



Roll No.																				
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**PRESIDENCY UNIVERSITY
BENGALURU**

SCHOOL OF ENGINEERING

TEST 1

Sem & AY: Odd Sem. 2019-20

Date: 30.09.2019

Course Code: CSE 211

Time: 11:00AM to 12:00PM

Course Name: COMPUTER NETWORKS

Max Marks: 40

Program & Sem: B.Tech (CSE) & V

Weightage: 20%

Instructions:

- (i) Read the question properly and answer accordingly.
- (ii) Question paper consists of 3 parts.
- (iii) Scientific and Non-programmable calculators are permitted

Part A [Memory Recall Questions]

Answer all the Questions. Each Question carries four marks. (5Qx4M=20M)

1. Differentiate between switch and router (Mention any four points)
(C.O.NO.1) [Knowledge]
2. Which type of LAN network no dedicated administrator are needed to run the network and Why?
(C.O.NO.1) [Knowledge]
3. Draw and Calculate the number of links in the point-to-point topology with five nodes are connected in the network
(C.O.NO.1) [Knowledge]
4. Draw the Relationship of layers and addresses in TCP/IP Protocol Suite
(C.O.NO.2) [Comprehension]
5. Explain the baseband signal transmission and Broadband signal transmission
(C.O.NO.1) [Knowledge]

Part B [Thought Provoking Questions]

Answer both the Questions. Each Question carries five marks. (2Qx5M=10M)

6. ABC company create a network using 10base 5 thick Ethernet cable , the total length of segment is 1500 meters, In this company, two are populated and one is unpopulated segment
Answer the following questions and draw the ABC company segments
 - a) How many repeater needed for the 1500 meters
 - b) Maximum cable segment length
 - c) Maximum number of devices per LAN
(C.O.NO.1) [Knowledge]

7. The 7 bit hamming code is received 1000100, Assume that it is even parity. Check whether the received code is correct , if it is not correct ,locate the bit and find the correct one (C.O.NO.2) [Application]

Part C [Problem Solving Questions]

Answer the Question. The Question carries six marks. (1Qx10M=10M)

8. a) With neat diagram, briefly explain OSI reference model. [6M]
(C.O.NO.1) [Comprehension]
- b) Computer B received the frame, frame bits are 1101011 divided by 10110., Find the frame bits are error or no error using Cyclic Redundancy Check(CRC) [4M]
(C.O.NO.2) [[Knowledge]



SCHOOL OF ENGINEERING

Semester: v

Course Code: cse211

Course Name: computer network

Date: SEPT 2019

Time: 11-12

Max Marks: 40

Weightage: 20%

Extract of question distribution [outcome wise & level wise]

Q.NO	C.O.NO	Unit/Module Number/Unit /Module Title	Memory recall type [Marks allotted] Bloom's Levels			Thought provoking type [Marks allotted] Bloom's Levels			Problem Solving type [Marks allotted]			Total Marks
			K			C			A			
1	1	UNIT 1	4									4
2	1	UNIT 1	4									4
3	1	UNIT 1	4									4
4	2	UNIT 2				4						4
5	1	UNIT 1	4									4
6	1	UNIT 1	5									5
7	2	UNIT 2						5				5
8a	2	UNIT 2				6						6
8a	1	UNIT 1						4				4
	Total Marks		21			10			9			40

K = Knowledge Level C = Comprehension Level, A = Application Level

Note: While setting all types of questions the general guideline is that about 60%

Of the questions must be such that even a below average students must be able to attempt, About 20% of the questions must be such that only above average students must be able to attempt and finally 20% of the questions must be such that only the bright students must be able to attempt.

I here certify that All the questions are set as per the above lines
Shanmugarathinam]

Annexure- II: Format of Answer Scheme



SCHOOL OF ENGINEERING

SOLUTION

Semester: V

Course Code: CSE 211

Course Name: Computer network

Date: 30/9/2019

Time: 11:-12

Max Marks: 40

Weightage: 20%

Part A

(Q x M = Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question														
	<p>1. Differentiate between switch and router (Mention any four points)</p> <table border="1" style="width: 100%; border-collapse: collapse; margin: 10px 0;"> <thead> <tr> <th style="width: 50%; text-align: center;">Router</th> <th style="width: 50%; text-align: center;">Switch</th> </tr> </thead> <tbody> <tr> <td>Basically, a router is used to connect <u>computers belonging to one network with those belonging to another or other networks.</u> Thus, a router connects two or more different networks.</td> <td>A switch on the other hand, connects different computers within one network.</td> </tr> <tr> <td>As per the OSI model, a router is a Network Layer device, i.e. it <u>operates at Layer 3.</u></td> <td>a network switch <u>operates at Layer 2 (Data Link Layer).</u></td> </tr> <tr> <td>Routers are much more sophisticated and intelligent network devices, as compared to switches.</td> <td>In comparison with routers, switches are less sophisticated and less intelligent.</td> </tr> <tr> <td>A router works on the principle of <u>IP addresses. Logical Address / Internet Address</u></td> <td>A switch works on the basis of <u>MAC addresses / Physical Address / NIC Address / Hardware Address</u></td> </tr> <tr> <td>A router's inbuilt hardware makes use of routing algorithms to compute the best possible path for routing data packets across different computer networks.</td> <td>A switch does not perform any such activities.</td> </tr> <tr> <td>Routers have their own inbuilt operating systems and they need to be configured before use</td> <td>Most switches do not require any prior configuration and are usually 'ready-to-use'.</td> </tr> </tbody> </table> <p>2. Which type of LAN network no dedicated administrated are needed to run the network? Why?</p>	Router	Switch	Basically, a router is used to connect <u>computers belonging to one network with those belonging to another or other networks.</u> Thus, a router connects two or more different networks.	A switch on the other hand, connects different computers within one network.	As per the OSI model, a router is a Network Layer device, i.e. it <u>operates at Layer 3.</u>	a network switch <u>operates at Layer 2 (Data Link Layer).</u>	Routers are much more sophisticated and intelligent network devices, as compared to switches.	In comparison with routers, switches are less sophisticated and less intelligent.	A router works on the principle of <u>IP addresses. Logical Address / Internet Address</u>	A switch works on the basis of <u>MAC addresses / Physical Address / NIC Address / Hardware Address</u>	A router's inbuilt hardware makes use of routing algorithms to compute the best possible path for routing data packets across different computer networks.	A switch does not perform any such activities.	Routers have their own inbuilt operating systems and they need to be configured before use	Most switches do not require any prior configuration and are usually 'ready-to-use'.	Each point 1 mark	Each questions carries 5 minutes To write the answer Total 20 minutes
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- In a peer-to-peer network, individual users control their own resources.
- There is **no administrator** responsible for the entire network.
- Peer-to-peer networks are relatively easy to install and operate.

As networks grow, peer-to-peer relationships become increasingly difficult to coordinate. A peer-to-peer network works well with 10 or fewer computers

Peer-to-peer networks are also called **workgroups**. The term "**workgroup**" implies a small group of people. There are typically 10 or fewer computers in a peer-to-peer network

Each point 1 mark

3. Draw and Calculate the number of links in the point-to-point topology with five nodes are connected in the network

The number of links in the Mesh topology with N nodes/Computers is calculated as $N * (N-1) / 2$.

$$5 * 4 / 2 = 10 \text{ links formula and calculation 2 marks}$$

marks

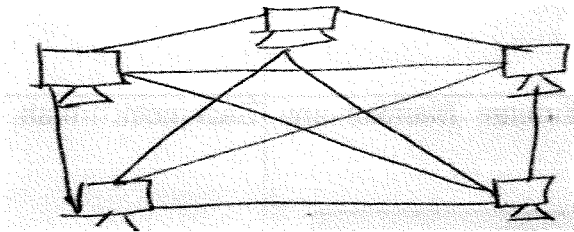


diagram -2 marks

formula and calculation 2 marks
Diagram 2 marks

4. Draw the Relationship of layers and addresses in TCP/IP Protocol Suite

Diagram with label 4 marks

	<p>Application layer: Processes → Specific addresses</p> <p>Transport layer: SCTP, TCP, UDP → Port addresses</p> <p>Network layer: IP and other protocols → Logical addresses</p> <p>Data link layer: Underlying physical networks → Physical addresses</p> <p>Physical layer: Underlying physical networks → Physical addresses</p>	<p>Each explanation 2 marks</p>	
	<p>5.Explain the baseband signal transmission and Broadband signal transmission</p> <p>Baseband systems use digital signaling over a single channel. Signals flow in the form of discrete pulses of electricity or light. a baseband transmission with a bi-directional digital wave. The digital signal uses the complete bandwidth of the cable, which constitute a single channel.</p> <p>Analog transmission, the signals are continuous. Signals flows across the physical medium in the form of electromagnetic or optical waves. (unidirectional analog signal)Examples of analog data being sent using analog transmissions are broadcast TV and radio</p>		

Part B

(Q x M = Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
	<p>Part B (2Q x 5M =10Marks)</p>		

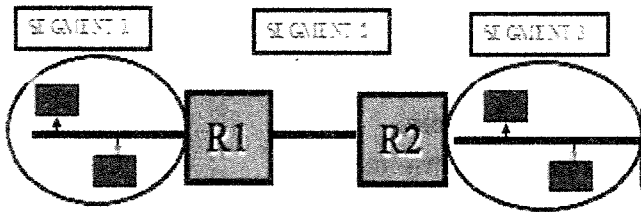
6. ABC company create a network using 10base 5 thick Ethernet cable, the total length of segments is 1500 meters, In this company two populated and one unpopulated segment

Answer the following questions and draw the ABC company segments

- How many repeater needed for the 1500 meters
- Maximum cable segment length
- Maximum number of devices per LAN

Ans

- How many repeater needed for the 1500 meters
-Two repeater
- Maximum cable segment length -500 meters
- Maximum number of devices per LAN- 300



7) The 7 bit hamming code is received 1000100, Assume that is even parity .check the received code is correct , if it is not correct ,locate the bit and find the correct one

Received Hamming code

D ₇	D ₆	D ₅	P ₄	D ₃	P ₂	P ₁
1	0	0	0	1	0	0

Step P₁ :

P ₁	D ₃	D ₅	D ₇	
0	1	0	1	P ₁ = no error =0

Step P₂

Each Answer 1 marks
Diagram 2 marks

Each questions carries 5 minutes
To write the answer

Total 10 minutes

P1 , p2 and P4 three marks
correcting error 2 marks

<p> $P_2 \ D_3 \ D_6 \ D_7$ 0 1 0 1 $P_2 = \text{no error} = 0$ </p> <p>Step P_4</p> <p> $P_4 \ D_5 \ D_6 \ D_7$ 0 0 0 1 $P_4 = \text{error so } P_4=1$ </p> <p style="margin-left: 100px;"> $P_4 \ P_2 \ P_1$ 1 0 0 </p> <p>1 0 0 0 1 0 0 , so 4th bit error</p> <p>Ans : 1001100</p>		
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Part C

(Q x M = Marks)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
	<p>8. a) With neat diagram, briefly explain OSI reference model. (8 marks)</p> <ul style="list-style-type: none"> ■ Application Layer ■ Presentation Layer ■ Session Layer ■ Transport Layer ■ Network Layer ■ Datalink Layer Physical Layer <p>Physical Layer</p> <p>Bit representation – encode bits into electrical or optical signals</p>	<p>Each layer explanation 0.75 marks</p>	<p>Each carries 7 minutes to write</p> <p>Total 15 minutes</p>

- **Transmission rate** – The number of bits sent each second
- **Physical** characteristics of transmission media
- **Synchronizing** , the sender and receiver clocks
- **Transmission mode** – simplex, half-duplex, full duplex
- **Physical Topology** – how devices are connected – ring, star, mesh, bus topology

■ **Datalink Layer**

Data Link Layer Responsible for delivery of data between two systems on the same network Main functions of this layer are:

- **Framing** – divides the stream of bits received from network layer into manageable data units called frames.
- **Physical Addressing** – Add a header to the frame to define the physical address of the source and the destination machines.
- **Flow control** – Impose a flow control – control rate at which data is transmitted so as not to flood the receiver (Feedbackbased flow control).

Network layer

- The network layer is considered the backbone of the OSI Model.
- It selects and manages the best logical path for data transfer between nodes.
- This layer contains hardware devices such as routers, bridges, firewalls and switches, but it actually creates a logical image of the most efficient communication route and implements it with a physical medium.

Network layer protocols exist in every host or router. The router examines the header fields of all the IP packets that pass through it.

- The **transport layer** is the **layer** in the open system interconnection (**OSI**) **model** responsible for end-to-end communication over a network.

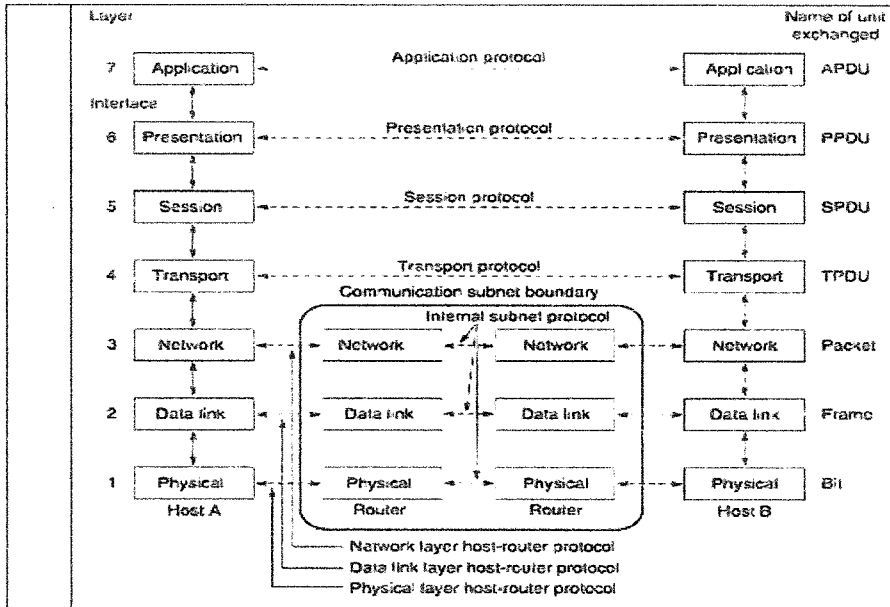
Diagram 1.5 marks

- It provides logical communication between application processes running on different hosts within a layered architecture of protocols and other network components.

- The session layer provides the mechanism for opening, closing and managing a session between end-user application processes, i.e., a semi-permanent dialogue.
- Communication sessions consist of requests and responses that occur between applications.
- Session-layer services are commonly used in application environments that make use of remote procedure calls (RPCs).
- The presentation layer mainly translates data between the application layer and the network format.
- Data can be communicated in different formats via different sources.
- Thus, the presentation layer is responsible for integrating all formats into a standard format for efficient and effective communication.

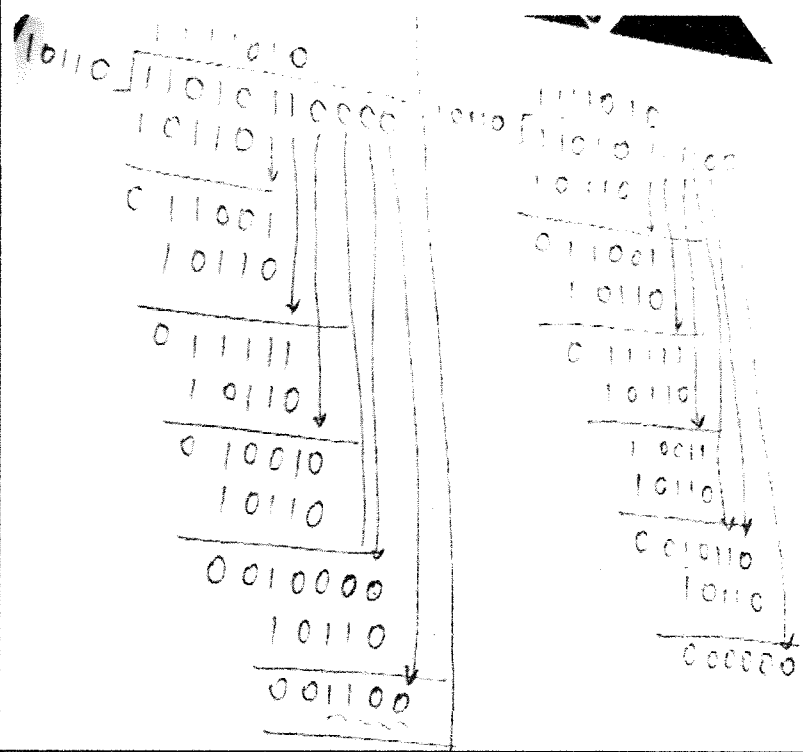
The presentation layer is responsible for the following:

- Data encryption/decryption
- Character/string conversion
- Data compression
- Graphic handling



CRC method 4 marks

b) Computer B received the frame, frame bits are 1101011 divided by 10110., Find the frame bits are error or no error using Cyclic Redundancy Check(CRC) (4 marks)





Roll No.

**PRESIDENCY UNIVERSITY
BENGALURU**
SCHOOL OF ENGINEERING

TEST – 2

Sem & AY: Odd Sem 2019-20

Course Code: CSE 211

Course Name: COMPUTER NETWORKS

Program & Sem: B.Tech (CSE) & V

Date: 18.11.2019

Time: 11.00 AM to 12.00 PM

Max Marks: 40

Weightage: 20%

Instructions:

- (i) Read the questions properly and answer accordingly
- (ii) Question paper contains 3 parts

Part A [Memory Recall Questions]

Answer all the Questions. Each Question carries four marks. (5Qx4M=20M)

1. Draw the SONET Network Diagram; show the importance of SONET?
(C.O.NO.2) [Knowledge]
2. List out the types of IPV4 addresses? (C.O.NO.3) [Knowledge]
3. State the HDLC operational modes (C.O.NO.2) [Knowledge]
4. Difference between IPV4 and IPV6. (C.O.NO.3) [Knowledge]
5. Calculate equivalent binary to decimal for the given value (11000000.10101000.00001010.00001101) and define which class IP address belongs?
(C.O.NO.2) [Knowledge]

Part B [Thought Provoking Questions]

Answer both the Questions. Each Question carries five marks. (2Qx5M=10M)

6. User A and User B available under Automatic Error control technique network (Go-Back-N ARQ). The communication is held totally 5 frames are transferred from user A to User B. while transmitting 3rd packet there are different issues faced among them (i) Damaged frame from 3 (ii) Lost ACK on Frame 3. Clearly show the steps in schematic on each issues with explanation in detail.

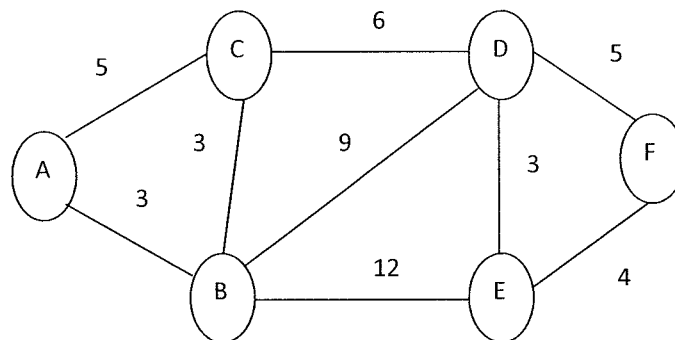
(C.O.NO.2) [Application]

7. Assume that you're the network administrator for the presidency university, the university needs 35 networks. Find the First host ID, Broad cast address and network address for the first four networks, the given address is 172.10.10.10
(C.O.NO.3) [Comprehension]

Part C [Problem Solving Questions]

Answer the Question. The Question carry ten marks. (1Qx10M=10M)

8. (a) Define HDLC and its stations in detail [3M] (C.O.NO.2) [Comprehension]
(b) Find the Shortest path using Dijkstr'a algorithm between two nodes of a Weighted graph from the source node 'A' to destination node 'F'.
[7M] (C.O.NO.3) [Application]





SCHOOL OF ENGINEERING

Semester: V

Course Code: CSE211

Course Name: COMPUTER NETWORKS

Date: 18-11-2019

Time: 1hr

Max Marks: 40

Weightage: 20%

Extract of question distribution [outcome wise & level wise]

Q.NO	C.O.NO	Unit/Module Number/Unit /Module Title	memory recall type			Thought provoking type			Problem Solving type			Total Marks
			[Marks allotted]	Bloom's Levels		[Marks allotted]	Bloom's Levels		[Marks allotted]			
			K			C			A			
1	2	Module-II	4									4
2	3	Module-III	4									4
3	2	Module-II	4									4
4	3	Module-III	4									4
5	2	Module-II	4									4
6	2	Module-II							5			5
7	3	Module-III				5						5
8(a)	2	Module-II				3						3
(b)	3	Module-III							7			7
	Total Marks		20			8			12			40

K = Knowledge Level C = Comprehension Level, A = Application Level

Note: While setting all types of questions the general guideline is that about 60%

Of the questions must be such that even a below average students must be able to attempt, About 20% of the questions must be such that only above average students must be able to attempt and finally 20% of the questions must be such that only the bright students must be able to attempt.

I hereby certify that all the questions are set as per the above guidelines. [Dr. SP Anandaraj]

Annexure- II: Format of Answer Scheme



SCHOOL OF ENGINEERING

SOLUTION

Date: 18-11-2019

Semester: V

Time: 1 hr

Course Code: CSE211

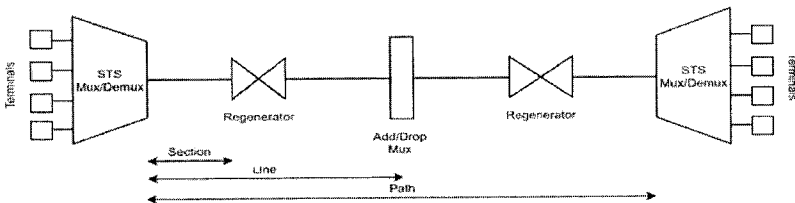
Max Marks: 40

Course Name: Computer Networks

Weightage: 20%

Part A

(5 x4M = 20)

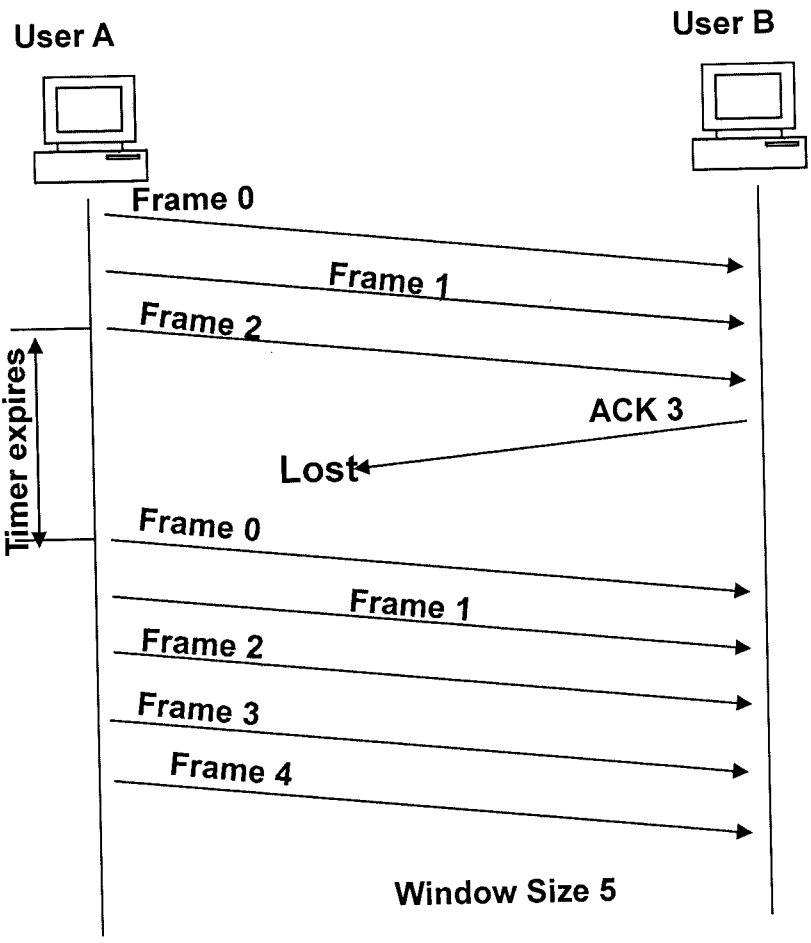
Q No	Solution	Scheme of Marking	Max. Time required for each Question
1.	<p>SONET Network Elements:</p>  <p>Importance of SONET: SONET is used to convert electrical signal into optical signal so that it can travel longer distances</p>	<p>Diagram:3 Importance explanation :1 mark</p>	<p>5 minutes</p>
2.	<p>Types of IPV4 addresses: Private address,</p>	<p>points carry -4 marks</p>	<p>4 minutes</p>

	Public address, Special IP address- *Network and Broadcast address *Loop back address *Link Local Address *Test-Net Address *Experiemental Address												
3.	<ul style="list-style-type: none"> ➤ Normal Response Mode (NRM) ➤ Asynchronous Response Mode (ARM) ➤ Asynchronous Balanced Mode (ABM) 	points carry 4 marks	4 minutes										
4.	IPV4 Vs IPV6 <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 50%;">IPV4</th> <th style="width: 50%;">IPV6</th> </tr> </thead> <tbody> <tr> <td>32-bit address</td> <td>128-bit address</td> </tr> <tr> <td>4 address fields contains</td> <td>8 address fields contains</td> </tr> <tr> <td>4.3 Billion users</td> <td>340 Billion users</td> </tr> <tr> <td>It denotes base8</td> <td>It denotes base 16</td> </tr> </tbody> </table>	IPV4	IPV6	32-bit address	128-bit address	4 address fields contains	8 address fields contains	4.3 Billion users	340 Billion users	It denotes base8	It denotes base 16	Each points carry 1 marks	4 minutes
IPV4	IPV6												
32-bit address	128-bit address												
4 address fields contains	8 address fields contains												
4.3 Billion users	340 Billion users												
It denotes base8	It denotes base 16												
5.	<p style="text-align: center;">Binary to equivalent decimal:</p> <ul style="list-style-type: none"> ➤ Binary: 11000000.10101000. 00001010.00001101 ➤ Decimal: 192.168.10.13 ➤ IP Address Class: C 	Calculation :2 marks Class IP Addresses: 1mark	5 minutes										

Part B

(2 x 5 = 10)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
6.	<p>(i) Damaged Frame 3:</p> <ul style="list-style-type: none"> ■ Say, frames 0-5 are sent and all but frame # 3 is correctly not received ■ Receiver sends NAK 3 and discards subsequent frames ■ This signals to sender that frames 0, 1, and 2 are correctly received and frame 3 is damaged ■ Sender retransmits frames 3, 4, and 5 ■ Same procedure for lost data frames <div style="text-align: center;"> <pre> sequenceDiagram participant UA as User A participant UB as User B UA->>UB: Frame 0 UA->>UB: Frame 1 UA->>UB: Frame 2 UA->>UB: Frame 3 UA->>UB: Frame 4 UA->>UB: Frame 5 UB-->>UA: NAK 3 UA->>UB: Frame 3 UA->>UB: Frame 4 UA->>UB: Frame 5 Note over UB: Damaged or, discard Note over UB: Discard Note over UB: Discard </pre> </div> <p>(ii) Lost ACK:</p> <ul style="list-style-type: none"> ■ When sender reaches window capacity, it starts a timer ■ If timer expires, it resends all outstanding (unACKed) frames ■ The receiver discards possible duplicate frames and sends another ACK 	<p>points:3 Schematic:2 points</p>	<p>8 minutes</p>



7. **Step1** : find how many bits for the 35 networks
 35 decimal to binary 128 64 32 16 8 4 2 1
 1 0 0 0 1 1

So 6 bits needed for the 35

Step 2

Subnet mask

128 64 32 16 8 4 2 1

172.0. 1 1 1 1 1 0 0 .00000000

New subnet mask= 128+64+32+16+8+4= 252

=255.255.252.0.0

Each step carries 1.25 points

7 minutes

Step 3:**Block size (network range)**

128 64 32 16 8 4 2 1

172.0.1 1 1 1 1 1 0 0 .00000000

Last network bits value is 4 , so block size is 4

Step 4:

Address	Network1	Network2	Network3
Network address	172.10.0.0	172.10.4.0	172.10.8.0
First Host address	172.10.0.1	172.10.4.1	172.10.8.1
Broadcast address	172.10.3.255	172.10.7.255	172.10.11.255

Part C

(1 x 10 = 10)

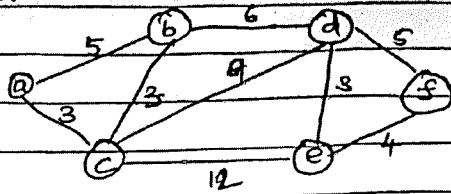
Q No	Solution	Scheme of Marking	Max. Time required for each Question
8.(a)	<p>HDLC:</p> <ul style="list-style-type: none"> • HDLC is a bit-oriented protocol. • Developed by ISO. • It specifies a packetization standard for serial links. • It has been so widely implemented because it supports both half-duplex and full-duplex communication lines, point-to-point (peer to peer) and multi-point networks, and switched or non-switched channels. • HDLC supports several modes of operation, including a simple sliding-window mode for reliable delivery <p>HDLC stations</p> <ul style="list-style-type: none"> • Primary Station • Secondary Station • Combined Station <p>Primary station:</p> <ul style="list-style-type: none"> • It is used as the controlling station on the link. • It has the responsibility of controlling all other stations on the link (usually secondary stations). 	Explanation: 3 marks	7 minutes

	<ul style="list-style-type: none"> • A primary issues commands and secondary issues responses <p>Secondary station:</p> <ul style="list-style-type: none"> • The secondary station is under the control of the primary station. • It has no ability, or direct responsibility for controlling the link. • It is only activated when requested by the primary station. • It only responds to the primary station. • The secondary station's frames are called responses. • It can only send response frames when requested by the primary station. • A primary station maintains a separate logical link with each secondary station. <p>Combined station:</p> <ul style="list-style-type: none"> • A combined station is a combination of a primary and secondary station. • On the link, all combined stations are able to send and receive commands and responses without any permission from any other stations on the link. • Each combined station is in full control of itself, and does not rely on any other stations on the link. No other stations can control any combined station. May issue both commands and responses. 		
8(b)	Dijikstr'a Shortest Path algorithm: (Solution attached separately)	Each step:1 marks	10 minutes

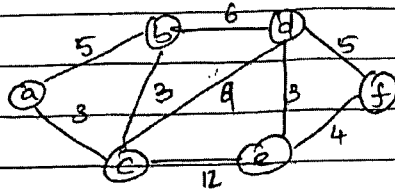
(86)

Source is 'a' destination is 'f'

Solution:



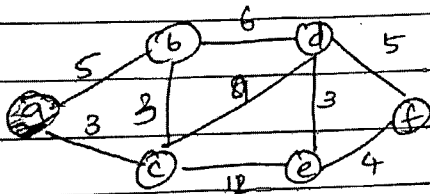
Step 1: Start by setting the starting node (A) as the current node.



node	Status	Shortest distance from 'a'	Previous node
a	Current node	0	
b		∞	
c		∞	
d		∞	
e		∞	
f		∞	

Step 2:

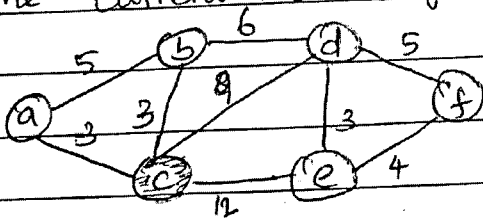
Check all the nodes connected to 'a' and update their "distance from a" and set their previous node to "a"



node	Status	Shortest distance from A	Previous node
A	Current node	0	
B		5	A
C		3	A
D			
E			
F			

Step 3:

Set the current node (A) to "visited" and use the closest unvisited node A as the current node (e.g. in this case: Node C)



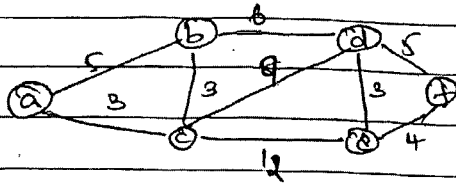
node	Status	Shortest distance from A	Previous node
A	visited node	0	
B		4	A
C		3	A
D		∞	
E		∞	
F		∞	

Step 4: check all unvisited nodes connected to the current node and add the distance from a to c to all distances from the connected nodes. Replace their values only if the new distance is lower than the previous node one.

$C \rightarrow b: 2+3=5 > 5$ don't change node

$C \rightarrow d: 2+8=10 < \infty$ change node D

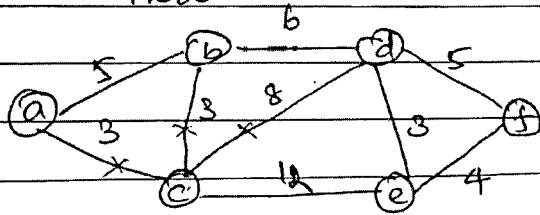
$C \rightarrow e: 1+3=4 < \infty$ change node E



node	Status	Shortest distance from a	Previous node
a	visited node	0	
b		5	A
c	current node	2	A
d		10	C
e		4	C
f		∞	

Step 5: set the current node c status to visited

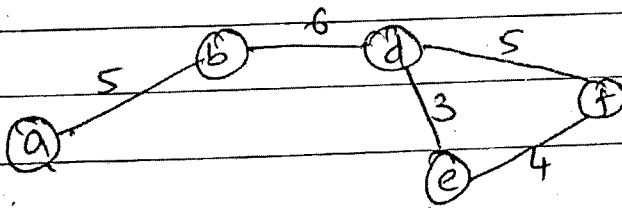
we then repeat the same process always picking the closest unvisited node to 'a' as the current node. In this case node 'b' becomes the current node.



node	Status	Shortest Distance from A	Previous node
a	visited node	0	
b	current node	5	A
c	visited node	3	A
d		10	C
e		15	C
f		∞	

Step 6:

$b \rightarrow d: 5+6=11 < 10$ change node d



node	Status	Shortest Distance from A	Previous node
a	visited node		
b	current node	5	
c	visited node	3	
d		11	
e		15	
f		∞	

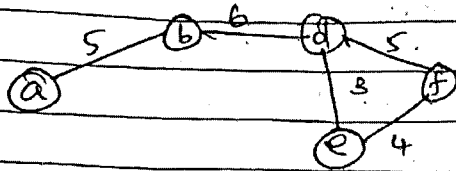
Step 7:

$d \rightarrow e: 11+3=14 < 15$ change node e

$d \rightarrow f: 11+5=16 < \infty$

we found a path from 'a' to 'f' but '16' may not be the shortest one yet. so we need to carry on the process.

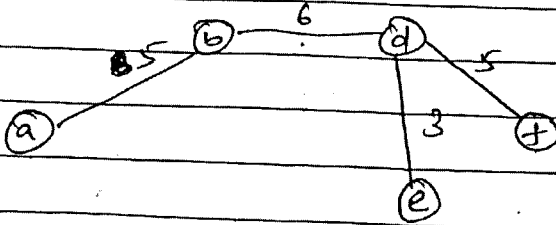
next "current node": E



node	Status	Shortest distance from A	Previous node
a	visited node	0	
b	visited node	5	a
c	visited node	3	a
d	Current node	11	b
e		14	d
f		16	d

step 8:

$e \rightarrow f: 5 + 6 + 3 + 4 = 18 > 16$ we do not change node 'f'



node	Status	Shortest distance from A	Previous node
a	visited node	0	
b	visited node	5	a
c	visited node	3	a
d	visited node	11	b
e	Current node	14	d
f		16	d

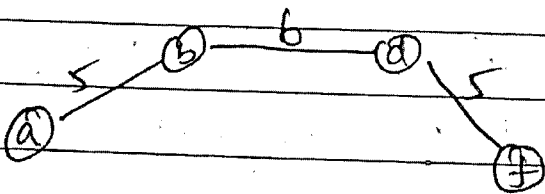
step 9:

we found the shortest path from 'a' to 'f'

read the path from f to a using the previous node column:

$f > d > b > a$

so the shortest path is $a \rightarrow b \rightarrow d \rightarrow f$ with a length of 16.



node	Status	Shortest distance from a	Previous node
a	visited node	0	
b	visited node	5	a
c	visited node	3	a
d	visited node	11	b
e	visited node	14	d
f	Current node	16	d



Roll No																			
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**PRESIDENCY UNIVERSITY
BENGALURU**

SCHOOL OF ENGINEERING

END TERM FINAL EXAMINATION

Semester: Odd Semester: 2019 - 20

Course Code: CSE 211

Course Name: COMPUTER NETWORKS

Program & Sem: B.Tech (CSE) & V

Date: 24 December 2019

Time: 9:30 AM to 12:30 PM

Max Marks: 80

Weightage: 40%

Instructions:

- (i) Read the question properly and answer accordingly.
- (ii) Question paper consists of 3 parts.
- (iii) Scientific and Non-programmable calculators are permitted

Part A [Memory Recall Questions]

Answer all the Questions. Each Question carries 2 marks.

(10Qx2M=20M)

1. List out network devices. (C.O.No.1) [Knowledge]
2. Describe multiplexing. (C.O.No.1) [Knowledge]
3. Differentiate between Wifi and WiMax. (C.O.No.2) [Knowledge]
4. Draw the FDDI concept (C.O.No.2) [Knowledge]
5. What are the types of switching networks? (C.O.No.3) [Knowledge]
6. Indicate different IPv4 class ranges. (C.O.No.3) [Knowledge]
7. Illustrate internetworking concept. (C.O.No.3) [Knowledge]
8. What are the responsibility of Transport layer? (C.O.No.4) [Knowledge]
9. Demonstrate TELNET (C.O.No.4) [Knowledge]
10. Identify the flow characteristic of QoS (C.O.No.4) [Knowledge]

Part B [Thought Provoking Questions]

Answer all the Questions. Each Question carries 10 marks.

(3Qx10M=30M)

11. Draw and explain the different types of transmission media
[10 M] (C.O.No.1) [Comprehension]

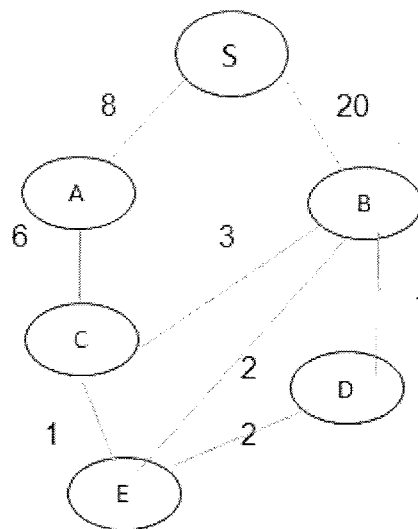
12. (A) The 7 bit hamming code is received 1000100, Assume that is even parity. Check the received code is correct, if it is not correct, locate the bit and find the correct one.

[5M] (C.O.No.2) [Knowledge]

(B) Frame bits are 10110 divided by 1101. Find the frame bits are error or no error using Cyclic Redundancy Check (CRC)

[5M] (C.O.No.2) [Knowledge]

13. Find a minimum value from Source to all Nodes using Bell Man Ford algorithm technique.



[10M] (C.O.No.3)[Application]

Part C [Problem Solving Questions]

Answer both the Questions. Each Question carries 15 marks.

(2Qx15M=30M)

14. With neat diagram briefly explain ISO/OSI reference model

[15M] (C.O.No.2) [Comprehension]

15. (A) Differentiate between TCP and UDP- Mention any eight points

[8M] (C.O.No.4) [Knowledge]

(B) Assume that you're the network administrator for the ABC Company, the company needs 10 networks. Find the First host ID, Broadcast address and network address for the first three networks, the given address is 200.0.0.0 [7M] (C.O.No.3) [Application]



SCHOOL OF ENGINEERING

END TERM FINAL EXAMINATION

Semester: V

Course Code: CSE211

Course Name: COMPUTER NETWORKS

Date: 24-12-2019

Time: 3hr

Max Marks: 80

Weightage: 40%

Extract of question distribution [outcome wise & level wise]

Q.NO	C.O.NO	Unit/Module Number/Unit /Module Title	memory recall type [Marks allotted] Bloom's Levels			Thought provoking type [Marks allotted] Bloom's Levels			Problem Solving type [Marks allotted]			Total Marks
			K			C			A			
1	1	Module-I	2									2
2	1	Module-I	2									2
3	2	Module-II	2									2
4	2	Module-III	2									2
5	3	Module-III	2									2
6	3	Module-III	2									2
7	3	Module-III	2									2
8	4	Module-IV	2									2
9	4	Module-IV	2									2
10	4	Module-IV	2									2
11	1	Module-I					10					10

12A	2	Module-II		5								5
12B	2	Module-II		5								5
13	3	Module-III								10		10
14	1	Module-I						15				15
15A	4	Module-IV			8							8
15B	3	Module-III									7	7
	Total Marks		20	10	8		10	15		10	7	80

K =Knowledge Level C = Comprehension Level, A = Application Level

Note: While setting all types of questions the general guideline is that about 60%

Of the questions must be such that even a below average students must be able to attempt, About 20% of the questions must be such that only above average students must be able to attempt and finally 20% of the questions must be such that only the bright students must be able to attempt.

I hereby certify that all the questions are set as per the above guidelines.

Faculty Signature:

Reviewer Commend:

Annexure- II: Format of Answer Scheme



SCHOOL OF ENGINEERING

SOLUTION

Semester: B.Tech CSE-V

Course Code: CSE211

Course Name: Computer Networks

Date: 24-12-2019

Time: 3 hr

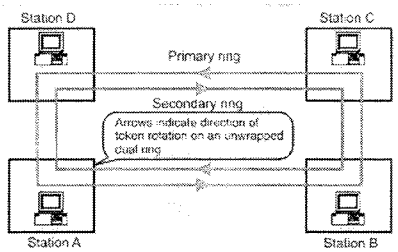
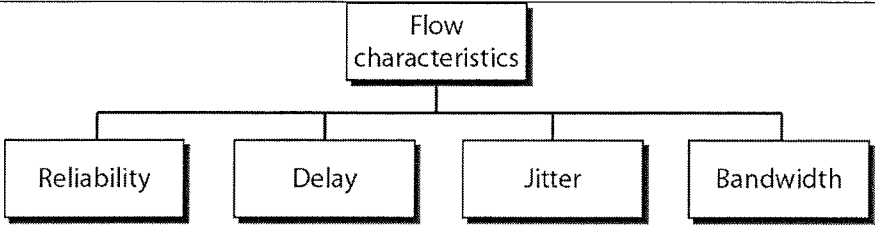
Max Marks: 80

Weightage: 40%

Part A

(10 x2M = 20)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
1.	<p>Networking devices may include gateways, routers, bridges, modems, wireless access points, switches, hubs, and repeaters; and may also include hybrid network devices such as multilayer switches, protocol converters, bridge routers, proxy servers, firewalls</p>	Any four devices :2 mark	4 minutes
2.	<p>Multiplexing is the process of combining multiple signals into one signal, over a shared medium. If analog signals are multiplexed, it is Analog Multiplexing and if digital signals are multiplexed, that process is Digital Multiplexing.</p>	points carry -2 marks	4 minutes
3.	<p>WIFI WIMAX</p> <p>Wifi is defined under IEEE 802.11x standards where x stands for various WiFi versions. WiMax is defined under IEEE 802.16y standards where y stands for various WiMax versions.</p> <p>WiFi is for LAN (Local Area Network) applications. WiMax is for MAN (Metropolitan Area Network) applications.</p> <p>WiFi does not guarantee any Quality of Service (Qos). WiMax guarantee Quality of Service (Qos).</p>	Any 2points carry 2 marks	4 minutes

	<p>WiFi network range is around 100 meters. WiMax network can reach about 50-90 km.</p> <p>WiFi MAC layer uses CSMA/CA protocol which is not connection oriented.</p>		
4.	 <p>The diagram shows four stations (A, B, C, D) arranged in a square. Two rings are shown: a Primary ring and a Secondary ring. Arrows indicate the direction of token rotation on an unwrapped dual ring.</p>	Diagram carry 2 marks	4 minutes
5.	<p>Message switching. Packet switching. Circuit switching</p>	points carry -2 marks	4 minutes
6	<ul style="list-style-type: none"> • Class A 0.0.0.0 to 127.255.255.255. • Class B 128.0.0.0 to 191.255.255.255. • Class C 192.0.0.0 to 223.255.255.255. • Class D 224.0.0.0 to 239.255.255.255. • Class E 240.0.0.0 to 255.255.255.255. 	points carry -2 marks	4 minutes
7	<p>Internetworking is the process or technique of connecting different networks by using intermediary devices such as routers or gateway devices.</p>	points carry -2 marks	4 minutes
8	<ul style="list-style-type: none"> • Process to process delivery • End-to-end Connection between hosts • Multiplexing and Demultiplexing • Congestion control 	points carry -2 marks	4 minutes
9	<p>TELNET is an abbreviation for TERminal NETWORK. TELNET enables the establishment of a connection to a remote system in such a way that the local terminal appears to be a terminal at the remote system.</p>	points carry -2 marks	4 minutes
10	 <p>The flowchart shows 'Flow characteristics' at the top, which branches down into four categories: Reliability, Delay, Jitter, and Bandwidth.</p>	points carry -2 marks	4 minutes

Part B

(3x 10 = 30)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
11.	<div style="text-align: center;"> <pre> graph TD TM[Transmission media] --> G[Guided (wired)] TM --> U[Unguided (wireless)] G --> TPC[Twisted-pair cable] G --> CC[Coaxial cable] G --> FOC[Fiber-optic cable] U --> FS[Free space] WT[Wireless transmission] --> RW[Radio wave] WT --> MW[Microwave] WT --> IR[Infrared] </pre> </div> <p>(i) Twisted Pair Cable – It consists of 2 separately insulated conductor wires wound about each other. Generally, several such pairs are bundled together in a protective sheath. They are the most widely used Transmission Media. Twisted Pair is of two types:</p> <ol style="list-style-type: none"> 1. Unshielded Twisted Pair (UTP): This type of cable has the ability to block interference and does not depend on a physical shield for this purpose. It is used for telephonic applications. <ul style="list-style-type: none"> • Short distance transmission due to attenuation 2. Shielded Twisted Pair (STP): This type of cable consists of a special jacket to block external interference. It is used in fast-data-rate Ethernet and in voice and data channels of telephone lines. <p>(ii) Coaxial Cable – It has an outer plastic covering containing 2 parallel conductors each having a separate insulated protection cover. Coaxial cable transmits information in two modes: Baseband mode(dedicated cable bandwidth) and Broadband mode(cable bandwidth is split into separate ranges). Cable TVs and analog television networks widely use Coaxial cables.</p>	Diagram:4 Schematic:6 points	20 minutes

(iii) Optical Fibre Cable –

It uses the concept of reflection of light through a core made up of glass or plastic. The core is surrounded by a less dense glass or plastic covering called the cladding. It is used for transmission of large volumes of data.

2. Unguided Media:

It is also referred to as Wireless or Unbounded transmission media. No physical medium is required for the transmission of electromagnetic signals.

Features:

- Signal is broadcasted through air
- Less Secure
- Used for larger distances

There are 3 major types of Unguided Media:

(i) Radiowaves –

These are easy to generate and can penetrate through buildings. The sending and receiving antennas need not be aligned. Frequency Range: 3KHz – 1GHz. AM and FM radios and cordless phones use Radiowaves for transmission.

Further Categorized as (i) Terrestrial and (ii) Satellite.

(ii) Microwaves –

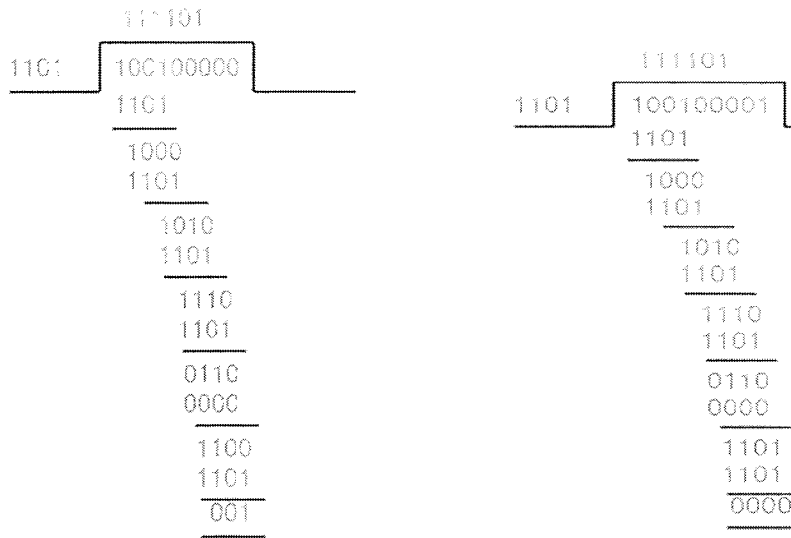
It is a line of sight transmission i.e. the sending and receiving antennas need to be properly aligned with each other. The distance covered by the signal is directly proportional to the height of the antenna. Frequency Range: 1GHz – 300GHz. These are majorly used for mobile phone communication and television distribution.

(iii) Infrared –

Infrared waves are used for very short distance communication. They cannot penetrate through obstacles. This prevents interference between systems. Frequency Range: 300GHz – 400THz. It is used in TV remotes, wireless mouse, keyboard, printer, etc.

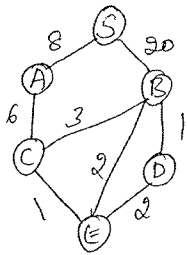
Receiver Side:

Code word received at the receiver side 100100001



13

BELLMAN ford Algo



Bellman ford eqn

$$d_x(y) = \min \{c(x,v) + d_v(y)\}$$

① Start from S

$$d_A(s) = 8$$

$$d_B(s) = 20$$

$$② d_C(s) = \{c(CA) + d_A(y)\}$$

$$= 6 + 8$$

$$d_C(s) = 14$$

$$d_D(s) = \{c(DB) + d_B(y)\}$$

$$= \{1 + 20\}$$

$$= 21$$

$d(x,y)$: cost of least cost path from node x to y
 $c(x,v)$: cost from node x to v where $v \in V$, the set of neighbors for node x

Carries 10 marks

20 Minutes

$$d_B^0 = \{c(EB) + d_B^0\}$$

$$d_E^0 = \{2 + 20\}$$

$$d_E^0 = 22$$

$$\textcircled{3} \quad d_B(s) = \min\{c(BC) + d_C(s), d_B^0\}$$

$$= \min\{3 + 14, 20\}$$

$$= \min(17, 20)$$

$$= \underline{17}$$

$$d_E(s) = \min\{c(EC) + d_C(s), d_E^0\}$$

$$= \min(1 + 14, 22)$$

$$= \min(15, 22)$$

$$= 15$$

$$\textcircled{4} \quad d_D(s) = \min\{c(DE) + d_E(s), d_D^0\}$$

$$= \min(2 + 15, 21)$$

$$= \min(17, 21)$$

$$= 17$$

$$\textcircled{5} \quad d_A(s) = 8 \quad \text{via } S$$

$$d_B(s) = 17 \quad \text{via } C$$

$$d_C(s) = 14 \quad \text{via } A$$

$$d_D(s) = 17 \quad \text{via } E$$

$$d_E(s) = 15 \quad \text{via } C$$

Part C

(2 x 15 = 30)

Q No	Solution	Scheme of Marking	Max. Time required for each Question
14	<p>. With neat diagram, briefly explain OSI reference model.</p> <ul style="list-style-type: none"> ■ Application Layer ■ Presentation Layer ■ Session Layer ■ Transport Layer ■ Network Layer ■ Datalink Layer Physical Layer <p>Physical Layer</p> <p>Bit representation – encode bits into electrical or optical signals</p> <ul style="list-style-type: none"> • Transmission rate – The number of bits sent each second • Physical characteristics of transmission media • Synchronizing , the sender and receiver clocks • Transmission mode – simplex, half-duplex, full duplex • Physical Topology – how devices are connected – ring, star, mesh, bus topology <p>■ Datalink Layer</p> <p>Data Link Layer Responsible for delivery of data between two systems on the same network Main functions of this layer are:</p> <ul style="list-style-type: none"> • Framing – divides the stream of bits received from network layer into manageable data units called frames. • Physical Addressing – Add a header to the frame to define the physical address of the source and the destination machines. • Flow control – Impose a flow control – control rate at which data is transmitted so as not to flood the receiver (Feedbackbased flow control. 	<p>Diagram 5marks Explanation: 10 marks</p>	<p>30 Minutes</p>

Network layer

- The network layer is considered the backbone of the OSI Model.
- It selects and manages the best logical path for data transfer between nodes.
- This layer contains hardware devices such as routers, bridges, firewalls and switches, but it actually creates a logical image of the most efficient communication route and implements it with a physical medium.

Network layer protocols exist in every host or router. The router examines the header fields of all the IP packets that pass through it.

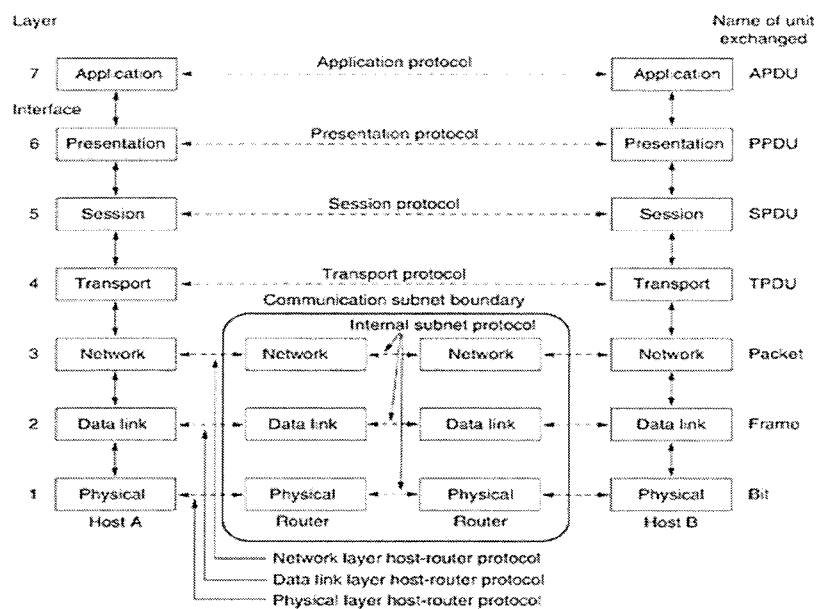
- The **transport layer** is the **layer** in the open system interconnection (**OSI**) **model** responsible for end-to-end communication over a network.
- It provides logical communication between application processes running on different hosts within a layered architecture of protocols and other network components.
- The session layer provides the mechanism for opening, closing and managing a session between end-user application processes, i.e., a semi-permanent dialogue.
- Communication sessions consist of requests and responses that occur between applications.
- Session-layer services are commonly used in application environments that make use of remote

procedure calls (RPCs).

- The presentation layer mainly translates data between the application layer and the network format.
- Data can be communicated in different formats via different sources.
- Thus, the presentation layer is responsible for integrating all formats into a standard format for efficient and effective communication.

The presentation layer is responsible for the following:

- Data encryption/decryption
- Character/string conversion
- Data compression
- Graphic handling



15a

	TCP	UDP
Acronym for	Transmission Control Protocol	User Datagram Protocol or Universal Datagram Protocol
Connection	Transmission Control Protocol is a connection-oriented protocol	User Datagram Protocol is a connectionless protocol
Function	As a message makes its way across the internet from one computer to another. This is connection based.	UDP is also a protocol used in message transport or transfer. This is not connection based which means that one program can send a load of packets to another and that would be the end of the relationship.
Usage	TCP is suited for applications that require high reliability, and transmission time is relatively less critical.	UDP is suitable for applications that need fast efficient transmission such as games. UDP's stateless nature is also useful for servers that answer small queries from huge numbers of clients.
Use by other protocols	HTTP, HTTPS, FTP, SMTP, Telnet	DNS, DHCP, TFTP, SNMP, RIP, VOIP
Ordering of data packets	TCP rearranges data packets in the order specified.	UDP has no inherent order as all packets are independent of each other. If ordering is required, it has to be managed by the application layer.
Speed of transfer	The speed for TCP is slower than UDP.	UDP is faster because error recovery is not attempted. It is a "best effort" protocol.
Reliability	There is absolute guarantee that the data transferred remains intact and arrives in the same order in which it was sent.	There is no guarantee that the messages or packets sent would reach at all.
Header Size	TCP header size is 20 bytes	UDP Header size is 8 bytes.

8 Different
8 Marks

15 Minutes

