve a scientific document that contains one reference to another text file and one reference to a large image. The main document and the image are stored in two separate files on the same site (file A and file B); the referenced text file is stored on another site (file C). Demonstrate the three transactions to see the whole document. Also, give the uniform resource locator format to locate any kind of information on the Internet.	10	L2	3	1	1.6.1
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**Answer:-**



### Course Outcome (CO) and Bloom's level (BL) Coverage in Questions



Register Number														
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**SRM Institute of Science and Technology**  
**College of Engineering and Technology**  
**School of Computing**

**Batch -1 Set - B**

SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamil Nadu

**Academic Year: 2022-23 (ODD)**

Test: CLA-T2

Course Code & Title: 18CSC302J – Computer Networks

Year & Sem: III Year / V Sem

Date: 19-10-2022

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Max. Marks: 25

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1	CO2	2	3	-	2	1	-	-	-	2	1	-	3
2	CO3	2	3	-	3	1	-	-	-	2	1	-	3

**Part – A**

**(5 x 1 mark = 5 Marks)**

Instructions: 1) Answer ALL questions. 2) Write the correct answer in the answer booklet

Q. No	Question	Marks	BL	CO	PO	PI Code
1	Intel follows _____ type of ordering to store the data. a. Both Little and Big Endian b. Little or Big Endian c. Big Endian <b>d. Little Endian</b>	1	L1	2	1	1.6.1
2	In a connection, the value of cwnd is 4000 and the value of rwnd is 5000. The host has sent 1,000 bytes, which have not been acknowledged. How many more bytes can be sent? a. 4000 b. 1000 c. 2000 <b>d. 3000</b>	1	L2	2	1	1.6.1
3	The FIN + ACK segment consumes _____ sequence number if it does not carry data. a. 0 <b>b. 1</b> c. 2 d. 3	1	L2	2	1	1.6.1
4	Which of the following statement is wrong? a) telnet is a general purpose client-server program b) telnet lets user access an application on a remote computer <b>c) telnet can also be used for file transfer</b> d) telnet can be used for remote login	1	L1	3	1	1.6.1
5	The port number _____ and _____ is used for data and control connection  a) 21, 20	1	L1	3	1	1.6.1



	<b>b) 20,21</b> c) 20,12 d) 12,21					
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Year & Sem: III Year / V Sem

Max. Marks: 25

Part – B (2 x 10 marks = 20 Marks)						
Instructions: Answer the questions						
Q. No	Question	Marks	BL	CO	PO	PI Code
6 a.	<p>The problem is to implement a client - server user-level application using sockets API in C/C++. The Server application has to support at least five clients simultaneously. Server accepts strings from clients (even multiple strings from each client) and replies with reverse strings. For example, when client sends “NAME”, Server replies with “EMAN”. Both server and client(s) have to output both sending &amp; receiving strings on the terminal.</p> <p><b>Answer:-</b></p> <p><b>Client</b></p> <pre>#include &lt;arpa/inet.h&gt; #include &lt;netinet/in.h&gt; #include &lt;stdio.h&gt; #include &lt;stdlib.h&gt; #include &lt;string.h&gt; #include &lt;sys/socket.h&gt; #include &lt;unistd.h&gt;  #define PORT 8090  // Driver code int main() {     struct sockaddr_in address;     int sock = 0, valread;     struct sockaddr_in serv_addr;     char str[100];      printf("\nInput the string:");     scanf("%s", str);      char buffer[1024] = { 0 };</pre>	10	L3	2	2	2.6.3

```

// Creating socket file descriptor
if ((sock = socket(AF_INET,
                   SOCK_STREAM, 0))
    < 0) {
    printf("\n Socket creation error \n");
    return -1;
}

memset(&serv_addr, '0', sizeof(serv_addr));
serv_addr.sin_family = AF_INET;
serv_addr.sin_port = htons(PORT);

// Convert IPv4 and IPv6 addresses from
// text to binary form 127.0.0.1 is local
// host IP address, this address should be
// your system local host IP address
if (inet_pton(AF_INET, "127.0.0.1",
              &serv_addr.sin_addr)
    <= 0) {
    printf("\nAddress not supported \n");
    return -1;
}

// connect the socket
if (connect(sock, (struct sockaddr*)&serv_addr,
            sizeof(serv_addr))
    < 0) {
    printf("\nConnection Failed \n");
    return -1;
}

int l = strlen(str);

// send string to server side
send(sock, str, sizeof(str), 0);

// read string sent by server
valread = read(sock, str, l);

printf("%s\n", str);

return 0;
}

```

### Server

```

#include <netinet/in.h>
#include <stdio.h>
#include <stdlib.h>
#include <string.h>
#include <sys/socket.h>
#include <unistd.h>

#define PORT 8090

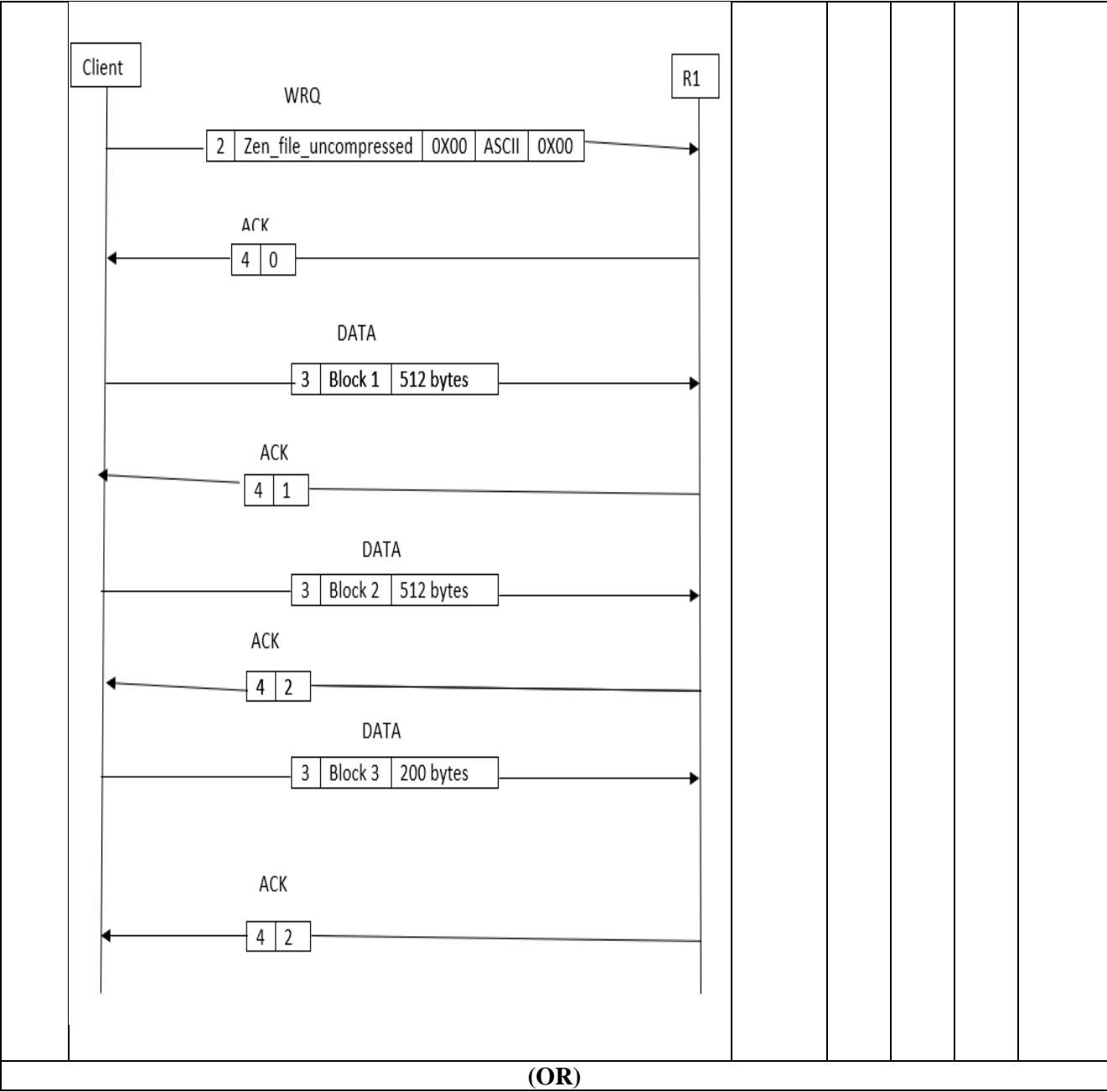
```

<pre>// Driver code int main() {     int server_fd, new_socket, valread;     struct sockaddr_in address;     char str[100];     int addrlen = sizeof(address);     char buffer[1024] = { 0 };     char* hello = "Hello from server";      // Creating socket file descriptor     if ((server_fd = socket(AF_INET,                           SOCK_STREAM, 0)) == 0) {         perror("socket failed");         exit(EXIT_FAILURE);     }      address.sin_family = AF_INET;     address.sin_addr.s_addr = INADDR_ANY;     address.sin_port = htons(PORT);      // Forcefully attaching socket to     // the port 8090     if (bind(server_fd, (struct sockaddr*)&amp;address,              sizeof(address)) &lt; 0) {         perror("bind failed");         exit(EXIT_FAILURE);     }      // puts the server socket in passive mode     if (listen(server_fd, 3) &lt; 0) {         perror("listen");         exit(EXIT_FAILURE);     }     if ((new_socket = accept(server_fd,                            (struct sockaddr*)&amp;address,                            (socklen_t*)&amp;addrlen)) &lt; 0) {         perror("accept");         exit(EXIT_FAILURE);     }      // read string send by client     valread = read(new_socket, str,                   sizeof(str));     int i, j, temp;     int l = strlen(str);      printf("\nString sent by client:%s\n", str);      // loop to reverse the string     for (i = 0, j = l - 1; i &lt; j; i++, j--) {         temp = str[i];         str[i] = str[j];         str[j] = temp;     } }</pre>					
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	<pre>// send reversed string to client // by send system call send(new_socket, str, sizeof(str), 0); printf("\nModified string sent to client\n");  return 0; }</pre>					
<b>(OR)</b>						
6 b.	<p>1. A client uses UDP to send data to a server. The data length is 16 bytes. Calculate the efficiency of this transmission at the UDP level (5 Marks)</p> <p><b>Answer:-</b></p> <p>Length of Header = 8 bytes</p> <p>Data length = 16 Bytes</p> <p>Total bytes transferred = Length of Header+ Data length</p> <p style="text-align: center;">= 24 bytes</p> <p>Efficiency = useful bytes transferred / Total Bytes Transferred</p> <p style="text-align: center;">= 16/24</p> <p style="text-align: center;">=66.667%</p> <p>2. Answer below question.</p> <p>i) Discuss about the types of Byte ordering. (2)</p> <p>ii) What are the examples of Byte ordering? (1)</p> <p>iii) Does bigendian affects file formats? (1)</p> <p>iv Which one is better byte ordering? (1)</p> <p><b>Answer:-</b></p> <p>i) An arrangement of bytes when data is transmitted over the network is called byte ordering. Different computers will use different byte ordering.</p> <ul style="list-style-type: none"> <li>●When communication taking place between two machines byte ordering should not make discomfort.</li> <li>●Generally an Internet protocol will specify a common form to allow different machines byte ordering. TCP/IP is the Internet Protocol in use.</li> <li>●Two ways to store bytes : Big endian and little endian</li> <li>●Big-endian –High order byte is stored on starting address and low order byte is stored on next address</li> <li>●Little-endian –Low order byte is stored on starting address and high order byte is stored on next address</li> </ul>	10	L2	2	1	1.6.1

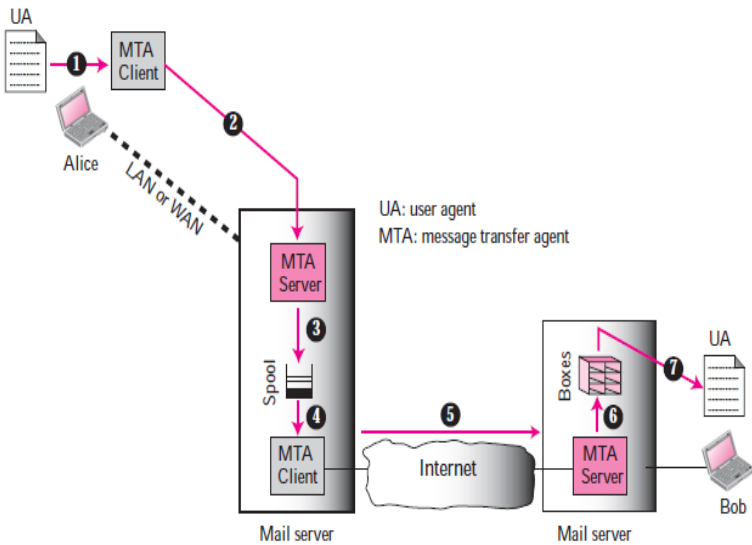
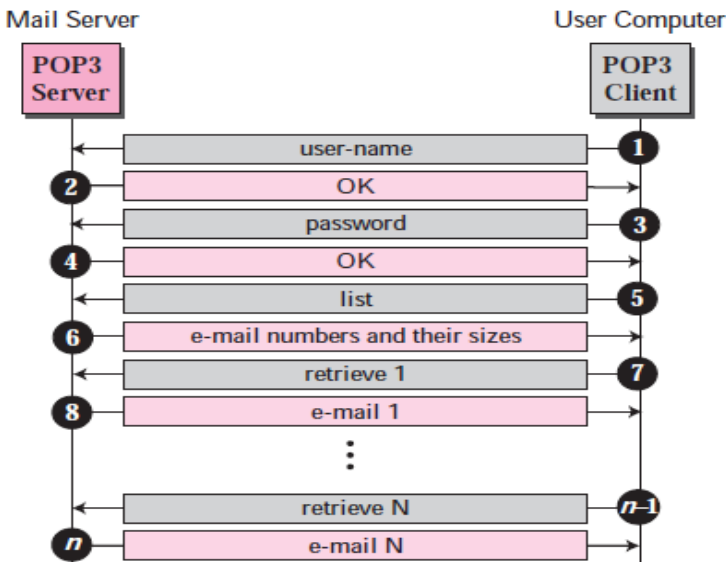
	<p>ii) Intel based processors are little endians. ARM processors were little endians. Current generation ARM processors are bi-endian.</p> <p>Motorola 68K processors are big endians. PowerPC (by Motorola) and SPARK (by Sun) processors were big endian. Current version of these processors are bi-endians.</p> <p>iii) File formats which have 1 byte as a basic unit are independent of e.g., ASCII files. Other file formats use some fixed endianness format e.g, JPEG files are stored in big endian format.</p> <p>iv) The term little and big endian came from Gulliver's Travels by Jonathan Swift. Two groups could not agree by which end an egg should be opened -a- the little or the big. Just like the egg issue, there is no technological reason to choose one-byte ordering convention over the other, hence the arguments degenerate into bickering about sociopolitical issues. As long as one of the conventions is selected and adhered to consistently, the choice is arbitrary.</p>					
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7 a.	<div data-bbox="217 73 997 232" data-label="Diagram"> <pre> graph LR     R1((R1 10.0.0.1)) --- S1[Switch]     S1 --- HA[Host A]     HA --- S2[Switch]     S2 --- FTS[FTP Server 192.168.5.102] </pre> </div> <p>1. Zen access the host A machine needs to download the ascii file “Zen_file” in compressed form from the FTP Server. The file resides in the path “ftpd/user/Zen”. Identify the suitable protocol and suggests Zen in framing the appropriate commands to download the file.</p> <p><b>Answer:-</b></p> <p><b>File Transfer Protocol</b></p> <p>220 (Service ready)  USER Zen  331 ( User name OK. Password?)  PASS yyy  230 (User login OK)  PORT 1267  150 (Data Connection opens shortly)  TYPE ASCII  200 (OK)  STRU F  200 (OK)  MODE C  200 (OK)  RETR ftpd/user/Zen/Zen_file  250 (OK)  (Data Transfer from server to client)  226 (Closing data connection)  QUIT  221 (Service closing)</p> <p>2. Zen uncompresses the received Zen_file and needs to store in R1. The uncompressed Zen_file consumes 1224 bytes of data. Identify the suitable protocol and suggest Zen in framing message structure in writing the content to R1.</p> <p><b>Answer:-</b></p> <p><b>Trivial File Transfer Protocol</b></p>	10	L3	3	2	2.6.3
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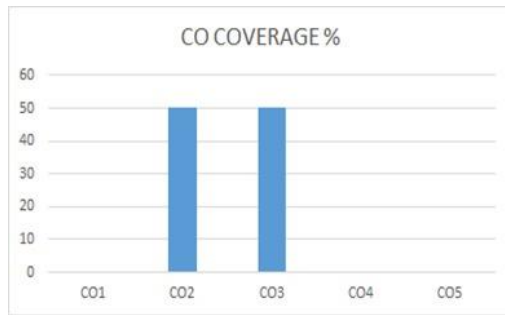


(OR)

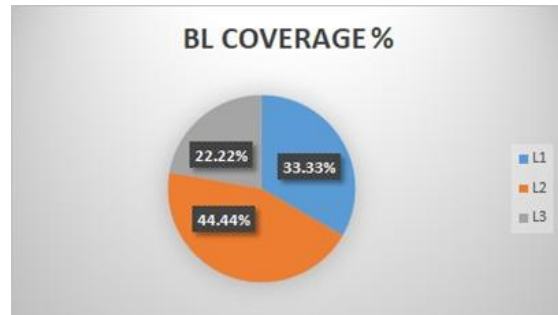


7b.	<p>1. In Email communication system, A sender is connected to the mail server via LAN/WAN, identify the component requirements and draw the system architecture.</p> <p><b>Answer:-</b></p>  <p>2. Why Message Access Agent is required, and with a neat interaction diagram, specify the interaction between user computer and POP3 server.</p> <p><b>Answer:-</b></p> <p>The actual mail transfer is done through message transfer agents. To send mail, a system must have the client MTA, and to receive mail, a system must have a server MTA. The first and the second stages of mail delivery use SMTP. However, SMTP is not involved in the third stage because SMTP is a push protocol; it pushes the message from the client to the server.</p> 	10	L2	3	1	1.6.1
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### Course Outcome (CO) and Bloom's level (BL) Coverage in Questions



**CO2 – 50%, CO3 – 50%**



Register Number														
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**SRM Institute of Science and Technology**  
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**Batch -2 Set - C**

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2	CO3	2	3	-	3	1	-	-	-	2	1	-	3

**Part – A**

**(5 x 1 mark = 5 Marks)**

Instructions: 1) Answer ALL questions. 2) Write the correct answer in the answer booklet

Q. No	Question	Marks	BL	CO	PO	PI Code
1	The Socket API function that converts an unconnected active TCP socket into a passive socket is _____. a. Bind Function b. Socket Function <b>c. Listen Function</b> d. Accept Function	1	L1	2	1	1.6.1
2	TCP connection is transferring the file of size 4000 bytes. The first byte is numbered 20,001. What will be the sequence number for the third segment if data are sent in four segments each carrying 1000 bytes? a. 20,001 b. 21,001 <b>c. 22,001</b> d. 23,001	1	L1	2	1	1.6.1
3	The UDP header in hexadecimal format is given as <b>CD83000B001C001C</b> . What is the source port number? <b>a. 52611</b> b. 52100 c. 52099 d. 52355	1	L2	2	1	1.6.1
4	The value of the magic cookie is _____. a. 99.130.81.88 <b>b. 99.130.83.99</b> c. 99.131.82.99 d. 99.99.99.99	1	L2	3	1	1.6.1
5	In the _____ encoding scheme, 24 bits become 4 characters, and eventually are sent as 32 bits.	1	L1	3	1	1.6.1

	a. 8bit b. 16bit <b>c. base64</b> d. binary					
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6 b.	<p>Alice and Bob discuss about the use of computer network for a particular application. They want to share multiple audio and video streams of data in each connection with increasing reliability or performance. They want to use a reliable message oriented protocol for this purpose. Help them with the explanation of such a protocol. Also differentiate in what ways this protocol is different from the existing protocols used for similar use. Outline the services provided by such protocol.</p> <p><b>Solution:</b></p> <p><b>Key:</b></p> <p>Identifying the need for SCTP (4)</p> <p>Comparison and contrasting of UDP, TCP, and SCTP (3)</p> <p>Outlining the SCTP services (3)</p> <p>SCTP (4):</p> <p>SCTP is designed as a general-purpose transport layer protocol that can handle multimedia and stream traffic, which are increasing every day on the Internet.</p> <p>It is a new reliable, message-oriented transport-layer protocol.</p> <p>Comparison and contrasting of UDP, TCP, and SCTP (3)</p>	10	L2	2	1	1.6.1
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	<table><tr><th>UDP</th><th>TCP</th><th>SCTP</th></tr><tr><td>Message-oriented protocol</td><td>Byte-oriented protocol</td><td>Best features of UDP and TCP</td></tr><tr><td>UDP conserves the message boundaries</td><td>No preservation of the message boundaries</td><td>Preserves the message boundaries along with detection of lost data, duplicate data, and out-of-order data</td></tr><tr><td>UDP is unreliable</td><td>TCP is a reliable protocol</td><td>SCTP is a reliable message oriented Protocol</td></tr><tr><td>Lacks in congestion control and flow control</td><td>TCP has congestion control and flow control mechanisms</td><td>It has congestion control and flow control mechanisms</td></tr></table> <p>SCTP services (3)</p> <p>Process-to-Process Communication</p> <p>Multiple Streams</p> <p>Multihoming</p> <p>Full-Duplex Communication</p> <p>Connection-oriented service</p> <p>Reliable service</p>	UDP	TCP	SCTP	Message-oriented protocol	Byte-oriented protocol	Best features of UDP and TCP	UDP conserves the message boundaries	No preservation of the message boundaries	Preserves the message boundaries along with detection of lost data, duplicate data, and out-of-order data	UDP is unreliable	TCP is a reliable protocol	SCTP is a reliable message oriented Protocol	Lacks in congestion control and flow control	TCP has congestion control and flow control mechanisms	It has congestion control and flow control mechanisms					
UDP	TCP	SCTP																			
Message-oriented protocol	Byte-oriented protocol	Best features of UDP and TCP																			
UDP conserves the message boundaries	No preservation of the message boundaries	Preserves the message boundaries along with detection of lost data, duplicate data, and out-of-order data																			
UDP is unreliable	TCP is a reliable protocol	SCTP is a reliable message oriented Protocol																			
Lacks in congestion control and flow control	TCP has congestion control and flow control mechanisms	It has congestion control and flow control mechanisms																			
7 a.	A customer connects to the ISP and wants to send request for websites to the ISP. The servers and routers in the ISP send these requests to its own DNS cache server and Name Servers, sometimes have to send a query to a Root Name	10	L3	3	2	2.6.3															

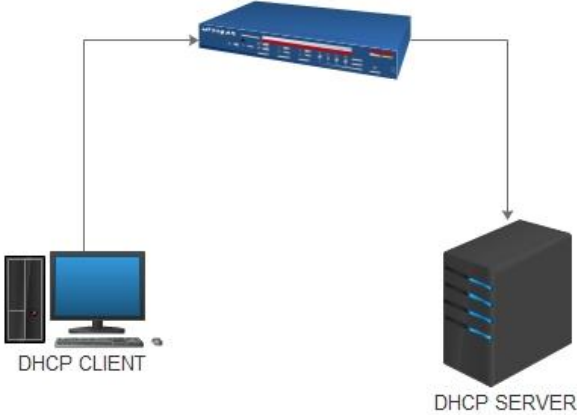
	<p>Server outside of the ISP if it is unable to resolve the requested domain name within its system. When the Root Server resolves the request, the ISP will add this information to its own DNS system.</p> <p>The solution had to be able to capture DNS traffic in such a way that shows every bit of information about what was happening during the DNS query process, while also being able to store the data and able to run analysis on the data.</p> <p>i) How do you capture DNS traffic and look at every specific detail of the packet in order to identify the issues, or important traffic information?</p> <p>In order to solve the main issue for all DNS solutions is that they need to reply to queries quickly and with the correct information. The correct information means that the ISP can resolve the request with the correct address, and hopefully, not direct the end-user to a malicious site. Thus, one of the main problems DNS systems face is Security.</p> <p>ii) Discuss about possible corruptions happening in DNS server records.</p> <p><b>Solution:</b></p> <p>i)</p> <p><b>Traffic Analysis:</b></p> <p>How do you capture DNS traffic and look at every specific detail of the packet in order to identify the issues, or important traffic information?</p> <p>This was one of the major concerns for the ISP since their current solution could not capture and do a Deep Packet Inspection with the detail they needed. They needed to be able to look at captured data over a period of time and look at historical bits of information. This information could provide them the ability to see traffic patterns, trends, errors, DNS attacks, and even misconfigured network elements such as routers, switches and DNS servers.</p> <p>Another issue is that of dropped packets. Yes, packets can be dropped in a DNS query and an error is sent to the client. Through traffic analysis, the ISP can see why, and where, the packets are being dropped.</p> <p>They also want to see when an address is queried and is not resolved, but directs the client to a default search engine or specific page. They want to be able to tell why it's not being resolved. It may not be a malicious redirect, but rather a request typed incorrectly by the client, or the domain may not exist anymore. There are many possibilities for this, but being able to find the exact reason why, quickly, is of major importance as the ISP has to be concerned with the satisfaction of their customers.</p> <p>Differences between a DNS cache system and the Name Server can cause many issues for a DNS resolver system. Symmetry between these systems is a key issue that the ISP was concerned about. If the DNS cache is not updated by the Name Servers, then it will always query the Name Servers for the domain name, creating an</p>					
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unnecessary step and extra traffic in the query process.					
ii)					
<p><b>Security Issues:</b></p> <ol style="list-style-type: none"> <li>1. <u>DOS attacks</u> – Servers supporting recursive DNS queries are vulnerable to phony requests that flood a particular IP address with the results of each server's query. This can overwhelm the IP address with a volume of traffic, causing the site/server to crash.</li> <li>2. <u>Cache Poisoning</u> – the attacker corrupts a DNS server by replacing a legitimate IP address in the server's cache with a re-direct address in order to redirect traffic to a malicious website.</li> <li>3. <u>DNS amplification</u> – a form of DDoS, the attacker takes advantage of a DNS server that permits recursive lookups and uses recursion to spread the attack to other DNS servers. The system sends requests to the targeted IP address (victim), causing a storm of responses to flood the IP address and shuts the site down. <u>DNS Fast-Flux</u> – is a DNS technique used by botnets to hide phishing and malware delivery sites behind an ever-changing network of compromised hosts acting as proxies. The basic idea behind Fast flux is to have numerous IP addresses associated with a single fully qualified domain name, where the IP addresses are swapped in and out with extremely high frequency, through changing DNS records.</li> <li>4. <u>DNS Fast-Flux</u> – is a DNS technique used by botnets to hide phishing and malware delivery sites behind an ever-changing network of compromised hosts acting as proxies. The basic idea behind Fast flux is to have numerous IP addresses associated with a single fully qualified domain name, where the IP addresses are swapped in and out with extremely high frequency, through changing DNS records.</li> </ol>					

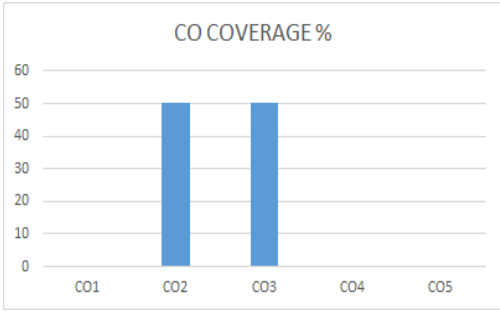
**(OR)**

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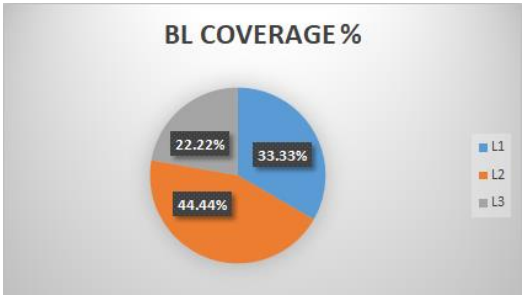
7 b.	<p>i) Can DHCP prevent unauthorized laptops from using a network that uses DHCP for dynamic addressing?</p> <p>ii) Explain the communication flow between a DHCP client and server on a network with two DHCP Servers.</p> <p>iii) Consider the below diagram, a DHCP client and server is connected to a switch. How does the DHCP process start?</p>  <p><b>Solution:</b></p> <p><b>i) 3M</b></p> <p><b>Answer</b> – No, DHCP is not capable of distinguishing between a permanent MAC address and the address by the user. So, it cannot stop unauthorized access to a network and cannot control the IP addresses used by users.</p> <p><b>ii) 3M</b></p> <p>The first packet the DHCP Client initiates would be the DHCP Discover packet. The DHCP Discover packet is broadcast in nature and would be received by both the DHCP servers. The DHCP servers would respond with DHCP offer packet containing the IP addresses which they offer. Based on the first DHCP offer the client receives, the client would respond with DHCP request packet which contains the IP address which it would be using along with the DHCP servers IP address which had provide the respective. This packet is sent as broadcast. The packet, when received by the other DHCP server would understand that the IP address which it had leased to the client (In the DHCP offer packet) is not taken. So, the DHCP server would put the IP address back to its pool.</p> <p><b>iii) 4M</b></p> <p>The TCP/IP of the client would be configured with the option ‘Obtain IP address automatically’. This is meant for DHCP clients. This configuration would automatically trigger a DHCP Discover packet from the PC. This packet</p>	10	L2	3	1	1.6.1
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	would reach the DHCP server which would then respond with the DHCP offer packet.					
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Course Outcome (CO) and Bloom’s level (BL) Coverage in Questions



CO2 – 50%, CO3 – 50%





Register Number															
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**SRM Institute of Science and Technology**  
**College of Engineering and Technology**  
**School of Computing**

**Batch -2 Set - D**

SRM Nagar, Kattankulathur – 603203, Chengalpattu District, Tamil Nadu

**Academic Year: 2022-23 (ODD)**

Test: CLA-T2

Date: 19-10-2022

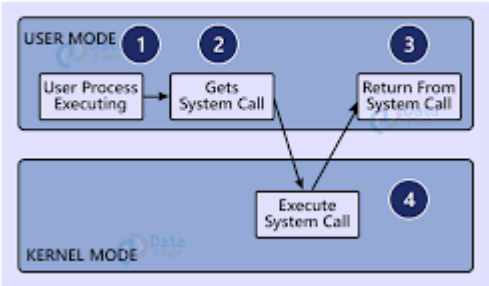
Course Code & Title: 18CSC302J – Computer Networks

Duration: 1 Period

Year & Sem: III Year / V Sem

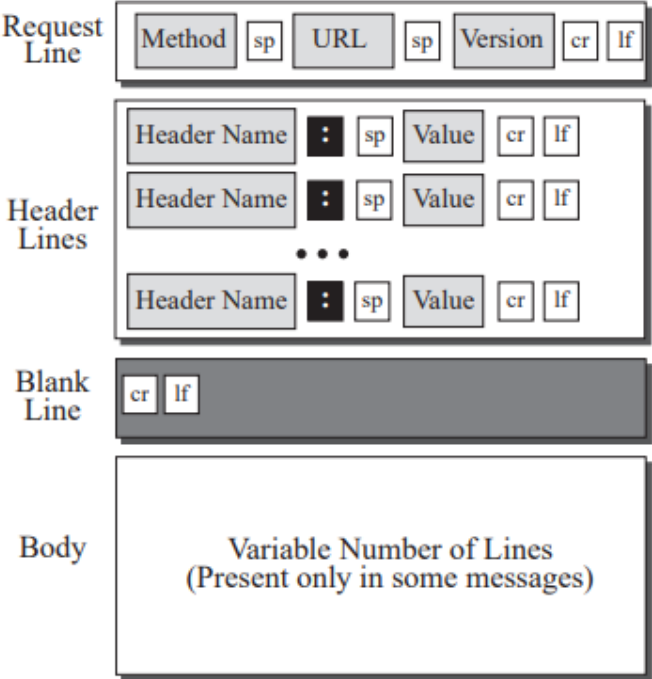
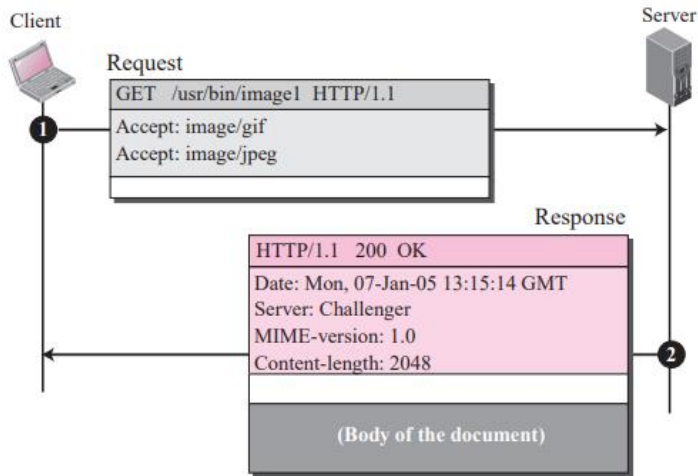
Max. Marks: 25

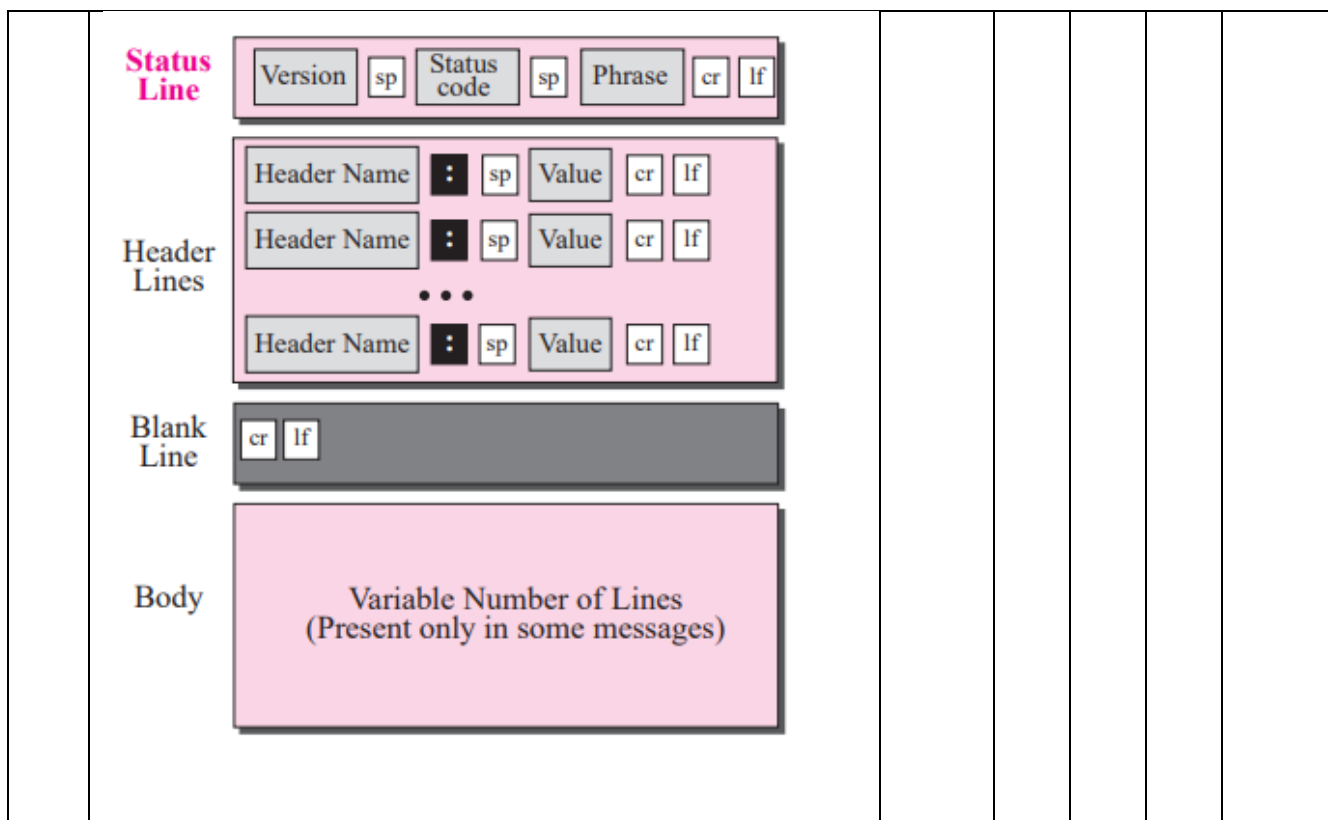
Part – B (2 x 10 marks = 20 Marks)						
Instructions: Answer the questions						
Q. No	Question	Marks	BL	CO	PO	PI Code
6 a.	<p>Sam was studying for computer networks exam. While studying he got a doubt regarding which programmatic way provides the services to interact with the operating system. Help him in identifying the relevant concept to clear his doubt. Also list out the services provided by the identified concept with a diagrammatic representation.</p> <p><b>Solution:</b></p> <p align="center"><b>System Call</b></p> <p>In computing, a system call is the programmatic way in which a computer program requests a service from the kernel of the operating system it is executed on. A system call is a way for programs to interact with the operating system. A computer program makes a system call when it makes a request to the operating system's kernel. System call provides the services of the operating system to the user programs via Application Program Interface (API). It provides an interface between a process and operating system to allow user-level processes to request services of the operating system. System calls are the only entry points into the kernel system. All programs needing resources must use system calls.</p> <p><b>Services Provided by System Calls:</b></p> <ol style="list-style-type: none"> <li>1. Process creation and management</li> <li>2. Main memory management</li> <li>3. File Access, Directory and File system management</li> </ol>	10	L3	2	2	2.6.3

	<p>4. Device handling(I/O)</p> <p>5. Protection</p> <p>6. Networking, etc.</p> <p><b>Types of System Calls:</b> There are 5 different categories of system calls –</p> <ol style="list-style-type: none"> <li>1. Process control: end, abort, create, terminate, allocate and free memory.</li> <li>2. File management: create, open, close, delete, read file etc.</li> <li>3. Device management</li> <li>4. Information maintenance</li> <li>5. Communication</li> </ol> <p style="text-align: center;"><b>WORKING OF A SYSTEM CALL</b></p> 					
<b>(OR)</b>						
6 b.	<p>The following is a dump of a UDP header in hexadecimal format. 0045DF0000580000</p> <ol style="list-style-type: none"> <li>What is the source port number?</li> <li>What is the destination port number?</li> <li>What is the total length of the user datagram?</li> <li>What is the length of the data?</li> <li>Has the sender calculated checksum for this packet?</li> </ol> <p><b>Solution:</b></p> <ol style="list-style-type: none"> <li>0045 = 69</li> <li>DF00 = 57088</li> <li>0058 = 88 bytes</li> <li>88 bytes – 8 bytes header= 80 bytes</li> <li>Last 16 bits are zeros so no calculated checksum</li> </ol>	10	L2	2	1	1.6.1
7 a.	<p>Sketch the format of the HTTP request and response message. Illustrate the following scenario, assume in HTTP transactions for communication between client and server use the GET method to retrieve an image with the URL, path</p>	10	L3	3	2	2.6.3

/usr/bin/image1. The client can accept images in GIF or JPEG format. The request does not have a body. The response message must contain the date, server, MIME version, and length of the document which is 2048. Followed by a header the body of the document can be blank.

**Solution:**





(OR)

7 b.	<p>Rahul sends a mail to his parents. As Email has some limitations supplementary protocols are used so that non-ASCII data can be sent through e-mail. Some specific header fields are added with respective to the conversion done in the message.</p> <p>i. Explain as when the RFC subtype and Partial subtype will be used?</p> <p>ii. In Which type of the encoding scheme the non-ASCII character is represented as three characters.</p> <p>iii. Explain how the following set of bits (Non-Ascii Data) can be encoded using Base 64.</p> <table><tr><td>10110100</td><td>10000001</td><td>00000101</td></tr></table> <p>iv. Draw the structure of MIME Header for MIME version 1.1.</p> <p><b>Solution:</b></p> <p>a. RFC822, partial, and external-body. The subtype RFC822 is used if the body is encapsulating another message (including header and the body). The partial subtype is used if the original message has been fragmented into different mail messages and this mail message is one of the fragments. The fragments must be reassembled at the destination by MIME. Three parameters must be added: id, number, and the total. The id identifies the message and is present in all the fragments. The number defines the sequence order of the fragment. The total defines the number of fragments that comprise the original message.</p> <p>b. Quoted-printable</p>	10110100	10000001	00000101	10	L2	3	1	1.6.1
10110100	10000001	00000101							



- c. Base64 transforms this type of data to printable characters, which can then be sent as ASCII characters or any type of character set supported by the underlying mail transfer mechanism. Base64 divides the binary data (made of streams of bits) into 24-bit blocks. Each block is then divided into four sections, each made of 6 bits

10110100	10000001	00000101
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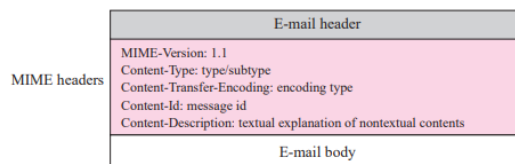
Combine and split to 6-bits

101101	001000	000100	000101
45	8	4	5

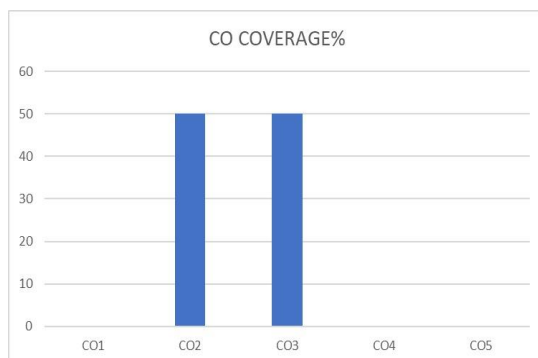
Base 64 Converter

t I E F

- d.



### Course Outcome (CO) and Bloom's level (BL) Coverage in Questions



CO2 – 50%, CO3 – 50%

