

# **JEPPIAAR ENGINEERING COLLEGE**

**DEPARTMENT OF ELECTRONICS AND COMMUNICATION  
ENGINEERING**

**EC6757-TOTAL QUALITY MANAGEMENT**

**QUESTION BANK**

**VIII SEMESTER ECE**

**BATCH 2014-2018**

Prepared By  
**Dr.S.K.Padmanabhan**  
Asso.Prof/ECE

# JEPPIAAR ENGINEERING COLLEGE

## DEPARTMENT OF ECE

### VISION OF INSTITUTION

To build Jeppiaar Engineering College as an institution of academic excellence in technological and management education to become a world class University.

### MISSION OF INSTITUTION

- To excel in teaching and learning, research and innovation by promoting the principles of scientific analysis and creative thinking.
- To participate in the production, development and dissemination of knowledge and interact with national and international communities.
- To equip students with values, ethics and life skills needed to enrich their lives and enable them to meaningfully contribute to the progress of society.
- To prepare students for higher studies and lifelong learning, enrich them with the practical and entrepreneurial skills necessary to excel as future professionals and contribute to Nation's economy

## PROGRAM OUTCOMES (POs)

<b>PO1</b>	<b>Engineering Knowledge:</b> Apply the knowledge of mathematics, science, engineering fundamentals, and electronics engineering specialization to the solution of complex engineering problems.
<b>PO2</b>	<b>Problem analysis:</b> Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
<b>PO3</b>	<b>Design/development of solutions:</b> Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
<b>PO4</b>	<b>Conduct investigations of complex problems:</b> Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
<b>PO5</b>	<b>Modern tool usage:</b> Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
<b>PO6</b>	<b>The engineer and society:</b> Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
<b>PO7</b>	<b>Environment and sustainability:</b> Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
<b>PO8</b>	<b>Ethics:</b> Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
<b>PO9</b>	<b>Individual and team work:</b> Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
<b>PO10</b>	<b>Communication:</b> Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
<b>PO11</b>	<b>Project management and finance:</b> Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
<b>PO12</b>	<b>Life-long learning:</b> Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

## VISION&MISSION, PEO & PSO OF THE DEPARTMENT

### VISION OF ECE DEPT

To become a centre of excellence to provide quality education and produce creative engineers in the field of Electronics and Communication Engineering to excel at international level.

### MISSION OF ECE DEPT

<b>M1</b>	Inculcate creative thinking and zeal for research to excel in teaching-learning process.
<b>M2</b>	Create and disseminate technical knowledge in collaboration with industries.
<b>M3</b>	Provide ethical and value based education by promoting activities for the betterment of the society.
<b>M4</b>	Encourage higher studies, employability skills, entrepreneurship and research to produce efficient professionals thereby adding value to the nation's economy.

### PEO of ECE DEPT

<b>PEO I</b>	Produce technically competent graduates with a solid foundation in the field of Electronics and Communication Engineering with the ability to analyze, design, develop, and implement electronic systems.
<b>PEO II</b>	Motivate the students for successful career choices in both public and private sectors by imparting professional development activities.
<b>PEO III</b>	Inculcate in the students' ethical values, effective communication skills and develop the ability to integrate engineering skills to broader social needs.
<b>PEO IV</b>	Impart professional competence, desire for lifelong learning and leadership skills in the field of Electronics and Communication Engineering.

### PSO of ECE DEPT

<b>PSO I</b>	Competence in using modern electronic tools in hardware and software co-design for networking and communication applications.
<b>PSO II</b>	Promote excellence in professional career and higher education by gaining knowledge in the field of Electronics and Communication Engineering
<b>PSO III</b>	Understand social needs and environmental concerns with ethical responsibility to become a successful professional.

## **UNIT I FUNDAMENTALS & LINK LAYER :**

Building a network – Requirements - Layering and protocols - Internet Architecture – Network software – Performance ; Link layer Services - Framing - Error Detection - Flow control

### **1. What are the two types of line configuration? NOV/DEC 2010**

Line configuration refers to the way two or more communication devices attached to a link. Line configuration is also referred to as connection. There are two possible types of line configurations or connections.

Point-to-point connection

Multipoint connection

### **2. Group the OSI layers by function?(NOV/DEC 2013)**

The seven layers of the OSI model belonging to three subgroups.

- Physical, data link and network layers are the *network support layers*; they deal with the physical aspects of moving data from one device to another.
- Session, presentation and application layers are the *user support layers*; they allow interoperability among unrelated software systems.
- The transport layer ensures *end-to-end reliable data transmission*.

### **3. What are the three criteria necessary for an effective and efficient network?**

The most important criteria are performance, reliability and security.

*Performance* of the network depends on number of users, type of transmission medium, and the capabilities of the connected h/w and the efficiency of the s/w.

*Reliability* is measured by frequency of failure, the time it takes a link to recover from the failure and the network's robustness in a catastrophe.

*Security* issues include protecting data from unauthorized access and viruses.

### **4. What are the two interfaces provided by protocols?**

- Service interface
- Peer interface

*Service interface*- defines the operations that local objects can perform on the protocol.

*Peer interface*- defines the form and meaning of messages exchanged between protocol peers to implement the communication service.

### **5. What is OSI?**

A standard that specifies a conceptual model called Open systems Interconnection network interface model, which breaks networked communications into seven layers: Application, Presentation, Session, Transport, Network, Data link, Physical.

### **6. Why protocols needed?**

In networks, communication occurs between the entities in different systems. Two entities cannot just send bit streams to each other and expect to be understood. For communication, the entities must agree on a protocol. A protocol is a set of rules that govern data communication.

### **7. What are header and trailers and how do they get added and removed?**

Each layer in the sending machine adds its own information to the message it receives from the layer just above it and passes the whole package to the layer just below it. This information is added in the form of headers or trailers. Headers are added to the message at the layers 6,5,4,3, and 2. A trailer is added at layer2. At the receiving machine, the headers or trailers attached to the data unit at the corresponding sending layers are removed, and actions appropriate to that layer are taken.

### **8. Mention the different physical media?**

- Twisted pair.
- Coaxial cable.
- Optical fiber.

### **9. What are the issues in data link layer? NOV/DEC 2012**

Specific responsibilities of data link layer include the following. a) Framing b) Physical addressing c) Flow control d) Error control e) Access control.

### **10. Write short notes on error correction? NOV/DEC 2011**

It is the mechanism to correct the errors and it can be handled in 2 ways.

- When an error is discovered, the receiver can have the sender retransmit the entire data unit.
- A receiver can use an error correcting coder, which automatically corrects certain errors.

### **11. Define Signals?**

Signals are actually electromagnetic waves traveling at the speed of light. The speed of light is, however, medium dependent-electromagnetic waves traveling through copper and fiber do so at about two-thirds the speed of light in vacuum.

### **12. Define flow control? NOV/DEC 2011, APR/MAY 2015**

Flow control refers to a set of procedures used to restrict the amount of data. The sender can send before waiting for acknowledgment.

### **13. What do you mean by error control? NOV/DEC 2010, APR/MAY 2015**

Error control refers primarily to methods of error detection and retransmission. Anytime an error is detected in an exchange, specified frames are retransmitted. This process is called automatic repeat request (ARQ).

**14. Define checksum.**

The error detection method used by the higher layer protocol is called checksum. Checksum is based on the concept of redundancy.

**15. What are the steps followed in checksum generator?**

The sender follows these steps a) the units are divided into k sections each of n bits. b) All sections are added together using 2's complement to get the sum. c) The sum is complemented and become the checksum. d) The checksum is sent with the data

**16. What is the purpose of hamming code?**

A hamming code can be designed to correct burst errors of certain lengths. So the simple strategy used by the hamming code to correct single bit errors must be redesigned to be applicable for multiple bit correction

**17. List out the available error detection methods.**

Some of the redundancy checks that are used in data communication are:

- Vertical redundancy checks (VRC).
- Longitudinal redundancy checks (LRC).
- Cyclic redundancy checks (CRC).
- Checksum.

**18. Write short notes on VRC.**

The most common and least expensive mechanism for error detection is the vertical redundancy check (VRC) often called a parity check. In this technique a redundant bit called a parity bit, is appended to every data unit so, that the total number of 0's in the unit (including the parity bit) becomes even.

**19. Write short notes on LRC.**

In longitudinal redundancy check (LRC), a block of bits is divided into rows and a redundant row of bits is added to the whole block.

**20. What is the use of two dimensional parity in error detection?**

Two-dimensional parity check increases the likelihood of detecting burst errors. It is used to detect errors occurred in more than one bits.

**21. Write short notes on CRC checker.**

A CRC checker functions exactly like a generator. After receiving the data appended with the CRC it does the same modulo-2 division. If the remainder is all 0's the CRC is dropped and the data accepted. Otherwise, the received stream of bits is discarded and the dates are resent.

**22. What are the ways to address the framing problem?**

- Byte-Oriented Protocols(PPP)
- Bit-Oriented Protocols(HDLC)
- Clock-Based Framing(SONET)

**23. What is spread spectrum and explain the two types of spread spectrum?**

Spread spectrum is to spread the signal over a wider frequency band than normal in such a way as to minimize the impact of interference from other devices.

- Frequency Hopping
- Direct sequence.

**24. Give the purpose of layering. MAY/JUNE 2013**

- It decomposes the problem of building a network into more manageable components.
- It provides a more modular design. To add a new service, then it is only needed to modify the functionality at one layer, reusing the functions at all the other layers.
- Uses abstraction to hide complexity of network from application.

**25. Define a layer. NOV/DEC 2013**

- The ISO defined a common way to connect computers, called the Open Systems Interconnection (OSI) architecture.
- It defines partitioning of network functionality into seven layers as shown.
- The bottom three layers, i.e., physical, data link and network are implemented on all nodes on the network including switches.

**26. What do you mean by framing? NOV/DEC 2013**

A frame consists of one complete cycle of time slots, including one or more slot dedicated to each sending device.

**27. What is the difference between port address, logical address and physical address? M/J 2014**

A physical address is like your hard drive to your computer. A logical address is like a file on the server, with information or instructions that lead to it. A port address is an address assigned by the CPU (0-FFFF) that can be accessed for I/O read/write like RAM.

**28. Mention the types of error correcting methods.**

There are 2 error-correcting methods.

- Single bit error correction
- Burst error correction.

**29. Mention the categories of flow control?**

There are 2 methods have been developed to control flow of data across communication links. a) Stop and wait- send one from at a time. b) Sliding window- send several frames at a time.

**30. What is redundancy?**

It is the error detecting mechanism, which means a shorter group of bits or extra bits may be appended at the destination of each unit.

**31. Distinguish between Packet Switched and Circuit Switched Networks. Apr/May 2017**

Circuit switching

Consists of a set of switches connected by physical links

A connection between two stations is a dedicated path made of one more links

Each connection uses only one dedicated channel on each link

Each link is divided into n channels by using TDM or FDM

**In a packet-switched network, there is no resource reservation; resources are allocated on demand.**

**32. What is meant by Bit stuffing? Give an example? Apr/May 2017**

Bit stuffing is the process of inserting noninformation bits into data to break up bit patterns to affect the synchronous transmission of information. It is widely used in network and communication protocols, in which bit stuffing is a required part of the transmission process. Bit stuffing is commonly used to bring bit streams up to a common transmission rate or to fill frames. Bit stuffing is also used for run-length limited coding.

**33. Define the term Bandwidth and Latency? Nov/Dec 17**

Bandwidth is the amount of data that can be transferred from one point to another normally measured in seconds.

Latency is the time that a data packet takes to travel from one point to another. Another accurate term for Latency is **delay**

**34. Compare Byte-Oriented versus Bit-oriented protocol. Nov/Dec 17**

A bit-oriented protocol is a communications protocol that sees the transmitted data as an opaque stream of bits with no semantics, or meaning. Control codes are defined in terms of bit sequences instead of characters. Bit oriented protocol can transfer data frames regardless of frame contents.

Synchronous framing High-Level Data Link Control is a popular bit-oriented protocol.

Byte-oriented framing protocol is "a communications protocol in which full bytes are used as control codes. Also known as character-oriented protocol. UART communication is byte-oriented

**PART-B**

**1. Explain ISO/OSI reference model. Dec 2010, NOV/DEC 2012, MAY/JUNE 2012**

Refer Larry Peterson Page no: 26-30

**2. Explain the topologies of the network. Dec 2010**

**3. Explain the Different types of Multiplexing? NOV/DEC 2011**

Refer Larry Peterson Page no: 11-14,25-26

**4. Explain the Error Detection Mechanism?. NOV/DEC 2012, APR/MAY 2015**

Refer Larry Peterson Page no: 92-101

**5. i) Discuss the framing technique used in HDLC. What is the effect of errors on this framing? (8) MAY/JUNE 2013**

**ii) The message 11001001 is to be transmitted using CRC error detection algorithm.**

Assuming the CRC polynomial to be  $x^3 + 1$ , determine the message that should be transmitted. If the second left most bit is corrupted, show that it is detected by the receiver. (8) MAY/JUNE 2013

**6. i) Discuss the principle of stop and wait flow control algorithm. Draw time line diagrams and explain how loss of a frame and loss of an ACK are handled. What is the effect of delay-bandwidth product on link utilization? (8) MAY/JUNE 2013**

**ii) Assume that a frame consists of 6 characters encoded in 7-bit ASCII. Attach a parity bit for every character to maintain even parity. Also attach a similar parity bit for each bit position across each of the bytes in the frame. Show that such a 2-dimensional parity scheme can detect all 1-bit, 2-bit and 3-bit and can correct a single bit error. (8) MAY/JUNE 2013**

**7. (i) Explain NRZ, NRZI and Manchester encoding schemes with examples (8)**

**(ii) Describe how bit stuffing works in HDLC protocol. (8) NOV/DEC 2013**

**8. (i) Discuss the issues in the data link layer (4)**

**(ii) Suppose we want to transmit the message 11001001 and protect it from errors using the CRC polynomial  $x^3 + 1$ . Use polynomial long division to determine the message that should be transmitted. (12) NOV/DEC 2013**

**9. Given a remainder of 111, a data unit of 10110011 and a divisor of 1001, is there an error in the data unit. Justify your answer with necessary principles. (16) MAY, JUNE 2014**

Refer Larry Peterson Page no: 93

**10. How is frame order and flow control is achieved using the data link layer? MAY, JUNE 2014**

Refer Larry Peterson Page no: 96

11. Discuss in detail about Internet architecture. APR/ MAY 2015

12. With a neat sketch explain the architecture of an OSI seven layer model? Nov/Dec 17

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 26-30

13. Discuss the approaches used for error detection in networking. Nov/Dec 17

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 92-101

## UNIT II MEDIA ACCESS & INTERNETWORKING 9

Media access control - Ethernet (802.3) - Wireless LANs – 802.11 – Bluetooth - Switching and bridging – Basic Internetworking (IP, CIDR, ARP, DHCP, ICMP)

### PART-A

1. Define the term carrier sense in CSMA/CD? NOV/DEC 2011

All the nodes can distinguish between idle and a busy-link and “collision detect” means that a node listens as it transmits and can therefore detect when a frame it is transmitting has interfered (collided) with a frame transmitted by another node.

2. What are the functions of MAC?

MAC sub layer resolves the contention for the shared media. It contains synchronization, flag, flow and error control specifications necessary to move information from one place to another, as well as the physical address of the next station to receive and route a packet.

3. What are the functions of LLC?

The IEEE project 802 models take the structure of an HDLC frame and divides it into 2 sets of functions. One set contains the end user portion of the HDLC frame – the logical address, control information, and data. These functions are handled by the IEEE 802.2 logical link control (LLC) protocol.

4. What is Ethernet?

Ethernet is a multiple-access network, meaning that a set of nodes send and receive frames over a shared link.

5. Advantages of Ethernet

1. Inexpensive 2. Easy to install 3. Supports various writing technologies.

6. Define the term carrier sense in CSMA/CD? (NOV/DEC 2011)

All the nodes can distinguish between idle and a busy-link and “collision detect” means that a node listens as it transmits and can therefore detect when a frame it is transmitting has interfered (collided) with a frame transmitted by another node.

7. Define ICMP?

Internet Control Message Protocol is a collection of error messages that are sent back to the source host whenever a router or host is unable to process an IP datagram successfully.

8. What is DHCP?

The Dynamic Host Configuration Protocol has been derived to provide dynamic configuration. DHCP is also needed when a host moves from network to network or is connected and disconnected from a network.

9. What do you mean by ARP?

ARP stands for Address resolution protocol, maps an IP address to a MAC address

10. What do you mean by RARP?

RARP stands for Reverse Address resolution protocol, maps a MAC address to an IP address.

11. Define Repeater?

A repeater is a device that forwards digital signals, much like an amplifier forwards analog signals. However, no more than four repeaters may be positioned between any pairs of hosts, meaning that an Ethernet has a total reach of only 2,500m.

12. Define collision detection?

In Ethernet, all these hosts are competing for access to the same link, and as a consequence, they are said to be in the same collision detection.

13. Why Ethernet is said to be a I-persistent protocol?

An adaptor with a frame to send transmits with probability ‘1’ whenever a busy line goes idle.

14. What is token holding time (THT)?

It defines that how much data a given node is allowed to transmit each time it possesses the token or equivalently, how long a given node is allowed to hold the token.

15. What are the two classes of traffic in FDDI?

- Synchronous
- Asynchronous

16. What is the difference between Switch and bridge? NOV/DEC 2012

It is used to forward the packets between shared media LANs such as Ethernet. Such switches are sometimes known by the obvious name of LAN switches.

17. Explain Bridge? NOV/DEC 2011

It is a collection of LANs connected by one or more bridges is usually said to form an extended LAN. In their simplest variants, bridges simply accept LAN frames on their inputs and forward them out on all other outputs.

18. How does a given bridge learn whether it should forward a multicast frame over a given port? NOV/DEC 2010



It learns exactly the same way that a bridge learns whether it should forward a unicast frame over a particular port- by observing the source addresses that it receives over that port.

**19. Name the two timers used in FDDI? MAY/JUNE 2012**

The two timers used by FDDI are called the token rotation timer (TRT), and token holding timer (THT).

**20. What is the advantage of FDDI over a basic token ring ? NOV/DEC 2010**

Speed performance with the **advantages** of a token passing ring topology. **FDDI** runs at 100 Mbps and its topology is a dual ring

**21. Differentiate fast Ethernet and gigabit ethernet? NOV/DEC 2012**

Fast Ethernet cards connect to networks at a rate of 100 Mbps while Gigabit network cards can connect at speeds up to 1000mb/s. The main difference between the two is speed. A fast Ethernet card can run on bandwidths at 100mb/s while a gigabit Ethernet can run at ten times that speed. However, the existence of FDDIs around made this technology more like a stepping stone to something better – enter the gigabit card. Gigabit networks are made to run the best at Layer 3 switching meaning it has more route functionality than the 100mbs fast Ethernet.

Gigabit Ethernet is backwards compatible meaning that it will support all current applications and requires a minimum of new learning. This goes just the same with the fast Ethernet, fast Ethernet can use 10/100 Mbps and gigabit can run on networks 10/100/1000 Mbps. Hence both cards are basically the same using the same technology except the gigabit card can run on 1000mb/s, an astonishing speed.

**22. What are the four prominent wireless technologies?**

- Bluetooth
- Wi-Fi(formally known as 802.11)
- WiMAX(802.16)
- Third generation or 3G cellular wireless.

**23. How to mediate access to a shared link?**

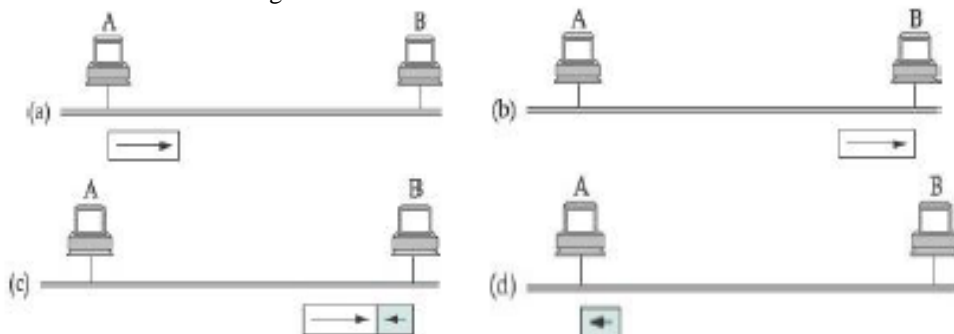
Ethernet, token ring, and several wireless protocols. Ethernet and token ring media access protocols have no central arbitrator of access. Media access in wireless networks is made more complicated by the fact that some nodes may be hidden from each other due to range limitations of radio transmission.

**24. What are the three pieces of information in the configuration messages?**

1. The ID for the bridge that is sending the message.
2. The ID for what the sending bridge believes to be the root bridge.
3. The distance, measured in hops, from the sending bridge to the root bridge.

**25. How is the minimum size of an ethernet frame determined? MAY/JUNE 2013**

- Consider the following worst case scenario in which hosts A and B are at either ends.



- Host A begins transmitting a frame at time  $t$ , as shown in (a).
- It takes one link latency (say  $d$ ) for the frame to reach host B. Thus, the first bit of A's frame arrives at B at time  $t + d$ , as shown in (b).
- Suppose an instant before host A's frame arrives, B senses it idle line, host B begins to transmit its own frame.
- B's frame will immediately collide with A's frame, and this collision will be detected by host B (c). Host B will send the 32-bit jamming sequence.
- Host A will not know that the collision occurred until B's frame reaches it, i.e., at time  $t + 2d$ , as shown in (d).
- On a maximally configured Ethernet, the round-trip delay is  $51.2 \mu\text{s}$ , i.e., 512 bits (64 bytes)

**26. What is broadcast?**

Broadcast is simple – each bridge forwards a frame with a destination broadcast address out on each active (selected) port other than the one on which the frame was received.

**27. What is multicast?**

Multicast is a method of sending Internet Protocol (IP) datagrams to a group of interested receivers in a single transmission. It is often employed for streaming media applications on the Internet and private networks.

**28. How does an FDDI node determine whether it can send asynchronous traffic and synchronous traffic? MAY/JUNE 2013**

**29. List the main two limitations of bridges. NOV/DEC 2013**

- It is not realistic to connect more than a few LANs by means of bridges. Broadcast does

not scale well, i.e., extended LANs do not scale.

- Bridges can support only networks that have exactly the same format for addresses.
- Bridges can be used to connect Ethernets to Ethernets, 802.5 to 802.5, and Ethernets to 802.5 rings. However, it cannot be used to connect ATM networks.

**30. Define source routing. NOV/DEC 2013**

- All the information about network topology that is required to switch a packet across the network to the destination is provided by the source host.
- The header contains an ordered list of intermediate hosts through which the packet must traverse.
- For each packet that arrives on an input, the switch reads the port number in the header and transmits the packet on that output.
- Source routing can be used in both datagram and virtual circuit networks

**31. State the functions of Bridges. Apr/May 17**

A bridge is a device that connects and passes packets between two network segments that use the same communications protocol. Bridges operate at the data link layer (layer 2) of the OSI reference model.

**32. When is ICMP redirect message used? Apr/May 17**

An ICMP redirect is an error message sent by a router to the sender of an IP packet. Redirects are used when a router believes a packet is being routed sub optimally and it would like to inform the sending host that it should forward subsequent packets to that same destination through a different gateway.

**33. Show the Ethernet Frame Format. Nov/Dec 17**

Ethernet is a multiple-access network, meaning that a set of nodes send and receive frames over a shared link. An Ethernet frame is preceded by a preamble and start frame delimiter (SFD), which are both part of the Ethernet packet at the physical layer. Each Ethernet frame starts with an Ethernet header, which contains destination and source MAC addresses as its first two fields. The middle section of the frame is payload data including any headers for other protocols (for example, Internet Protocol) carried in the frame. The frame ends with a frame check sequence (FCS), which is a 32-bit cyclic redundancy check used to detect any in-transit corruption of data.

**34. Highlight the characteristics of datagram networks. Nov/Dec 17**

In datagram approach, each packet is treated independently from all others. Even when one packet represents just a place of a multi packet transmission, the network treats it although it existed alone. Packets in this technology are referred to as datagram.

**PART-B**

**1. Explain in detail about the access method and frame format used in Ethernet and Token ring. APR/MAY 2015**

**2.) Explain the functioning of wireless LAN in detail. NOV/DEC 2010**

Refer Larry Peterson Page no:133

**3. Explain IEEE 802.11 architecture for wireless LAN and key requirements of Wireless LAN. MAY/JUNE 2012, APR/MAY 2015**

Refer Larry Peterson Page no:137-143

**4. Explain Bridges and LAN switches?**

Refer Larry Peterson Page no:183-194

**5. i) Discuss the limitations of bridges. (6) MAY/JUNE 2013**

ii) Determine the maximum distance between any pair of stations in a CSMA/CD network with a data rate of 10 Mbps, for the correct operation of collision detection process, assuming the frame size to be 512 bits. What should be the maximum distance, if the data rate is increased to 1 Gbps? 2 stations A and B, connected to opposite ends of a 10-Mbps CSMA/CD network, start transmission of long frames at times  $t_1 = 0$ , and  $t_2 = 3\mu s$  respectively. Determine the instants when A hears the collision and B hears the collision. Signal propagation speed may be assumed as  $2 \times 10^8$  m/s. (10) MAY/JUNE 2013.

**6. (i) Describe the transmitter algorithm implemented at the sender side of the Ethernet protocol. Why should Ethernet frame be 512 bytes long. (10)**

(ii) Explain how the hidden node and exposed node problem is addressed in 802.11 (6) NOV/DEC 2013

**7. Write short notes on switches (8) MAY/JUNE 2014**

Refer Larry Peterson Page no:168

**8. Explain the MAC layer functions of IEEE 802.11 APR/MAY 2015**

**9. Explain the functions of Wi-Fi and Bluetooth in detail. Nov/Dec 17**

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 142 - 144

**10. Explain the Datagram forwarding in IP. Nov/Dec 17**

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 216 - 220

**11. Show and explain the ARP packet format for mapping IP addresses in to Ethernet addresses. Nov/Dec 17**

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 228-231

## UNIT III - ROUTING

Routing (RIP, OSPF, metrics) – Switch basics – Global Internet (Areas, BGP, IPv6), Multicast – addresses – multicast routing (DVMRP, PIM)

**1. Define routing. (Nov/Dec 2012)**

Routing is a process that takes place in the background so that, when a data packet turns up, we will have the right information in the forwarding table to be able to forward, or switch, the packet.

**2. Write on the packet cost referred in distance vector and link state routing. (Apr/May 2012)**

In distance vector routing, cost refer to hop count while in case of link state routing, cost is a weighted value based on a variety of factors such as security levels, traffic or the state of the link.

**3. What is source routing? (Nov/Dec 2013)**

**Source routing**, also called path addressing, allows a sender of a packet to partially or completely specify the route the packet takes through the network.

**4. List out the types of source routing approach? (Nov/Dec 2013)**

Rotation, stripping off and using pointers are the different types of source routing approach.

**5. What is the function of a router? (Nov/Dec 2010)**

Routers relay packets among multiple interconnected networks. They route packets from one network to any of a number of potential destination networks on internet. A router operates as the physical, data link and network layer of the OSI model. A router is termed as an intelligent device. Therefore, its capabilities are much more than those of a repeater or a bridge. A router is useful for interconnecting two or more heterogeneous networks that differ in their physical characteristics such as frame size, transmission rates, topologies, addressing etc. A router has to determine the best possible transmission path among several available paths. Destination, Cost and Next Hop are the important fields in a routing table.

**6. What is the role of VCI? (Apr/May 2011)**

An Incoming **virtual circuit identifier (VCI)** uniquely identifies the connection at this switch and that will be carried inside the header of the packets that belong to this connection. It is a potentially different **outgoing VCI** that will be used for outgoing packets. The combination of incoming interface and incoming VCI uniquely identifies the virtual connection. VCI assigned by n/w admin is an unused value on that interface and VCIs are unique on a link and not on entire n/w. Also incoming and outgoing VCIs need not be same.

**7. Write the difference between Distance vector routing and Link state routing.**

Distance Vector Routing	Link state routing
Basic idea is each node sends its knowledge about the entire network to its neighbors.	Basic idea is every node sends its knowledge about its neighbors to the entire network
It is dynamic routing	It is dynamic routing
RIP uses Distance vector routing	OSPF uses link state routing

**8. What is subnetting? (Nov/Dec2011)**

Subnetting provides an elegantly simple way to reduce the total number of network numbers that are assigned. The idea is to take a single IP network number and allocate the IP address with that network to several physical networks, which are now referred to as subnets.

**9. State the rules of non boundary-level masking? (May/June 2012)**

- The bytes in the IP address that corresponds to 255 in the mask will be repeated in the sub network address
- The bytes in the IP address that corresponds to 0 in the mask will change to 0 in the sub network address
- For other bytes, use the bit-wise AND operator.

Example-

IP address	45	123	21	8
Mask	255	192	0	0
Subnet	45	64	0	0
123	0 1 1 1 1 0 1 1			
192	1 1 0 0 0 0 0 0			
64	0 1 0 0 0 0 0 0			

**10. Define MTU.**

A maximum transmission unit (MTU) is the largest size packet or frame, specified in octets (eight-bit bytes), that can be sent in a packet- or frame-based network such as the Internet. The Internet's Transmission Control Protocol (TCP) uses the MTU to determine the maximum size of each packet in any transmission.

**11. What are data grams?**

In datagram approach, each packet is treated independently from all others. Even when one packet represents just a place of a multi packet transmission, the network treats it although it existed alone. Packets in this technology are referred to as datagram.

## 12. What does Border Gateway Protocol (BGP) mean?

Border Gateway Protocol (BGP) is a routing protocol used to transfer data and information between different host gateways, the Internet or autonomous systems. BGP is a Path Vector Protocol (PVP), which maintains paths to different hosts, networks and gateway routers and determines the routing decision based on that. It does not use Interior Gateway Protocol (IGP) metrics for routing decisions, but only decides the route based on path, network policies and rule sets. Sometimes, BGP is described as a reach ability protocol rather than a routing protocol.

## 13. Explain IPV6 protocol.

IPv6 (Internet Protocol version 6) is a set of basics of IPv6 are similar to those of IPv4. The most obvious improvement in IPv6 over IPv4 is that IP addresses are lengthened from 32 bits to 128 bits. This extension anticipates considerable future growth of the Internet and provides relief for what was perceived as an impending shortage of network addresses. IPv6 also supports auto-configuration to help correct most of the shortcomings in version 4, and it has integrated security and mobility features.

## 14. What is RIP?

RIP (Routing Information Protocol) is a widely-used protocol for managing router information within a self-contained network such as a corporate local area network or an interconnected group of such LANs. Using RIP, a gateway host (with a router) sends its entire routing table (which lists all the other hosts it knows about) to its closest neighbor host every 30 seconds. The neighbor host in turn will pass the information on to its next neighbor and so on until all hosts within the network have the same knowledge of routing paths, a state known as network convergence.

## 15. Explain about OSPF.

OSPF (Open Shortest Path First) is a router protocol used within larger autonomous system networks in preference to the Routing Information Protocol (RIP), an older routing protocol that is installed in many of today's corporate networks. Using OSPF, a host that obtains a change to a routing table or detects a change in the network immediately multicasts the information to all other hosts in the network so that all will have the same routing table information.

## 16. Explain Multicast routing?

Multicast IP Routing protocols are used to distribute data (for example, audio/video streaming broadcasts) to multiple recipients. Using multicast, a source can send a single copy of data to a single multicast address, which is then distributed to an entire group of recipients.

## 17. What is PIM?

**Protocol-Independent Multicast (PIM)** is a family of multicast routing protocols for Internet Protocol (IP) networks that provide one-to-many and many-to-many distribution of data over a LAN, WAN or the Internet. It is termed *protocol-independent* because PIM does not include its own topology discovery mechanism, but instead uses routing information supplied by other routing protocols. There are four variants of PIM:

- **PIM Source-Specific Multicast**
- **Bidirectional PIM**
- **PIM Dense Mode**
- **PIM Sparse Mode**

## 18. What is DVMRP?

**The Distance Vector Multicast Routing Protocol (DVMRP)**, is a routing protocol used to share information between routers to facilitate the transportation of IP multicast packets among networks. The protocol is based on the RIP protocol. The router generates a routing table with the multicast group of which it has knowledge with corresponding distances. When a multicast packet is received by a router, it is forwarded by the router's interfaces specified in the routing table.

## 19. Explain IPV4 protocol.

IPv4 (Internet Protocol Version 4) is the fourth revision of the Internet Protocol (IP) used to identify devices on a network through an addressing system. The Internet Protocol is designed for use in interconnected systems of packet-switched computer communication networks. IPv4 is the most widely deployed Internet protocol used to connect devices to the Internet. IPv4 uses a 32-bit address scheme

## 20. What are the differences between IPV4 and IPV6?

IPV4	IPV6
A 32-bit numeric address in IPv4 is written in decimal as four numbers separated by periods. Each number can be zero to 255.	IPv6 addresses are 128-bit IP address written in hexadecimal and separated by colons.
For example, <b>1.160.10.240</b> could be an IP address.	An example IPv6 address could be written like this: <b>3ffe:1900:4545:3:200:f8ff:fe21:67cf</b>

## 21. Define a switch.

**Switches** are hardware or software device capable of creating temporary connections between more devices which are not directly connected. It is a multi input/output port device. It transfers data coming from one input port to one or more output ports. This function is called as forwarding. Reliability, performance, security, and geography are the reason for using bridges in LAN.

## 22. What is a virtual circuit? NOV/DEC 2010

A logical circuit made between the sending and receiving computers. The connection is made after both computers do handshaking. After the connection, all packets follow the same route and arrive in sequence.

## 23. What is Source Specific Multicast? NOV/DEC 2010

SSM, a receiving host specifies both a multicast group and a specific host. The receiving host would then receive multicast addressed to the specified group, but only if they are from the special sender.

## 24. What is LSP? MAY/JUNE 2012

In link state routing, a small packet containing routing information sent by a router to all other router by a packet called link state packet.

**25. What is meant by circuit switching? NOV/DEC 2010**

**Circuit switching** is a methodology of implementing a telecommunications network in which two network nodes establish a dedicated communications channel (circuit) through the network before the nodes may communicate. The circuit guarantees the full bandwidth of the channel and remains connected for the duration of the communication session. The circuit functions as if the nodes were physically connected as with an electrical circuit.

**26. Differentiate between connection less operation and connection oriented operation.**

**MAY/JUNE 2013**

<i>Circuit switching</i>	<i>Packet switching</i>
Source and destination host are physically connected	No such physical connection exists
Switching takes place at the physical layer	Switching takes place at network (datagram) or data link layer (VCN)
Resources such as bandwidth, switch buffer & processing time, are allocated in advance.	Resources are allocated on demand
Resources remain allocated for the entire duration of data communication.	Resources can be reallocated when idle.
There is no delay during data transfer.	Delay exists at each switch during data transfer
Data transferred between the two stations is a continuous flow of signal	Data is transferred as discrete packets
Example: <i>Telephony</i>	Example: <i>Internet</i>

**27. What is the need of subnetting? NOV/DEC 2013**

- *Subnetting* reduces the total number of network numbers by assigning a single network number to many adjacent physical networks.
- Each physical network is referred to as *subnet*.
- For subnetting, the subnets must be close to each other.
- For example, each department having a network within a college campus with a router connecting to the external world.

**28. List out some routing algorithm types?**

Static, dynamic, flat, hierarchical, host- intelligent,router- intelligent, intradomain, interdomain, link state and distance vector.

**29. What is IP addressing?**

An IP address is a numerical label assigned to each divide in a computer network that uses internet protocol for communication.

Two important functions at IP address

- Host identification
- Location addressing

**30. How can the routing be classified?**

The routing can be classified as,

- Adaptive routing
- Non-adaptive routing.

**31.How do routers differentiate the incoming unicast, multicast and broadcast IP packets?Apr/May 17**

**unicast addresses** – represent a single LAN interface. A unicast frame will be sent to a specific device, not to a group of devices on the LAN.

**multicast addresses** – represent a group of devices in a LAN. A frame sent to a multicast address will be forwarded to a group of devices on the LAN.

**broadcast addresses** – represent all device on the LAN. Frames sent to a broadcast address will be delivered to all devices on the LAN.

**32. Why is IPV4 to IPV6 transition required? Apr/May 17**

**Auto Configuration** - Auto Configuration is now built in and helps make IP addressing more managable. With IPv4, we relied on DHCP or manually configuring IP addresses.

**Direct Addressing** - With Direct Addressing, the primary use of NAT (Network Area Translation) now becomes obsolete with IPv6. So, Direct Addressing is now possible.

**Mobility** - Mobility is better integrated into IPv6 than it is with IPv4. It makes it easier for users to roam to different networks and keep their same IP address.

**Improved Integrated Security (IPSec)** - IPSec is now integrated into IPv6, while with IPv4 it was more an add-on.

**33. Differentiate between forwarding table and routing table. Nov/Dec 17**

A routing table uses a packet's destination IP address to determine which IP address should next receive the packet, that is, the "next hop" IP address.

A forwarding table uses the "next hop" IP address to determine which interface should deliver the packet to that next hop, and which layer 2 address (e.g., MAC address) should receive the packet on multipoint interfaces like Ethernet or Wi-Fi.

**34. What is Border Gateway Protocol (BGP)? Nov/Dec 17**

Border Gateway Protocol (BGP) is a routing protocol used to transfer data and information between different host gateways, the Internet or autonomous systems. BGP is a Path Vector Protocol (PVP), which maintains paths to different hosts, networks and gateway routers and determines the routing decision based on that. It does not use Interior Gateway Protocol (IGP) metrics for routing decisions, but only decides the route based on path, network policies and rule sets. Sometimes, BGP is described as a reach ability protocol rather than a routing protocol.

**PART-B**

**1. Explain in detail about Address Resolution protocol and subnetting? NOV/DEC 2012.**

Refer Larry Peterson Page no:254-258,299-303

**2. Describe the methods that are used to calculate the shortest path between two routers? APR/MAY 2012 Refer Larry Peterson Page no:277**

**3. Explain circuit switching and packet switching in detail ?NOV/DEC 2011**

Refer Larry Peterson Page no:168-183

**4. Define bridge and explain the type of bridges. (16)**

Refer Larry Peterson Page no:183

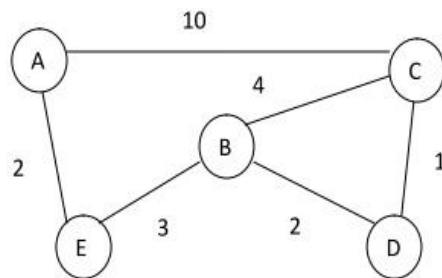
**5. Write notes on (i) Internet Protocol (ii) Routers(16) / AU Dec 2010**

Refer Larry Peterson Page no:234,316

**6. Explain in detail the various aspects of IPv6 / AU Dec 2010, NOV/DEC 2011**

Refer Larry Peterson Page no:318-329

**7.i) For the following network, develop the datagram for forwarding table for all the nodes. The links are labeled with relative costs. The tables should forward each packet via the least cost path to destination. (10) MAY/JUNE 2013**



**8. (i) Suppose hosts A and B have been assigned the same IP address on the same Ethernet, on which ARP is used. B starts up after A. What will happen to A's existing connections?**

**Explain how 'self ARP' might help this problem. (4) NOV/DEC 2013**

Refer Larry Peterson Page no:254

**9. Describe the Distance vector routing protocol with examples. (16) NOV/DEC 2013**

Refer Larry Peterson Page no:269

**10. Explain the RIP algorithm with a simple example of your choice. (16) MAY/JUNE 2014**

Refer Larry Peterson Page no:269

**11. Explain the shortest path algorithm with suitable illustrations. APR/MAY 2015**

**12. Explain the distance vector routing algorithm. Mention the limitations of the same. APR/MAY 2015**

**13. With an example explain the function of link state routing protocol. Nov/Dec 17**

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 308 -313

**b) Elaborate the multicast routing protocol. Nov/Dec 17**

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 341 – 351

## UNIT IV TRANSPORT LAYER

Overview of Transport layer - UDP - Reliable byte stream (TCP) - Connection management - Flow control - Retransmission – TCP Congestion control - Congestion avoidance (DECbit, RED) – QoS – Application requirements

**1. Give any two Transport layer service. (Dec 2012)**

**Multiplexing:**

Transport layer performs multiplexing/demultiplexing function. Multiple applications employ same transport protocol, but use different port number. According to lower layer n/w protocol, it does upward multiplexing or downward multiplexing.

**Reliability:** Error Control and Flow Control.

**2. Mention the various adaptive retransmission policy of TCP.**

- Simple average
- Exponential / weighted average
- Exponential RTT backoff
- Jacobson's Algorithm

**3. Define congestion. (Nov '11)**

Congestion in a network occurs if user sends data into the network at a rate greater than that allowed by network resources. Any given node has a number of I/O ports attached to it. There are two buffers at each port. One to accept arriving packets & another one to hold packets that are waiting to depart. If packets arrive too fast node than to process them or faster than packets can be cleared from the outgoing buffers, then there will be no empty buffer. Thus causing congestion and traffic in the network.

**4. Why the congestion occur in network?**

Congestion occurs because the switches in a network have a limited buffer size to store arrived packets. And also because the packets arrive at a faster rate than what the receiver can receive and process the packets.

**5. What is Tinygram?**

A very small packet of data is called a tinygram. Too many tinygrams can congest a network connection.

**6. Give the datagram format of UDP?**

The basic idea of UDP is for a source process to send a message to a port and for the destination process to receive the message from a port.

Source Port Address 16 bits	Destination Port Address 16 bits
Total Length 16 bits	Checksum 16 bits

- **Source port address:** It is the address of the application program that has created the message.
- **Destination port address:** It is the address of the application program that will receive the message.
- **Total Length:** It defines the total length of the user datagram in bytes.
- **Checksum:** It is a 16 bit field used in error correction.

**7. What is the main difference between TCP & UDP?(Nov/Dec 2014)**

TCP	UDP
It provides Connection oriented service	Provides connectionless service.
Connection Establishment delay will be there	No connection establishment delay
Provides reliable service	Provides unreliable, but fast service
It is used by FTP, SMTP	It is used by DNS,SNMP, audio, video and multimedia applications.

**8. What are the advantages of using UDP over TCP? (Nov/Dec 2010)**

UDP is very useful for audio or video delivery which does not need acknowledgement. It is useful in the transmission of multimedia data. Connection Establishment delay will occur in TCP.

**9. What is TCP? (Nov/Dec 2011)**

Transmission Control Protocol provides Connection oriented and reliable services. TCP guarantees the reliable, in order delivery of a stream of bytes. It is a full-duplex protocol, meaning that each TCP connection supports a pair of byte streams, one flowing in each direction. It is used by FTP, SMTP. The different phases in TCP state machine are Connection Establishment, Data transfer and Connection Release. TCP services to provide reliable communication are Error control, Flow control, Connection control and Congestion control.

**10. Name the policies that can prevent (avoid) congestion.**

- DEC (Digital Equipment Corporation) bit.
- Random Early Detection (RED).
- Source based congestion avoidance.

The congestion may be avoided by two bits:

BECN - Backward Explicit Congestion Notification

FECN - Forward Explicit Congestion Notification.

**11. List out various congestion control techniques.**

- AIMD (Additive Increase Multiplicative Decrease)
- slow start
- Fast retransmit
- Recovery.

**12. What is the difference between service point address, logical address and physical address?**

Service point addressing	Logical addressing	Physical addressing
The transport layer header includes a type of address called a service point address or port address, which makes a data delivery from a specific process on one computer to a specific process on another computer.	If a packet passes the network boundary we need another addressing to differentiate the source and destination systems. The network layer adds a header, which indicates the logical address of the sender and receiver.	If the frames are to be distributed to different systems on the network, the data link layer adds the header, which defines the source machine's address and the destination Machine's address.

**13. What is the use of UDP's Pseudo header?**

The pseudo header consists of three field from the IP header protocol number ,source IP address and destination IP address plus the UDP length field (which is included twice in checksum calculation).The pseudo header is used to check whether the message is delivered between 2 endpoints.

**14. What are the two categories of QoS attributes?**

User Oriented and Network Oriented. User related attributes are

- SCR – Sustainable Cell Rate
- PCR – Peak Cell Rate
- MCR- Minimum Cell Rate
- CVDT – Cell Variation Delay Tolerance.

The network related attributes are, Cell loss ratio (CLR), Cell transfer delay (CTD), Cell delay variation (CDV), Cell error ratio (CER).

**15. Suppose TCP operates over a 1-Gbps link, utilizing the full bandwidth continuously. How long will it take for the sequence numbers to wrap around completely? Suppose an added 32-bit timestamp field increments 1000 times during this wrap around time, how long it will take timestamp filed to wrap around? (May2013)**

Once a segment with sequence x survives in Internet, TCP cannot use the same sequence no. How fast 32-bit sequence no space can be consumed? 32-bit sequence no is adequate for today's network.

Wrap Around Time for T3-45Mbps ( $2^{32} \times 8$ ) /45Mbps=763.55sec=12.73 min.

**16. Write short notes on congestion control. (Nov/Dec 2012)**

It involves preventing too much data from being injected into the network, thereby causing switches or links to become overloaded. Thus flow control is an end to an end issue, while congestion control is concerned with how hosts and networks interact.

**17. Differentiate congestion control and flow control. (Nov/Dec 2013)**

Congestion Control	Flow Control
Congestion control means preventing the source from sending data that will end up getting dropped by a router because its queue is full.	Flow control means preventing the source from sending data that the receiver will end up dropping because it runs out of buffer space.
This is more complicated, because packets from different sources travelling different paths can converge on the same queue.	This is fairly easy with a sliding window protocol

**18. What do you mean by QoS? (May/June 2012,Nov/Dec 2014)**

The quality of service defines a set of attributes related to the performance of the connection. For each connection, the user can request a particular attribute each service class is associated with a set of attributes.

**19. What are the four aspects related to the reliable delivery of data? (May/June 2012)**

The four aspects are Error control, Sequence control, Loss control and Duplication control.

**20. What is UDP?**

It stands for User Datagram Protocol. It is part of the TCP/IP suite of protocols used for data transferring. UDP is a known as a "stateless" protocol, meaning it doesn't acknowledge that the packets being sent have been received.

**21. List the flag used in TCP header?**

TCP header contains six flags. They are URG,ACK,PSH,RST,SYN,FIN

**22. Give the approaches to improve the QOS?**

- Fine grained approaches-which provide QOS to individual applications or flows.
- Integrated services- a QOS architecture developed in the IETE and often associated with RSVP.

**23. What is RTT?**



RTT is an acronym for Round Trip Time: it is a measure of the time it takes for a packet to travel from a computer, across a network to another computer, and back.

**24. What is a port?**

Applications running on different hosts communicate with TCP with the help of a concept called as ports. A port is a 16 bit unique number allocated to a particular application.

**25. List the services of end to end services.**

- Guarantee message delivery.
- Delivery messages in the same order they are sent.
- Deliver at most one copy of each message.
- Support arbitrarily large message.
- Support synchronization.

**26. What are the types of QOS tools?**

- Classification
- Congestion management
- Congestion avoidance
- Shaping/policing
- Link efficiency

**27. List some ways to deal with congestion**

- packet elimination
- Flow control
- Buffer allocation
- Choke packets

**28. List out the three types of addresses in TCP/IP?**

Three types of addresses are used by systems using the TCP/IP protocol: the physical address, the internetwork address (IP address), and the port address.

**29. What are the flow characteristics related to QOS?**

The flow characteristics related to QOS are

- Reliability
- Delay
- Jitter
- Bandwidth

**30. What are the techniques to improve QOS?**

The techniques to improve QOS are

- Scheduling
- Traffic shaping
- Resource reservation
- Admission control

**31. What are the types of port numbers used in transport layer?**

- Well-known port
- Registered port
- Dynamic port

**32. Define jitter.**

It is the variation in delay for packets belonging to same flow.

**33. List the advantages of connection oriented services over connectionless services. Apr/May 17**

**Connection-oriented** Requires a session connection (analogous to a phone call) be established before any data can be sent. This method is often called a "reliable" network service. It can guarantee that data will arrive in the same order.

**Connectionless** : Does not require a session connection between sender and receiver. The sender simply starts sending packets (called datagrams) to the destination. This service does not have the reliability of the connection-oriented method.

**34. How do fast retransmit mechanism of TCP works? Apr/May 17**

In TCP/IP, fast retransmit and recovery (FRR) is a congestion control algorithm that makes it possible to quickly recover lost data packets. Without FRR, the TCP uses a timer that requires a retransmission timeout if a packet is lost. No new or duplicate packets can be sent during the timeout period. With FRR, if a receiver receives a data segment that is out of order, it immediately sends a duplicate acknowledgement to the sender. If the sender receives three duplicate acknowledgements, it assumes that the data segment indicated by the acknowledgements is lost and immediately retransmits the lost segment.

**35. Compare flow control versus congestion control. Nov/Dec 17**

Congestion Control	Flow Control
Congestion control means preventing the source from sending data that will end up getting dropped by a router because its queue is full.	Flow control means preventing the source from sending data that the receiver will end up dropping because it runs out of buffer space.

This is more complicated, because packets from different sources travelling different paths can converge on the same queue.

This is fairly easy with a sliding window protocol

**36. What are the approaches used to provide a range of quality of service (QoS) ? Nov/Dec 17**

The techniques to improve QoS are

- Scheduling
- Traffic shaping
- Resource reservation
- Admission control

Fine grained approaches-which provide QoS to individual applications or flows.

Integrated services- a QoS architecture developed in the IETE and often associated with RSVP.

**PART-B&C**

**1. Explain the Additive increase/multiplicative decrease methods used in TCP for congestion control? NOV/DEC 2012**

Refer Larry Peterson Page no: 474-477

**2. With the help of network diagram, Explain how TCP messages a byte stream. Give an example.NOV/DEC 2012 Refer**

Larry Peterson Page no: 384

**3. Explain UDP & TCP. NOV/DEC 2010 Refer Larry Peterson Page no: 382,384-411**

**4. Explain about TCP congestion avoidance algorithm.NOV/DEC 2011**

Refer Larry Peterson Page no: 486-499

**5. Explain adaptive flow control in detail and its uses(16) / AU Dec2010**

Refer Larry Peterson Page no:403

**6. i) Suppose TCP operates over a 1-Gbps link, utilizing the full bandwidth continuously. How long will it take for the sequence numbers to wrap around completely? Suppose an added 32-bit timestamp field increments 1000 times during this wrap around time, how long will it take for the timestamp field to wrap around. (8) MAY/JUNE 2013**

**ii) What is the need for Nagle's algorithm? How does it determine when to transmit data? (8) MAY/JUNE 2013**

**7. i) A TCP machine is sending full windows of 65,535 bytes over a 1-Gbps network that has a 10-ms one-way delay. What is the throughput achievable? What is the efficiency of transmission? How many bits are needed in the Advertised window field of a proposed reliable byte stream protocol running over the above network, for achieving maximum efficiency? (8) MAY/JUNE 2013**

**ii) Illustrate the features of TCP that can be used by the sender to insert record boundaries into the byte stream. Also mention their original purpose. (8) MAY/JUNE 2013**

**8. (i) Describe how reliable and ordered delivery is achieved through TCP (8)**

**(ii) Why does TCP uses an adaptive retransmission and describes its mechanism. (8)**

**NOV/DEC 2013**

**9. Describe with examples the three mechanisms by which congestion control is achieved in**

**TCP. (16) NOV/DEC 2013**

**10. Explain the principles of congestion in TCP.(16) MAY/JUNE 2014, APR/MAY 2015**

**12. Explain the three way handshake protocol to establish the transport level connection. APR/MAY 2015**

**13. Draw the TCP state transition diagram for connection management. Nov/Dec 17**

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 402-406

**14. Brief about approaches used for TCP congestion control. Nov/Dec 17**

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 499 - 500

**15. Write a detailed note on Congestion Avoidance Mechanism used in TCP. Nov/Dec 17**

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 514- 523

## UNIT V APPLICATION LAYER

Traditional applications -Electronic Mail (SMTP, POP3, IMAP, MIME) – HTTP – Web Services – DNS  
- SNMP

### PART-A

**1. What are the four main properties of HTTP?**

- Global Uniform Resource Identifier.
- Request-response exchange.
- Statelessness.
- Resource metadata.

**2. What are the four groups of HTTP Headers? What are the two methods of HTTP?**

The four groups of HTTP headers are

- General headers
- Entity Headers
- Request Headers
- Response Headers.

Two methods of HTTP are

- GetMethod( )
- PostMethod( ).

**3. What is WWW? (Nov/Dec 2010,May/June 2014)**

World Wide Web is an internet application that allows user to view pages and move from one web page to another. It helps to store and share data across varied distances.

**4. What is PGP? (Nov/Dec,2010 Apr/May 2012,May/June 2014)**

Pretty Good Privacy (PGP) is used to provide security for electronic mail. It provides authentication, confidentiality, data integrity, and non repudiation. It is a program using public key encryption popularly used with email.

**5. What is the function of SMTP? NOV/DEC 2012, APR/MAY 2015**

The TCP/IP protocol supports electronic mail on the Internet is called Simple Mail Transfer (SMTP). It is a system for sending messages to other computer users based on e-mail addresses. SMTP provides mail exchange between users on the same or different computers.

**6. Why is an application such as POP needed for electronic messaging? (Apr/May 2012)**

Workstations interact with the SMTP host, which receives the mail on behalf of every host in the organization, to retrieve messages by using a client-server protocol such as Post Office Protocol. Although POP3 is used to download messages from the server, the SMTP client still needed on the desktop to forward messages from the workstation user to its SMTP mail server.

**7. What is the purpose of Domain Name System? MAY/JUNE 2012**

Domain Name System can map a name to an address and conversely an address to name.

**8. Discuss the three main division of the domain name space. NOV/DEC 2008**

Domain name space is divided into three different sections: generic domains, country domains & inverse domain.

- Generic domain: Define registered hosts according to their generic behavior, uses generic suffixes.
- Country domain: Uses two characters to identify a country as the last suffix.
- Inverse domain: Finds the domain name given the IP address.

**9. What is a Web browser?**

Web browser is a software program that interprets and displays the contents of HTML webpages.

**10. What is URL?**

URL is Uniform Resource Locator. URL is a string identifier that identifies a page on the World Wide Web (WWW).

**11. What do you mean by TELNET?**

TELNET is used to connect remote computers and issue commands on those computers.

**12. What are the responsibilities of Application Layer?**

The Application Layer enables the user, whether human or software, to access the network. It provides user interfaces and support for services such as e-mail, shared database management and other types of distributed information services

- Network virtual Terminal
- File transfer, access and Management (FTAM)
- Mail services
- Directory Services

**13. Write down the three types of WWW documents.**

The documents in the WWW can be grouped into three broad categories: static, dynamic and active.

- *Static*: Fixed-content documents that are created and stored in a server.
- *Dynamic*: Created by web server whenever a browser requests the document.
- *Active*: A program to be run at the client side

#### 14. What is Generic Domains?

Generic domain define registered hosts according to their generic behaviour. Each node in the tree defines a domain, which is an index to the domain name space database

- Eg. com – Commercial organizations
- edu - Educational institutions
- gov - Government institutions

#### 15. What do you mean by File transfer protocol?

It is a standard mechanism provided by the internet for copying a file from one host to another host.

#### 16. What are the two types of connections in FTP?

The two types of connections in FTP are

- Control connection
- Open connection

#### 17. Define HTTP.

HTTP is Hypertext Transfer Protocol. It is used mainly to access data on the World Wide Web. The protocol transfer data in the form of plaintext, hypertext, audio, video and so on

#### 18. What are the types of messages in HTTP transaction?

The types of messages in HTTP transaction are

- Request messages
- Response messages

#### 19. What are the parts of a browser?

The parts of a browser are

- A controller
- A client program
- Interpreter

#### 20. What is POP?

Post Office Protocol, version3 (POP3) and Internet Mail Access Protocol version4 (IMAP4) are protocol used by a mail server in conjunction with SMTP to receive and hold mail for hosts.

#### 21. Compare the HTTP and FTP.

FTP	HTTP
FTP transfers the file from client to server and server to client.	HTTP transfer the file from server to client.(i.e. web pages)
It uses two different port connections. (i.e. port 20 and port 21)	HTTP use only one port connection. (i.e. Port 80)
FTP uses two parallel TCP connections to transfer a file. They are Control Connection and Data connection.	It also uses TCP protocol.
Out – of – band	In – band

#### 22. What are the TCP connections needed in FTP?

FTP establishes two connections between the hosts. One connection is used for data transfer, the other for control information. The control connection uses very simple rules of communication. The data connection needs more complex rules due to the variety of data types transferred.

#### 23. What is IMAP?

Internet Message Access Protocol (IMAP) is a standard protocol for accessing e-mail from your local server. IMAP is a client/server protocol in which e-mail is received and held for you by your Internet server. IMAP can be thought of as a remote file server. POP3 can be thought of as a "store-and-forward" service.

#### 24. Name four factors needed for a secure network?

**Privacy:** The sender and the receiver expect confidentiality.

**Authentication:** The receiver is sure of the sender's identity and that an imposter has not sent the message.

**Integrity:** The data must arrive at the receiver exactly as it was sent.

**Non-Reputation:** The receiver must able to prove that a received message came from a specific sender.

#### 25. Define SNMP. (May/June 2012)

**Simple Network Management Protocol (SNMP)** is an "Internet-standard protocol for managing devices on IP networks". Devices that typically support SNMP include routers, switches, servers, workstations, printers, & modem. It is used mostly in network management systems to monitor network-attached devices for conditions that warrant administrative attention.

#### 26. Define Name Resolution.

To improve reliability, some of the name servers can be located outside the zone. The process of looking up a name and finding an address is called name resolution.

#### 27. What if TFTP?

Trivial file transfer protocol is designed for transferring bootstrap and configuration files. It is so simple and can fit into ROM of a disc less memory. TFTP does reading and writing of files. Reading means copying files from server site to client site and writing in FTP means copying a file from client site to server site.

**28. Explain CyberSquatting.**

The practice of registering a domain only to turn around and sell it off to an interested party at a much higher price even has a name. It is called cybersquatting.

**29. What are the transmission modes of FTP?**

- Stream mode: Default mode and data is delivered from FTP to TCP as a continuous stream of data.
- Block mode: Data is delivered from FTP to TCP in terms of blocks. Each data block follows the three byte header.
- Compressed mode: File is compressed before transmitting if size is big. Run length encoding method is used for compression.

**30. What is use of digital signature?**

Digital signature is a method to authenticate the sender of a message. It is similar to that of signing transactions documents when you do business with a bank. In network transactions, you can create an equivalent of an electronic or digital signature by the way you send data. Data appended to, or a data unit that allows a recipient of the data unit to prove the source and integrity if the data unit and protect against forgery.

**31. State the usage of conditional get in HTTP. Apr/May 17**

The HTTP Protocol defines a caching mechanism, in which the proxy web-servers can cache pages, files, images etc. Since caching is in place, There is a method which the servers are asked to return the document, either the “cached” or “live” document.

This request of asking the server for a document considering a specific parameter is called a **Conditional GET Request**

**32. Present the information contained in a DNS resource record. Apr/May 17**

This list of DNS record types is an overview of resource records (RRs) permissible in zone files of the Domain Name System (DNS). It also contains pseudo-RRs.

**33. Write the use of Hyper Text Transfer Protocol (HTTP)? Nov/Dec 17**

HTTP is Hypertext Transfer Protocol. It is used mainly to access data on the World Wide Web. The protocol transfer data in the form of plaintext, hypertext, audio, video and so on

**34. What do you mean by Web Services Description Language (WSDL)? Nov/Dec 17**

Web Services Description Language (WSDL) is a format for describing a Web Services interface. It is a way to describe services and how they should be bound to specific network addresses. WSDL has three parts:

- Definitions
- Operations
- Service bindings

**PART-B&C**

**1. Explain the functions of SMTP. (16) / AU Dec2010, MAY/JUNE 2012, APR/MAY 2015**

Refer Larry Peterson Page no:643-650

**2. Write short notes on E-mail,HTTP? NOV/DEC 2012, APR/MAY 2015**

Refer Larry Peterson Page no:643-656

**4. Explain the type of encryption/decryption method. Conventional Methods? APR/MAY 2012**

Peterson Page no:586(chapter 8)

Refer Larry

**5. Explain the role of a DNS on a computer Network / AU Dec2010NOV/DEC 2011,2010**

Refer Larry Peterson Page no:657-666

**6. Discuss the need for name resolution. Illustrate the domain name hierarchy and the steps in resolution.(16) MAY/JUNE 2013** Refer Larry Peterson Page no:

**7. Describe the message format and the message transfer and the underlying protocol involved in the working of the electronic mail. (16) NOV/DEC 2013**

Refer Larry Peterson Page no:643

**8. Explain with example :**

(i) HTTP (8) (ii) RTP (8) NOV/DEC 2013 Refer Larry Peterson Page no:650

**9.Explain the SNMP protocol in detail (16)MAY/JUNE2014** Refer Larry Peterson Pgno:666

**10.Write short notes on(16) i)DNS ii)FTP MAY/JUNE2014** Refer Larry Peterson Pg no:657

**11. Write short notes on web services, SNMP. APR/MAY 2015**

**12. Explain the function of internet Message Access Protocol (IMAP) with a state diagram. Nov/Dec 17**

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 700 - 708

**13. List and explain the various HTTP request operations. Nov/Dec 17**

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 708 - 718

**14. What is Domain Name System (DNS) ? Explain. Nov/Dec 17**

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 745 - 756

**15.Brief the importance of Single Network Management Protocol (SNMP) Nov/Dec 17**

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 756 - 758

Time: Three hours

Maximum: 100 marks

Answer ALL questions

PART A – (10 × 2 = 20 marks)

1. What is the difference between port address, logical address and physical address?
2. What will the maximum number of frames sent but unacknowledged for a sliding window of size  $n - 1$  ( $n$  is the sequence number)?
3. What is the average size of an Ethernet frame?
4. What is the access method used by wireless LAN?
5. What is the network address in a class A subnet with the IP address of one of the hosts as 25.34.12.56 and mask 255.255.0.0?
6. Differentiate circuit and packet switched networks.
7. Define slow start.
8. When can an application make use of UDP?
9. What is PGP?
10. What do you mean by TELNET?

PART B – (5 × 16 = 80 marks)

11. (a) Given a remainder of 111, a data unit of 10110011 and a divisor of 1001, is there an error in the data unit. Justify your answer with necessary principles. (16)  
Or  
(b) How is frame order and flow control is achieved using the data link layer? (16)
12. (a) Describe the CSMA/CD protocol and comment on its performances for medium access. (16)

Or

- (b) Write short notes on :  
i. FDDI  
ii. Bridges and switches (16)

13 (a) Explain the RIP algorithm with a simple example of your choice. (16)

Or

- (b) i. Discuss the IP addressing methods. (8)  
ii. Write short notes on ARP. (8)

14 (a) Explain the principles of congestion control in TCP. (16)

Or

- (b) Discuss the Random Early Detection mechanism and derive the expression for drop probability. (16)

15 (a) Explain the SNMP protocol in detail. (16)

Or

- (b) Write short notes on :  
i. DNS  
ii. FTP (16)

**B.E./B.Tech DEGREE EXAMINATION MAY/JUNE 2013**

Fifth Semester

Computer Science Engineering

CS2302 – Computer Networks  
(Common to Information Technology)

(Regulation 2008)

Time: 3 hours

Maximum: 100 marks

Answer ALL questions

**PART A – (10 × 2 = 20 marks)**

1. Give the purpose of layering.
2. Mention the advantage and disadvantage of error correction by receiver, as compared to error detection.
3. How is the minimum size of an ethernet frame determined?
4. How does an FDDI node determine whether it can send asynchronous traffic and synchronous traffic?
5. Compare circuit switching and virtual circuit based packet switching, in respect of queuing and forwarding delays.
6. Differentiate between connection less operation and connection oriented operation.
7. Why is UDP pseudo header included in UDP checksum calculation? What is the effect of an invalid checksum at the receiving UDP?
8. How can the effect of jitter be compensated? What types of applications require this compensation?
9. What are the advantages of allowing persistent TCP connections in HTTP?
10. Is a cryptographic hash function, an irreversible mapping? Justify your answer.

**PART B – (5 × 16 = 80 marks)**

- 11 a) i) Discuss the framing technique used in HDLC. What is the effect of errors on this framing? (8)
- ii) The message 11001001 is to be transmitted using CRC error detection algorithm. Assuming the CRC polynomial to be  $x^3 + 1$ , determine the message that should be transmitted. If the second left most bit is corrupted, show that it is detected by the receiver. (8)
- [OR]
- b) i) Discuss the principle of stop and wait flow control algorithm. Draw time line diagrams and explain how loss of a frame and loss of an ACK are handled. What is the effect of delay-bandwidth product on link utilization? (8)



- ii) Assume that a frame consists of 6 characters encoded in 7-bit ASCII. Attach a parity bit for every character to maintain even parity. Also attach a similar parity bit for each bit position across each of the bytes in the frame. Show that such a 2-dimensional parity scheme can detect all 1-bit, 2-bit and 3-bit and can correct a single bit error. (8)

- 12 a) i) An IEEE 802.5 token ring has 5 stations and a total wire length of 230m. How many bits of delay must the monitor insert into the ring? Calculate this for both 4 Mbps and 16 Mbps rings. The propagation speed may be assumed to be  $2.3 \times 10^8$  m/s. (6)
- ii) Discuss the problems encountered in applying CSMA/CD algorithm to wireless LANs. How does 802.11 specification solve these problems. (10)

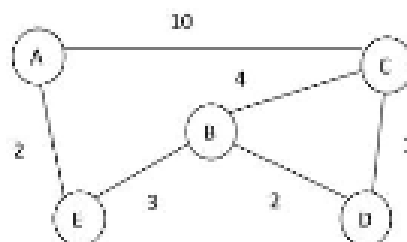
[OR]

- b) i) Discuss the limitations of bridges. (6)
- ii) Determine the maximum distance between any pair of stations in a CSMA/CD network with a data rate of 10 Mbps, for the correct operation of collision detection process, assuming the frame size to be 512 bits. What should be the maximum distance, if the data rate is increased to 1 Gbps? 2 stations *A* and *B*, connected to opposite ends of a 10-Mbps CSMA/CD network, start transmission of long frames at times  $t_1 = 0$ , and  $t_2 = 3\mu\text{s}$  respectively. Determine the instants when *A* hears the collision and *B* hears the collision. Signal propagation speed may be assumed as  $2 \times 10^8$  m/s. (10)

- 13 a) i) A 4480-byte datagram is to be transmitted through an ethernet with a maximum data size of 1500 bytes in frames. Show the values of Total length, M flag, identification and fragmentation offset fields in each of the fragments created out of the datagram (10)
- ii) Discuss the principles of reliable flooding and its advantages and applications. (6)

[OR]

- b) i) For the following network, develop the datagram for forwarding table for all the nodes. The links are labeled with relative costs. The tables should forward each packet via the least cost path to destination. (10)



- ii) What is the need for ICMP? Mention any four ICMP message and their purpose. (6)

14 a) i) Suppose TCP operates over a 1-Gbps link, utilizing the full bandwidth continuously. How long will it take for the sequence numbers to wrap around completely? Suppose an added 32-bit timestamp field increments 1000 times during this wrap around time, how long will it take for the timestamp field to wrap around. (8)

ii) What is the need for Nagle's algorithm? How does it determine when to transmit data? (8)

[OR]

b) i) A TCP machine is sending full windows of 65,535 bytes over a 1-Gbps network that has a 10-ms one-way delay. What is the throughput achievable? What is the efficiency of transmission? How many bits are needed in the Advertised window field of a proposed reliable byte stream protocol running over the above network, for achieving maximum efficiency? (8)

ii) Illustrate the features of TCP that can be used by the sender to insert record boundaries into the byte stream. Also mention their original purpose. (8)

15 a) Discuss the need for name resolution. Illustrate the domain name hierarchy and the steps in resolution. (16)

[OR]

b) i) Illustrate the features of FTP and its operation. (8)

ii) Illustrate the features of TELNET. What is the need for network virtual terminal? (8)

**B.E./B.Tech DEGREE EXAMINATION NOVEMBER/DECEMBER 2013**

Fifth Semester

Computer Science Engineering

CS2302 – Computer Networks

(Common to Information Technology)

(Regulation 2008)

Time: 3 hours

Maximum: 100 marks

Answer ALL questions

PART A – (10 × 2 = 20 marks)

1. Define a layer.
2. What do you mean by framing?
3. List the main two limitations of bridges.
4. Define source routing.
5. What is the need of subnetting?
6. What is the need for ARP?
7. Differentiate flow control and congestion control.
8. Differentiate between delay and jitter.
9. What DNS cache issues are involved in changing the IP address of a web server host name?
10. Differentiate application programs and application protocols.

PART B – (5 × 16 = 80 marks)

11. (a) (i) Explain NRZ, NRZI and Manchester encoding schemes with examples (8)
- (ii) Describe how bit stuffing works in HDLC protocol. (8)
- Or
- b) (i) Discuss the issues in the data link layer (4)
- (ii) Suppose we want to transmit the message 11001001 and protect it from errors using the CRC polynomial  $x^3 + 1$ . Use polynomial long division to determine the message that should be transmitted. (12)

12. (a) (i) Describe the transmitter algorithm implemented at the sender side of the Ethernet protocol. Why should Ethernet frame be 1500 bytes long. (10)
- (ii) Explain how the hidden node and exposed node problem is addressed in 802.11 (6)

Or

- (b) Describe how MAC protocol operates on a token ring. (16)

13. (a) (i) Suppose hosts A and B have been assigned the same IP address on the same Ethernet, on which ARP is used. B starts up after A. What will happen to A's existing connections? Explain how 'self ARP' might help this problem. (4)
- (ii) Describe with example how CIDR addresses the two scaling concerns in the internet. (12)

Or

- (b) Describe the Distance vector routing protocol with examples. (16)

14. (a) (i) Describe how reliable and ordered delivery is achieved through TCP (8)
- (ii) Why does TCP uses an adaptive retransmission and describe its mechanism. (8)

Or

- (b) Describe with examples the three mechanism by which congestion control is achieved in TCP. (16)

15. (a) Describe the message format and the message transfer and the underlying protocol involved in the working of the electronic mail. (16)

Or

- b) Explain with example :
- (i) HTTP (8)
- (ii) RTP (8)

B.E/ B.Tech DEGREE EXAMINATION APRIL/MAY 2015.

Sixth Semester

Electronics and communication Engineering

CS6551 – COMPUTER NETWORKS

(Regulation 2013)

Time: Three hours

Maximum : 100 marks

Answer ALL questions  
PART A ( 10 ×2 = 20 marks)

1. What do you mean by error control?

Error control refers primarily to methods of error detection and retransmission. Anytime an error is detected in an exchange, specified frames are retransmitted. This process is called automatic repeat request (ARQ).

2. Define flow control.

Flow control refers to a set of procedures used to restrict the amount of data. The sender can send before waiting for acknowledgment.

3. What do you understand by CSMA protocol?

Carrier Sense Multiple Access with Collision Detection is one of the methods of medium access. It is used to sense whether a medium is busy before transmission. If the medium is busy, it refrains from transmitting the data or else proceeds with the transmission. Also has the ability to check whether a transmission has collided with another.

4. List the functions of bridges.

Pass data frames between networks using MAC address  
Break up collision domains  
Forwards all broadcast messages

5. How does a router differ from a bridge?

A bridge is a product that connects a local area network (LAN) to another local area network that uses the same protocol (for example, Ethernet or Token Ring). You can envision a bridge as being a device that decides whether a message from you to someone else is going to the local area network in your building or to someone on the local area network in the building across the street.

A router is a device or, in some cases, software in a computer, that determines the next network point to which a packet should be forwarded toward its destination. The router is connected to at least two networks and decides which way to send each information packet based on its current understanding of the state of the networks it is connected to. A router is located at any gateway (where one network meets another), including each point-of-presence on the Internet. A router is often included as part of a network switch.

6. What are the metrics used by routing protocols?

Metrics are used to determine whether one route should be chosen over another. Router metrics can contain any number of values that help the router determine the best route among multiple routes to a destination. A router metric typically based on information like path length, bandwidth, load, hop count, path cost, delay, Maximum Transmission Unit (MTU), reliability and communications cost.

7. List some of the Quality of Service parameters of transport layer.

User Oriented and Network Oriented. User related attributes are

SCR – Sustainable Cell Rate

PCR – Peak Cell Rate

MCR- Minimum Cell Rate

CVDT – Cell Variation Delay Tolerance.

The network related attributes are, Cell loss ratio (CLR), Cell transfer delay (CTD), Cell delay variation (CDV), Cell error ratio (CER).

8. How does transport layer perform duplication control?  
To detect and discard duplicates, the receiver maintains a sliding window starting at the lowest payload number not yet received (which is zero when the connection is first established) and covering the next  $2^{16}$  payloads
9. Define SMTP.  
The TCP/IP protocol that supports electronic mail on the Internet is called Simple Mail Transfer (SMTP). It is a system for sending messages to other computer users based on e-mail addresses. SMTP provides mail exchange between users on the same or different computers.
10. What are the groups of HTTP header?  
The four groups of HTTP headers are  
General headers  
Entity Headers  
Request Headers  
Response Headers.  
Two methods of HTTP are  
GetMethod( )  
PostMethod( ).

PART B (  $5 \times 16 = 80$  marks)

11. (a) Discuss in detail about Internet Architecture. ( 16)  
Refer Larry Peterson Page no: : **33-36**  
Or  
(b) (i) What is the need for error detection? Explain with typical examples.  
(ii) Explain methods used for error detection and error correction. (16)  
Refer Larry Peterson Page no: : **92-101**
12. (a) Explain in detail about access method and frame format used in Ethernet and token ring.(16)  
Refer Larry Peterson Page no: **122-127**  
Or  
(b) (i) Discuss the MAC layer functions of IEEE802.11 (8)  
Refer Larry Peterson Page no: **135-141**  
(ii) Briefly define key requirements of wireless LAN. (8)  
Refer Larry Peterson Page no: **128-134**
13. (a) Explain the shortest path algorithm with suitable illustrations. (16)  
Refer Larry Peterson Page no: **240-244**  
Or  
(b) Explain the distance vector routing algorithm. Mention the limitations of the same.(16)  
Refer Larry Peterson Page no:243-252
14. (a) Explain the various fields of the TCP header and the working the TCP protocol.(16)  
Refer Larry Peterson Page no:400-410  
Or  
(b) (i) Explain the three way handshake protocol to establish the transport level connection .(8)  
(ii) List the various congestion control mechanisms. Explain any one in detail. (8)  
Refer Larry Peterson Page no:514-516

15. (a) (i) Explain the message transfer using Simple Mail Transfer Protocol.(8)  
Refer Larry Peterson Page no:700-704  
(ii) Explain the final delivery of email to the end user using POP.(8)  
Refer Larry Peterson Page no:700-704  
Or  
b) Write short notes on  
(i) Web services (8) Refer Larry Peterson Page no:718-724  
(ii) SNMP (8) Refer Larry Peterson Page no:756-758

**B.E/ B.Tech DEGREE EXAMINATION NOV/DEC 2015.**  
Sixth Semester  
Electronics and communication Engineering  
CS6551 – COMPUTER NETWORKS  
(Regulation 2013)

Time: Three hours

Maximum : 100 marks

Answer ALL questions  
PART A ( 10 ×2 = 20 marks)

1. State the issues of data link layer  
Data Link Layer Design Issues:  
The data link layer has a number of specific functions it can carry out. These functions include
  1. Providing a well-defined service interface to the network layer.
  2. Dealing with transmission errors.
  3. Regulating the flow of data so that slow receivers are not swamped by fast senders.
2. Define the term protocol?  
Protocol is the set of rules governing the exchange of data between two entities. It defines what is communicated, how it is communicated, when it is communicated. The Key elements of a Protocol are as follows,  
**Syntax** – It refers to the structure or format of data meaning the order in which they are presented.  
**Semantics** – It refers to the meaning of each section of bit. How to do interpretation.  
**Timing** – When data should be sent and how fast they can be sent.
3. Define sub netting.  
A subnetwork or subnet is a logical subdivision of an IP network. The practice of dividing a network into two or more networks is called subnetting. Computers that belong to a subnet are addressed with a common, identical, most-significant bit-group in their IP address.
4. What is the need of ARP?  
ARP is a function of the IP layer of the TCP/IP protocol stack. It is necessary to translate a host's software address (IP address) to a hardware address (MAC address). Typically, a host uses ARP to determine the hardware address of another host
5. Identify the class of the following ipv4 address  
110.34.56.45  
212.208.63.23  
110.34.56.45: This IP address belongs to Class A.  
212.208.63.23: This IP address belongs to Class C.
6. Define routing.  
The process of moving a packet of data from source to destination. Routing is usually performed by a dedicated device called a router. Routing is a key feature of the Internet because it enables messages to pass from one computer to another and eventually reach the target machine.

7. what is the difference between congestion control and flow control?

<b>Congestion Control</b>	<b>Flow Control</b>
Congestion control means preventing the source from sending data that will end up getting dropped by a router because its queue is full.	Flow control means preventing the source from sending data that the receiver will end up dropping because it runs out of buffer space.
This is more complicated, because packets from different sources travelling different paths can converge on the same queue.	This is fairly easy with a sliding window protocol

8. What do you mean by QOS?

The quality of service defines a set of attributes related to the performance of the connection. For each connection, the user can request a particular attribute each service class is associated with a set of attributes.

9. Mention the types of HTTP messages?

The types of messages in HTTP transaction are  
Request messages  
Response messages

10. What is SMTP?

SMTP stands for Simple Mail Transfer Protocol. SMTP is used when email is delivered from an email client, such as Outlook Express, to an email server or when email is delivered from one email server to another.

PART B( 5 × 16 = 80 marks)

11. a. Draw the OSI network architecture and explain the functionalities of every layer in details

Refer Larry Peterson Page no: 26-30

(or)

b. Explain various flow control mechanisms. Refer Larry Peterson Page no: 96

12. a. Write short notes on

(i) Ethernet Refer Larry Peterson Page no: **135-141**

(ii) wireless LAN Refer Larry Peterson Page no: **128-134**

(or)

b. Explain in detail about ARP, DHCP, and ICMP. Refer Larry Peterson Page no: **228-235**

13. a. Describe distance vector routing

Refer Larry Peterson Page no: 243-252

(or)

b. Explain multi cast routing in details. Refer Larry Peterson Page no: 338-341

14. a. With neat architecture explain TCP in detail. Refer Larry Peterson Page no: 486-499

(or)

b. Explain TCP congestion control methods. Refer Larry Peterson Page no: 486-499

15. a. Explain in detail about domain name system. Refer Larry Peterson Page no: 486-499

(or)

b. Write short notes on the following

(i) EMAIL Refer Larry Peterson Page no: 700-704

(ii) HTTP Refer Larry Peterson Page no: 708-717



B.E/ B.Tech DEGREE EXAMINATION MAY/JUNE 2016.

Sixth Semester

Electronics and Communication Engineering

**CS6551 – COMPUTER NETWORKS**

(Regulation 2013)

Time: Three hours

Maximum : 100 marks

Answer ALL questions

PART A ( 10 ×2 = 20 marks)

1. Define flow control.  
Flow control refers to a set of procedures used to restrict the amount of data. The sender can send before waiting for acknowledgment.
2. Write the parameters used to measure network performance.  
The parameters used to measure network performance are  
**Bandwidth** commonly measured in bits/second is the maximum rate that information can be transferred  
**Throughput** is the actual rate that information is transferred.  
**Latency** the delay between the sender and the receiver decoding it, this is mainly a function of the signals travel time, and processing time at any nodes the information traverses  
**Jitter** variation in packet delay at the receiver of the information  
**Error rate** the number of corrupted bits expressed as a percentage or fraction of the total sent
3. Define hidden node problem  
In wireless networking, the hidden node problem or hidden terminal problem occurs when a node is visible from a wireless access point (AP), but not from other nodes communicating with that AP.
4. What is Bluetooth?  
Bluetooth is a wireless technology standard for exchanging data over short distances (using short-wavelength UHF radio waves in the ISM band from 2.4 to 2.485 GHz) from fixed and mobile devices, and building personal area networks (PANs).
5. Expand ICMP and write the function.  
The Internet Control Message Protocol (ICMP) is one of the main protocols of the internet protocol suite.  
ICMP is an error reporting mechanism. It does not specify the action to be taken for each possible error. The source must relate the error to an individual application program and take other actions to correct the problem.
6. Write the types of connecting devices in internetworking?  
Backbone Network is a means of connecting 2 LAN's. It provides a transmission channel for packets from being transmitted from one LAN to the other. The individual LAN's are connected to the Backbone Network by using some types of devices such as Hubs, Repeaters, Switches, Bridges, Routers and Gateways.
7. What do you mean by slow start in TCP congestion?  
It is a congestion control technique. The additive increase mechanism is the right approach to use when the source is operating close to the available capacity of the network, but it takes too long to ramp up a connection when it is starting from scratch.
8. List the difference phases used in TCP connection

9. Define URL.  
Uniform Resource Locator is a string identifier that identifies a page on the World Wide Web.
10. Mention the different levels in domain name space.  
Domain name space is divided into three different sections: generic domains, country domains & inverse domain.  
Generic domain: Define registered hosts according to their generic behavior, uses generic suffixes.  
Country domain: Uses two characters to identify a country as the last suffix.  
Inverse domain: Finds the domain name given the IP address.
11. (a) Explain any two error detection mechanism in detail.(16)  
Refer Larry Peterson Page no: : **92-101**  
(or)  
(b) Explain in detail about :  
(i) HDLC Refer Larry Peterson Page no: **85-87**  
(ii) PPP Refer Larry Peterson Page no: **81, 82**
12. (a).Give the comparison between different wireless technologies? Enumerate 802.11 protocol stack in detail. Refer Larry Peterson Page no: **128-134**  
(or)  
(b).Write a short on :  
(i) DHCP Refer Larry Peterson Page no: **231-234**  
(ii)ICMP Refer Larry Peterson Page no: **235**
13. (a).With a neat diagram explain Distance vector routing protocol.  
Refer Larry Peterson Page no: **243-252**  
(or)  
(b). Explain about IPV6? Compare IPV4 and IPV6  
Refer Larry Peterson Page no: **324-328**
14. (a). Define UDP.Discuss the operation of UDP.Explain UDP checksum with one example.  
Refer Larry Peterson Page no: **393-398**  
(or)  
(b). Explain in detail the various TCP congestion control mechanism.  
Refer Larry Peterson Page no: **486-499**
15. (a) (i) Describe how SMTP protocol is used in E-mail applications.  
Refer Larry Peterson Page no: **700-704**  
(ii)Explain HTTP with an example. Refer Larry Peterson Page no: **708-710**  
(or)  
(b) Explain in detail about Web service architecture.  
Refer Larry Peterson Page no: **718-724.**

B.E/ B.Tech DEGREE EXAMINATION APRIL/MAY 2017.

Sixth Semester

Electronics and Communication Engineering

**CS6551 – COMPUTER NETWORKS**

(Regulation 2013)

Time: Three hours

Maximum : 100 marks

Answer ALL questions  
PART A ( 10 ×2 = 20 marks)

1. Distinguish between Packet Switched and Circuit Switched Networks.

Circuit switching

Consists of a set of switches connected by physical links

A connection between two stations is a dedicated path made of one more links

Each connection uses only one dedicated channel on each link

Each link is divided into n channels by using TDM or FDM

**In a packet-switched network, there is no resource reservation; resources are allocated on demand.**

2. What is meant by Bit stuffing? Give an example?

Bit stuffing is the process of inserting noninformation bits into data to break up bit patterns to affect the synchronous transmission of information. It is widely used in network and communication protocols, in which bit stuffing is a required part of the transmission process. Bit stuffing is commonly used to bring bit streams up to a common transmission rate or to fill frames. Bit stuffing is also used for run-length limited coding.

3. State the functions of Bridges.

A bridge is a device that connects and passes packets between two network segments that use the same communications protocol. Bridges operate at the data link layer (layer 2) of the OSI reference model.

4. When is ICMP redirect message used?

An ICMP redirect is an error message sent by a router to the sender of an IP packet. Redirects are used when a router believes a packet is being routed sub optimally and it would like to inform the sending host that it should forward subsequent packets to that same destination through a different gateway.

5. How do routers differentiate the incoming unicast, multicast and broadcast IP packets?

**unicast addresses** – represent a single LAN interface. A unicast frame will be sent to a specific device, not to a group of devices on the LAN.

**multicast addresses** – represent a group of devices in a LAN. A frame sent to a multicast address will be forwarded to a group of devices on the LAN.

**broadcast addresses** – represent all device on the LAN. Frames sent to a broadcast address will be delivered to all devices on the LAN.

6. Why is IPV4 to IPV6 transition required?

**Auto Configuration** - Auto Configuration is now built in and helps make IP addressing more managable. With IPv4, we relied on DHCP or manually configuring IP addresses.

**Direct Addressing** - With Direct Addressing, the primary use of NAT (Network Area Translation) now becomes obsolete with IPv6. So, Direct Addressing is now possible.

**Mobility** - Mobility is better integrated into IPv6 than it is with IPv4. It makes it easier for users to roam to different networks and keep their same IP address.

**Improved Integrated Security (IPSec)** - IPSec is now integrated into IPv6, while with IPv4 it was more an add-on.

7. List the advantages of connection oriented services over connectionless services.

**Connection-oriented** Requires a session connection (analogous to a phone call) be established before any data can be sent. This method is often called a "reliable" network service. It can guarantee that data will arrive in the same order.

**Connectionless** : Does not require a session connection between sender and receiver. The sender simply starts sending packets (called datagrams) to the destination. This service does not have the reliability of the connection-oriented method.

8. How do fast retransmit mechanism of TCP works?

In TCP/IP, fast retransmit and recovery (FRR) is a congestion control algorithm that makes it possible to quickly recover lost data packets. Without FRR, the TCP uses a timer that requires a retransmission timeout if a packet is lost. No new or duplicate packets can be sent during the timeout period. With FRR, if a receiver receives a data segment that is out of order, it immediately sends a duplicate acknowledgement to the sender. If the sender receives three duplicate acknowledgements, it assumes that the data segment indicated by the acknowledgements is lost and immediately retransmits the lost segment.

9. State the usage of conditional get in HTTP.

The HTTP Protocol defines a caching mechanism, in which the proxy web-servers can cache pages, files, images etc. Since caching is in place, There is a method which the servers are asked to return the document, either the “cached” or “live” document.

This request of asking the server for a document considering a specific parameter is called a **Conditional GET Request**

10. Present the information contained in a DNS resource record.

This list of DNS record types is an overview of resource records (RRs) permissible in zone files of the Domain Name System (DNS). It also contains pseudo-RRs.

Part – B (5 X 13 = 65 Marks)

11. a) (i) Explain the challenges faced in building a network. (10)

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 1-6

(ii) Obtain the 4-bit CRC code for the data bit sequence 10011011100 using the polynomial  $x^4+x^2+1$

(3)

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 97 to 101

(Or)

b) (i) With a protocol graph, explain the architecture of internet. (7)

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 33 to 35

(ii) Consider a bus LAN with a number of equally spaced stations with a data rate of 9 Mbps and a bus length of 1 km. What is the mean time to send a frame of 500 bits to another station, measured from the beginning of transmission to the end of reception? Assume a propagation speed of 150 m/s. If two stations begin to monitor and transmit at the same time, how long does it need to wait before an interference is noticed?

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 44 to 481

12. a) (i) Discuss the working of CSMA/CD protocol. (6)

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 138 to 139

(ii) Explain the functions of MAC layer present in IEEE 802.11 with necessary diagrams. (7)

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 135 to 139

(Or)

b) (i) Consider sending a 3500 byte datagram that has arrived at a router  $R_1$  that needs to be sent over a link that has an MTU size of 1000 bytes to  $R_2$ . Then it has to traverse a link with an MTU of 600 bytes. Let the identification number of the original datagram be 465. How many fragments are delivered at the destination? Show the parameters associated with each of these fragments. (6)

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 216 to 219

(ii) Explain the working of DHCP protocol with its header format. (7)

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 231 to 234

13. (a) Explain in detail the operation of OSPF protocol by considering a suitable network. (13)

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 252 to 266

(Or)

(b) Explain the working of Protocol Independent Multi-cast (PIM) in detail. (13)

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 338 to 351.

14. (a) (i) Explain the adaptive flow control and retransmission techniques used in TCP. (8)

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 510 to 513

(ii) With TCPs slow start and AIMD for congestion control, show how the window size will vary for a transmission where every 5<sup>th</sup> packet is lost. Assume an advertised window size of 50 MSS. (5)

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 499 to 500

(Or)

b) (i) Explain congestion avoidance using random early detection in transport layer with an example. (7)

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 514 to 523

(ii) Explain the differentiate services operation of QoS in detail. (6)

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 530 to 531

15. (a) (i) Describe how SMTP transfers message from one host to another with suitable illustration. (6)

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 700 to 708

(ii) Explain IMAP with its state transition diagram. (7)

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 700 to 708

(Or)

(b) (i) List the elements of network management and explain the operation of SNMP protocol in detail.

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 756 to 758

(8)

(ii) Discuss the functions performed by an DNS. Give example. (5)

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 745 to 750

Part – C (1 X 15 = 15 Marks)

16. a) (i) Draw the format of TCP packet header and explain each of its field. (10)

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 423 to 425

(ii) Specify the justification for having variable field lengths for the fields in the TCP header. (5)

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 423 to 425

(Or)

b) Illustrate the sequence of events and the respective protocols involved while accessing a web page from a machine when it is connected with internet for first time. (15)

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 33 to 35

## B.E/ B.Tech DEGREE EXAMINATION NOV/DEC 2017.

Sixth Semester

Electronics and Communication Engineering

**CS6551 – COMPUTER NETWORKS**

(Regulation 2013)

Time: Three hours

Maximum : 100 marks

Answer ALL questions

PART A ( 10 ×2 = 20 marks)

1. Define the term Bandwidth and Latency?

Bandwidth is the amount of data that can be transferred from one point to another normally measured in seconds.

Latency is the time that a data packet takes to travel from one point to another. Another accurate term for Latency is **delay**

2. Compare Byte-Oriented verses Bit-oriented protocol.

A bit-oriented protocol is a communications protocol that sees the transmitted data as an opaque stream of bits with no semantics, or meaning. Control codes are defined in terms of bit sequences instead of characters. Bit oriented protocol can transfer data frames regardless of frame contents.

Synchronous framing High-Level Data Link Control is a popular bit-oriented protocol.

Byte-oriented framing protocol is "a communications protocol in which full bytes are used as control codes. Also known as character-oriented protocol. UART communication is byte-oriented

3. Show the Ethernet Frame Format.

Ethernet is a multiple-access network, meaning that a set of nodes send and receive frames over a shared link. An Ethernet frame is preceded by a preamble and start frame delimiter (SFD), which are both part of the Ethernet packet at the physical layer. Each Ethernet frame starts with an Ethernet header, which contains destination and source MAC addresses as its first two fields. The middle section of the frame is payload data including any headers for other protocols (for example, Internet Protocol) carried in the frame. The frame ends with a frame check sequence (FCS), which is a 32-bit cyclic redundancy check used to detect any in-transit corruption of data.

4. Highlight the characteristics of datagram networks.

In datagram approach, each packet is treated independently from all others. Even when one packet represents just a place of a multi packet transmission, the network treats it although it existed alone. Packets in this technology are referred to as datagram.

5. Differentiate between forwarding table and routing table.

A routing table uses a packet's destination IP address to determine which IP address should next receive the packet, that is, the "next hop" IP address.

A forwarding table uses the "next hop" IP address to determine which interface should deliver the packet to that next hop, and which layer 2 address (e.g., MAC address) should receive the packet on multipoint interfaces like Ethernet or Wi-Fi.

6. What is Border Gateway Protocol (BGP)?

Border Gateway Protocol (BGP) is a routing protocol used to transfer data and information between different host gateways, the Internet or autonomous systems. BGP is a Path Vector Protocol (PVP), which maintains paths to different hosts,

networks and gateway routers and determines the routing decision based on that. It does not use Interior Gateway Protocol (IGP) metrics for routing decisions, but only decides the route based on path, network policies and rule sets. Sometimes, BGP is described as a reach ability protocol rather than a routing protocol.

7. Compare flow control versus congestion control.

<b>Congestion Control</b>	<b>Flow Control</b>
Congestion control means preventing the source from sending data that will end up getting dropped by a router because its queue is full.	Flow control means preventing the source from sending data that the receiver will end up dropping because it runs out of buffer space.
This is more complicated, because packets from different sources travelling different paths can converge on the same queue.	This is fairly easy with a sliding window protocol

8. What are the approaches used to provide a range of quality of service (QoS) ?

The techniques to improve QOS are

- Scheduling
- Traffic shaping
- Resource reservation
- Admission control

Fine grained approaches-which provide QOS to individual applications or flows.

Integrated services- a QOS architecture developed in the IETE and often associated with RSVP.

9. Write the use of Hyper Text Transfer Protocol (HTTP)?

HTTP is Hypertext Transfer Protocol. It is used mainly to access data on the World Wide Web. The protocol transfer data in the form of plaintext, hypertext, audio, video and so on

10. What do you mean by Web Services Description Language (WSDL)?

Web Services Description Language (WSDL) is a format for describing a Web Services interface. It is a way to describe services and how they should be bound to specific network addresses. WSDL has three parts:

- Definitions
- Operations
- Service bindings

Part – B (5 X 13 = 65 Marks)

11. a) With a neat sketch explain the architecture of an OSI seven layer model? (13)

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 26-30

(Or)

b) Discuss the approaches used for error detection in networking. (13)

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 92-101

12. a) Explain the functions of Wi-Fi and Bluetooth in detail. (13)

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 142 - 144

(Or)

b) (i) Explain the Datagram forwarding in IP. (7)

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 216 - 220

(ii) Show and explain the ARP packet format for mapping IP addresses in to Ethernet addresses (6)

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 228-231

13. a) With an example explain the function of link state routing protocol. (13)

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 308 -313

(Or)

b) Elaborate the multicast routing protocol. (13)

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 341 - 351

14. a) (i) Draw the TCP state transition diagram for connection management. (7)

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 402-406

(ii) Brief about approaches used for TCP congestion control. (6)

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 499 - 500

(Or)

b) Write a detailed note on Congestion Avoidance Mechanism used in TCP. (13)  
Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 514- 523

15. a) (i) Explain the function of internet Message Access Protocol (IMAP) with a state diagram. (8)  
Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 700 - 708

(ii) List and explain the various HTTP request operations. (5)  
Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 708 - 718

(Or)

b) (i) What is Domain Name System (DNS) ? Explain. (8)  
Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 745 - 756

(ii) Brief the importance of Single Network Management Protocol (SNMP) (5)  
Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 756 - 758

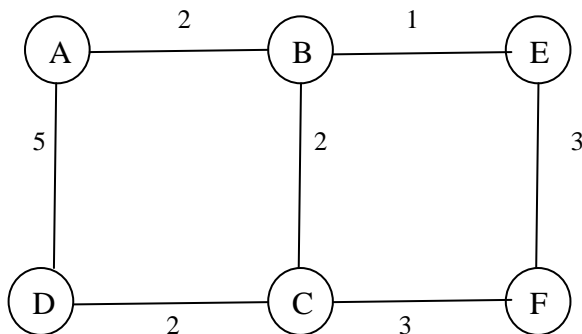
Part – C (1 X 15 = 15 Marks)

16. a) Outline the stage involved in building a computer network. Give the detailed description for each step. (15)

Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 1 - 17

(Or)

- b) For the network given in Fig.1, give global distance vector tables when,
- (i) Each node knows only the distance to its immediate neighbours. (5)
  - (ii) Each node has reported the information it had in the proceedings steps to its immediate neighbours. (5)
  - (iii) Step (ii) happen a second time.



Refer Computer Networks a systems approach 5<sup>th</sup> Edition Larry Peterson Page no: 313 - 324