



## QUESTION BANK

Name of the Department : Computer Science and Engineering

Subject Code & Name : CS8591 & Computer Networks

Year & Semester : III & V

### UNIT-1

#### PART-A

#### 1. Define Network?

A network is a set of devices connected by physical media links. A network is recursively is a connection of two or more nodes by a physical link or two or more networks connected by one or more nodes.

#### 1. What is mean by data communication?

Data communication is the exchange of data (in the form of 1s and 0s) between two devices via some form of transmission medium (such as a wire cable).

#### 2. What are the functions of application layer? [MAY – 2011]

It provides a means for the user to access information on the network through an application. This layer is the main interface for the user to interact with the application and therefore the network.

#### 3. What are the three fundamental characteristics determine the effectiveness of the data communication system?

The effectiveness of the data communication system depends on three fundamental characteristics:

Delivery: The system must deliver data to the correct destination.

Accuracy: The system must deliver data accurately.

Timeliness: The system must deliver data in a timely manner.

#### 4. What are the advantages of distributed processing?

Advantages of distributed processing include security/encapsulation, distributed databases, faster problem solving, security through redundancy and collaborative processing.

#### 5. Why are protocols needed? [MAY -2009]

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.



## 6. Why are standards needed?

Co-ordination across the nodes of a network is necessary for an efficient communication. If there<sup>2</sup> are no standards, difficulties arise. A standard provides a model or basis for development to which everyone has agreed.

## 7. Define bit stuffing.

[MAY – 2011]

Each frame begins and ends with a special bit pattern called a flag byte. Whenever sender data link layer encounters five consecutive ones in the data stream, it automatically stuffs a 0bit into the outgoing stream.

## 8. What is the difference between a passive and an active hub?

An active hub contains a repeater that regenerates the received bit patterns before sending them out. A passive hub provides a simple physical connection between the attached devices.

## 9. Distinguish between peer-to-peer relationship and a primary-secondary relationship.

Peer-to-peer relationship: All the devices share the link equally. Primary-secondary relationship: One device controls traffic and the others must transmit through it.

## 10. Assume 6 devices are arranged in a mesh topology. How many cables are needed? How many ports are needed for each device?

Number of cables= $n(n-1)/2=6(6-1)/2=15$

Number of ports per device= $n-1=6-1=5$

## 11. Group the OSI layers by function.

[NOV -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.

## 12. 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.



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**13. The transport layer creates a communication between the source and destination. What are the three events involved in a connection?** 3

Creating a connection involves three steps: connection establishment, data transfer and connection release.

**14. Define Bridge.** [MAY- 2011]

Bridge is OSI layer-2 devices. Bridge filters traffic based on the destination address of the frame. If a frames destination is a node on another LAN, it is connected to corresponding bridge port and forward to that port.

**15. Define Gateways.** [MAY- 2011]

Gateways are the most complex devices with respect to the functionality. They typically work at the upper most layers of the OSI model.

**16. Using HDB3, encode the bit stream 10000000000100.** Assume the number of 1s so far is odd and the first 1 is positive.

**17. What are the functions of a DTE? What are the functions of a DCE?**

Data terminal equipment is a device that is an information source or an information sink. It is connected to a network through a DCE. Data circuit-terminating equipment is a device used as an interface between a DTE and a network.

**18. Write short notes on error correction?** [MAY -2013]

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.

**19. Discuss the mode for propagating light along optical channels.**

There are two modes for propagating light along optical channels, multimode and single mode.

Multimode: Multiple beams from a light source move through the core in different paths.

Single mode: Fiber with extremely small diameter that limits beams to a few angles, resulting in an almost horizontal beam.

**20. What is refraction?**

The phenomenon related to the bending of light when it passes from one medium to another.

**21. What do you mean by error control?** [NOV-2010& DEC- 2011,2014]

Error control is a method that can be used to recover the corrupted data whenever possible. There are two basic types of error control which are backward error control and forward error control.



## Types of Errors

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### \*Single Bit Error

Single bit error means that only one bit of the data unit was changed from 1 to 0 and 0 to 1.

### \*Burst Error

Burst error means that two or more bits in the data unit were changed. Burst error is also called packet level error, where errors like packet loss, duplication, reordering.

## 22. 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.

## 23. What are the criteria used to evaluate transmission medium?

The criteria used to evaluate transmission medium are

- Throughput
- Propagation speed
- Propagation time
- Wavelength

## 24. Give the relationship between propagation speed and propagation time?

$$\text{Propagation time} = \text{distance} / \text{propagation speed}$$

the time required for a signal or a bit to travel from one point to another is called Propagation time.

Propagation speed is the distance, a signal or a bit travel through a medium in one second.

## 25. Define flow control?

[DEC -2011,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.

## 26. Write the parameters used to measure Network performance. [MAY/JUNE-2016]

- **Bandwidth** commonly measured in bits/second is the maximum rate that information can be transferred
- **Throughput** is the actual rate that information is transferred



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- **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

## 27. Define the term protocol.

[NOV/DEC-2015]

When computers communicate with each other, there needs to be a common set of rules and instructions that each computer follows. A specific set of communication rules is called a protocol

## 28. What are the applications of Computer Networks?

### 1. Information:

One of the applications of computer networks is the ability to provide access to remote information.

- Pay bills; carry out transactions on bank accounts etc.
- Shop from home by inspecting the catalogs of thousands of companies available online.
- Ask the newspaper for full information about your interesting topics such as corrupt politicians, big fires, football and so on.
- Access information about health, science, art, business, cooking, sports, travel, and government and so on. All this is available on the information systems like the World Wide Web (WWW).

### 2. Communication:

The popular application of computer networks is electronic mail or e-mail which widely used by millions of people to send and receive text messages. With real-time e-mail, remote users can Communicate even by see and hear each other at the same time. It is also possible to have virtual meetings called videoconference on-line among remote users.

### 3. Entertainment:

A huge and growing application is entertainment. It entertains people by allowing video demand, and has multiple real-time games etc.



1. Draw the ISO-OSI reference model and explain the functionalities of each layer inDetail.(16)  
[DEC- 2011]
2. Discuss in detail about Internet Architecture. [APR/MAY-2015,17]
3. Give the TCP/IP network architecture model and discuss the design issues of the same in detail. (16)  
[MAY- 2011]
4. Explain the various network types.(12)
5. (i) Discuss in detail about the network performance Measures.(6)  
(ii) Explain in detail about protocol layering. (6)
6. Discuss in detail about TCP/IP protocol suite. (12)
7. Write about various Transmission medias used in networks.(12)
8. Outline the steps involved in building a computer network. Give the detailed description for each step.
9. Explain about the various switching methods in detail.



## UNIT-2

### PART-A

#### **1. What are the functions of MAC? [DEC- 2011]**

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.

#### **2. 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.

#### **3. What is Ethernet? [MAY- 2011]**

- Ethernet is a multiple-access network, meaning that a set of nodes send and receive frames over a shared link.
- Ethernet is a networking technology developed in 1970 which is governed by the IEEE 802.3 specifications.

Advantages of Ethernet

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

#### **4. Define the term carrier sense in CSMA/CD? [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.

#### **5. 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.

#### **6. 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.

#### **7. 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.



## 8. What is token ring?

[NOV -2009]In

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a token ring a special bit pattern, called the token circulates around the ring whenever all stations are idle. When a station wants to transmit a frame, it is required to seize the token and remove it from the ring before transmitting.

## 9. 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.

## 10. What are the two classes of traffic in FDDI?

[DEC -2010]

- Synchronous
- Asynchronous

## 11. What are the four prominent wireless technologies?

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

## 12. Define Bluetooth?

Bluetooth fills the niche of very short-range communication between mobile phones, PDAs, notebook computers, and other personal or peripheral devices. For example, Bluetooth can be used to connect mobile phones to a headset, or a notebook computer to a printer.

## 13. What are the four steps involves in scanning?

1. The node sends a Probe frame.
2. All APs within reach reply with a Probe Response frame.
3. The node selects one of the access points, and sends that AP an Association Request frame.
4. The AP replies with an Association Response frame.

## 14. Explain the term handoff?

If the phone is involved in a call at the time, the call must be transferred to the new base station in what is called a hand off.

## 15. Define sat phones?

Satphones use communication satellites as base stations, communicating on frequency bands that have been reserved internationally for satellite use.

## 16. How to mediate access to a shared link?



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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.

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### 17. Define Aggregation points?

It collects and processes the data they receive from neighboring nodes, and then transmit the processed data. By processing the data incrementally, instead of forwarding all the raw data to the base station, the amount of traffic in the network is reduced.

### 18. What is character stuffing?

[MAY- 2011]

ASCII characters are used as framing delimiters. The problem occurs when these character patterns occur within the transparent data. The solution is that sender stuffs DLE into the data stream just before each occurrence of an accident DLE in the data stream.

### 19. What is the use of Switch?

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.

### 20. Explain Bridge?

[DEC -2010,MAY-2015]

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.

### 21. What is Spanning tree?

It is for the bridges to select the ports over which they will forward frames.

### 22. Define the term medium access control mechanism.

[DEC -2011]

The protocol that determines who can transmit on a broadcast channel are called medium access control protocol. The MAC protocols are implemented in the MAC sublayer which is the lower sublayer of the datalink layer.

### 23. 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.

### 24. What is multicast?

[DEC- 2010]

It can be implemented with each host deciding for it whether or not to accept the message.

### 25. How does a given bridge learn whether it should forward a multicast frame over a given port?



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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.

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### 26. What are the limitations of bridges?

- scale
- heterogeneity

### 27. How is error controlled in datalink controlled protocol?

In a data link control protocol, error control is activated by retransmission of damaged frame that have not been acknowledged by other side which requests a retransmission

### 28. Discuss the concept of redundancy in error detection.

Error detection uses the concept of redundancy, which means adding extra bits for detecting errors at the destination.

### 29. What are the three types of redundancy checks used in data communications?

- Vertical Redundancy Check (VRC)
- Longitudinal Redundancy Check (LRC)
- Cyclic Redundancy Check (CRC)

### 30. What is SIFS?

Short Inter Frame Spacing is used to allow the parties in a single dialog the chance to go first.

### 31. What are transceivers?

Transceivers are combination of transmitter and receiver. Transceivers are also called as medium attachment unit (MAU)

### 32. What is the function of NIC?

NIC is used to allow the computer to communicate on the network. It supports transmitting, receiving and controlling traffic with other computers on network.

### 33. List the functions & limitations of bridges [APR/MAY 15,17,NOV/DEC-10] Functions of

#### Bridges:

A bridge device filters data traffic at a network boundary. Bridges reduce the amount of traffic on a local area network (LAN) by dividing it into two segments. Bridges operate at the data link layer (Layer 2) of the OSI model. Bridges inspect incoming traffic and decide whether to forward or discard it.



### Limitations of bridges:

A network bridge does not incur any communication between network path and the physical hosts of the data. The data packets are not guided as through which path to travel along. Therefore a network data packet is sent to every network terminal.

### 34. What is CSMA/CD?

[NOV/DEC-2011]

CSMA/CD (Carrier Sense, Multiple Access with Collision Detect):

Carrier sense multiple access means that multiple stations can listen to the link and detect when it is in use or idle; —collision detect indicates that, if two or more stations are transmitting on the link simultaneously, they will detect the collision of their signals. Ethernet is the best-known technology that uses CSMA/CD.

### 35. How does a router & switch differ from a bridge? [APR/MAY-2015] & [NOV/DEC-2012]

Router	Switch	Bridge
A device that forwards data packets along networks. A router is connected to at least two networks, commonly two LANs or WANs	In networks, a device that filters and forwards packets between LAN segments which selects a path or circuit for sending a unit of data to its next destination.	A bridge is a product that connects a local area network (LAN) to another local area network that uses the same protocol



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	Switches operate at the data link layer (layer 2) and sometimes at the network layer (layer 3)		12
Routers are located at gateways, the places where two or more networks connect.	Switches operate at the data link layer (layer 2) and sometimes at the network layer (layer 3)	A bridge examines each message on a LAN. Messages are sent out to every address on the network and accepted only by the intended destination node.	
Routers use headers and forwarding tables to determine the best path for forwarding the packets	LANs that use switches to join segments are called switched LANs	Bridges learn which addresses are on which network and develop a learning table so that subsequent messages can be forwarded to the right network.	

**36. What is the need for ARP?**

**[NOV/DEC-2013,2015]**

ARP – —**Address Resolution Protocol** , is used to map IP Network addresses to the hardware (Media Access Control sub layer) addresses used by the data link



protocol. The ARP protocol operates between the network layer and the data link layer in the Open System Interconnection (OSI) model.

### ARP is used in four cases of two hosts communicating:

- When two hosts are on the same network and one desires to send a packet to the other
- When two hosts are on different networks and must use a gateway/router to reach the other host
- When a router needs to forward a packet for one host through another router
- When a router needs to forward a packet from one host to the destination host on the same network

### 37. What is meant by exponential back off and scatter net?[Nov 16]

In a variety of computer networks, binary **exponential backoff** or truncated binary exponential backoff refers to an algorithm used to space out repeated retransmissions of the same block of data, often as part of network congestion avoidance.

### 38. Compare a piconet and a scatter net. .(Nov Dec 2008)

Ans: A piconet is the type of connection that is formed between two or more Bluetooth enabled devices, one device takes the role of 'master', and all other devices assume a 'slave' role for synchronization reasons. scatternet is a number of interconnected piconets that supports communication between more than 8 devices. Scatternets can be formed when a member of one piconet elects to participate as a slave in a second, separate piconet.

A **scatternet** is a type of network that is formed between two or more Bluetooth-enabled devices, such as smartphones and newer home appliances. A scatternet is made up of at least two piconets. Bluetooth devices are peer units that act as slaves or masters. Scatternets are formed when a device in a piconet, whether a master or a slave, decides to participate as a slave to the master of another piconet. This device then becomes the bridge between the two piconets, connecting both networks.

### 39. 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



## PART-B

1. Explain the HDLC working in detail. (16)
- 2.i. Explain the services Provided by PPP (7)  
ii. Define PPP. Describe the details with neat diagram.(6)
3. Explain the CSMA/CD algorithms of Ethernet. (8) [MAY- 2011]
4. Explain in details about the random multiple access methods used in DLL.
5. Discuss the various design issues related to the data link layer. (8) [DEC- 2011]
6. Explain the various Flow control methods in DLL.
7. What are the various addressing mechanisms used in DLL?
8. Explain about the Ethernet specifications.
9. Discuss the MAC layer functions of IEEE 802.11. (16) [NOV -2013]
10. i. What is the remainder obtained by dividing  $x^7+x^5+1$  by the generator polynomial  $x^3+1$ .(6)  
ii. A bit stream 10011101 is transmitted using the standard CRC method. The generator polynomial is  $x^3+1$  show the actual bit string transmitted. Suppose the third bit from left is inverted during transmission show that this error is detected at receiver's end.(6)  
iii. A bit string 011110111110111110, needs to be transmitted at the data link layer. What is the string actually transmitted after bit stuffing. (6)
11. Briefly define key requirements for wireless LANs.(16) [DEC -2010]
12. Explain in details the types of bridges.(16) [MAY- 2011]
13. Explain the physical properties of Ethernet 802.3 with necessary diagram of Ethernet Transceiver and adaptor. [DEC- 2012]
14. Describe the CSMA/CD protocol and comment on its performance for medium access.(16) [MAY-2014]
15. (i) discuss the MAC layer functions of IEEE802.11 (8)  
(ii) Briefly define key requirements of wireless LAN (8) [MAY-2015]
16. What is the need for error detection? Explain with typical examples. Explain methods used for error detection and error correction.(16)
17. Compare Bridges and routers



## UNIT-3

### PART-A

#### **1. Define packet switching?**

[APL- 2013]

A packet switch is a device with several inputs and outputs leading to and from the hosts that the switch interconnects.

#### **2. What is a virtual circuit?**

[APL -2013]

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.

#### **3. 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.

#### **4. What is meant by switched virtual circuit?**

Switched virtual circuit format is comparable conceptually to dial-up line in circuit switching. In this method, a virtual circuit is created whenever it is needed and exists only for the duration of specific exchange.

#### **5. What is meant by Permanent virtual circuit?**

Permanent virtual circuits are comparable to leased lines in circuit switching. In this method, the same virtual circuit is provided between two uses on a continuous basis. The circuit is dedicated to the specific uses.

#### **6. What are the properties in star topology?**

- Even though a switch has a fixed number of inputs and outputs, which limits the number of hosts that can be connected to a single switch, large networks can be built by interconnecting a number of switches.
- We can connect switches to each other and to hosts using point-to point links, which typically means that we can build networks of large geographic scope.

#### **7. What is VCI?**

A Virtual Circuit Identifier that uniquely identifies the connection at this switch, and which will be carried inside the header of the packets that belongs to this connection.



## 8. What is hop-by-hop flow control?

Each node is ensured of having the buffers it needs to queue the packets that arrive on that circuit.

This basic strategy is usually called hop-by-hop flow control.

## 9. Explain the term best-effort?

If something goes wrong and the packet gets lost, corrupted, misbelieved, or in any way fails to reach its intended destination, the network does nothing.

## 10. What is maximum transmission unit?

MTU- which is the largest IP datagram that it can carry in a frame.

## 11. Define Routing?

It is the process of building up the tables that allow the collect output for a packet to be determined.

## 12. 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

## 13. Write the keys for understanding the distance vector routing?

The three keys for understanding the algorithm are,

- Knowledge about the whole networks
- Routing only to neighbors
- Information sharing at regular intervals

## 14. Write the keys for understanding the link state routing?

The three keys for understanding the algorithm are,

- Knowledge about the neighborhood.
- Routing to all neighbors.
- Information sharing when there is a range.

## 15. How the packet cost referred in distance vector and link state routing?

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.

## 16. Define Reliable flooding?

[MAY -2011]

It is the process of making sure that all the nodes participating in the routing protocol get a copy of the link state information from all the other nodes.

## 17. What are the features in OSPF?



- Authentication of routing messages.
- Additional hierarchy.
- Load balancing.

### 18. Define sub netting?

[DEC- 2013]

Sub netting 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.

### 19. What are the different types of AS?

- Stub AS
- Multi homed AS
- Transit AS

### 20. What are the fields on which the UDP checksum is calculated? Why? [MAY -2009]

UDP checksum includes a pseudo header, the UDP header and the data coming from the application layer.

### 21. What is Source Specific Multicast?

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.

### 22. What is meant by congestion?

Congestion in a network occurs if user sends data into the network at a rate greater than that allowed by network resources.

### 23. Why the congestion occurs in network?

Congestion occurs because the switches in a network have a limited buffer size to store arrived packets.

### 24. What are the rules of non-boundary-level masking?

- 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.



## 25. What is the use of CIDR value in IP addressing?

[DEC-2011]

Class C address concept becomes meaningless on these routes between domains, the technique is call classless inter domain routing or CIDR. A key concept is to allocate multiple IP address in the way that allows summarization into a smaller number of routing table.

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## 26. Define BGP and VCI.

[NOV/DEC-2014,16].

Border Gateway Protocol (BGP) is an inter domain routing protocol using path vector routing traffic on the internet can be classified into two types:

- Local traffic that starts/ends on nodes within an AS
- Transit traffic that passes through an AS

**Virtual Channel Identifier:** The VCI, used in conjunction with the VPI (virtual path indicator), indicates where an ATM cell is to travel over a **network**. ATM, or asynchronous transfer mode, is a method that many ISPs (Internet Service Providers) use to transfer data to client computers.

## 27. What are the salient features of IPV6?

[NOV/DEC-2012]

- Support for real time services
- Security support auto configuration
- Enhanced routing functional ty, ncluding support for mobile hosts
- New header format
- Large address space
- Efficient and hierarchical addressing and routing infrastructure
- Stateless and stateful address configuration
- Built-in security
- Better support for quality of service (QoS)
- New protocol for neighbouring node interaction
- Extensibility

## 28. What are the metrics used by routing protocols?

[APR/MAY-2015]

The following are metrics used in determining the best path for a routing protocol:

**Bandwidth** – Throughput speed in bits per second

**Cost** – An arbitrary value assigned by an administrator for the intersecting of networks

**Delay** – Network late cy caused by such factors as distance or congestion



**Hop Count** – The number of routers (hops) a packet passes through to its destination

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**Load** – Measurement of traffic that flows through a router

**MTU** (Maximum Transmission Unit) – The largest unit size allowed to be transmitted on all routes from source to destination

**Reliability** – Represents the amount of network downtime, that is, how reliable a network path is?

**Ticks** – Measurement of delay, where a tick is 1/18 of a second. A tick is used as part of the routing protocol IPX RIP

## PART-B

1. Write notes on the following. [DEC -2010]
  - i) Internet protocol. (8)
  - ii) Routers. (8)
2. Discuss in detail the various aspects of IPV6. Write its packet format. (16) [DEC- 2010]
3. i) Explain the network layer in the Internet and IP addressing. (8)  
ii) Write a note on various internetworking devices (8) [APL- 2011]
5. Explain shortest path algorithm with a suitable illustration
6. i) Explain the distance vector routing algorithm. (4)  
ii) Mention the limitations of distance vector routing algorithm. (4)  
iii) Explain the building & distribution of link state packets in link state routing algorithm. (4)  
iv) Mention the limitations of link state routing algorithm. (4)
7. i). Explain link state routing and discuss its advantages over distance vector routing.  
ii) State the major difference between Distance Vector Routing and Link state routing. Discuss how these routing techniques work. [NOV- 2013]
8. What is the need for ICMP? Mention any four ICMP message and their purpose. (6) [APL -2013]
9. Explain the RIP algorithm with a simple example of your choice (16) [MAY-2014]
10. Explain the shortest path algorithm with suitable illustrations. (16) [MAY-2015]
11. Explain the distance vector routing algorithm. Mention the limitation of the same. (16) [MAY-2015]



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12. Discuss briefly about RIP and OSPF. [APR/MAY-2015],[MAY/JUNE-012],[MAY/JUNE-2014,2016,17]&[NOV/DEC2014,2015,16]

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13. Describe the Interdomain routing (Border Gateway Protocol).

14.i). Explain in details IP addressing methods.(7)

ii).Explain about IPV6? Compare IPV4 and IPV6.(7)

15 i)what is subnetting? Discuss. Also state which classes of IP address can be subnetted.

[NOV- 2012]

ii. What is subnet masking? Discuss

iii. How can we prove that we have 2,147,483,648 addresses in class A?

iv. What is the subnetwork address if the destination address is 200.45.34.56 and the subnet mask is 255.255.240.0 .

16.i) In classful addressing how is an IP address in class A, Class B and Class C divided? Discuss

ii. Given the address 23.56.7.91 and the default class A mask, find the beginning address (network address).

[NOV- 2013]

iii. Given the address 201.180.56.5 and the default class C mask, find the beginning address (network address).

17. For the network shown in figure with the given link cost, use Dijkstra's algorithm to determine the shortest path from A to all other nodes. Show all your working and show your result as a spanning tree(s) rooted at A.



## UNIT-4

### PART-A

#### **1. Explain the main idea of UDP?**

[NOV- 2010,MAY -2014]

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

#### **2. What are the different fields in pseudo header?**

- Protocol number
- Source IP address
- Destination IP addresses.

#### **3. Define TCP?**

[NOV- 2011]

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.

#### **4. Define Congestion Control?**

[APL- 2011]

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.

#### **5. State the two kinds of events trigger a state transition?**

- A segment arrives from the peer.
- The local application process invokes an operation on TCP.

#### **6. What are the different kinds of multicast routing?**

[MAY- 2011]

Different kinds of multicast routing are reverse path multicasting and reverse path broadcasting.

#### **7. What is meant by segmentation?**

When the size of the data unit received from the upper layer is too long for the network layer datagram or data link layer frame to handle, the transport protocol divides it into smaller usable blocks. The dividing process is called segmentation.

#### **8. What is slow start mechanism?**

[MAY- 2011,2014& DEC -2011]

Slow – start mechanism is part of the congestion control strategy used by TCP, the data transmission protocol used by much internet application. It is used in conjunction with other algorithms to avoid sending more data than the network is capable of transmitting to avoid causing network congestion.



## 9. What is rate based design?

Rate- based design, in which the receiver tells the sender the rate-expressed in either bytes or packets per second – at which it is willing to accept incoming data.

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## 10. Define Gateway.

A device used to connect two separate networks that use different communication protocols.

## 11. What is meant by quality of service?

[MAY -2012,NOV -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.

## 12. What are the two categories of QoS attributes?

[MAY -2012]

The two main categories are,

- User Oriented
- Network Oriented

## 13. List out the user related attributes?

User related attributes are SCR – Sustainable Cell Rate PCR – Peak Cell Rate MCR- Minimum Cell Rate CVDT – Cell Variation Delay Tolerance.

## 14. What are the networks related attributes?

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

## 15. What is RED?

Random Early Detection in each router is programmed to monitor its own queue length and when it detects that congestion is imminent, to notify the source to adjust its congestion window.

## 16. What are the three events involved in the connection?

For security, the transport layer may create a connection between the two end ports. A connection is a single logical path between the source and destination that is associated with all packets in a message. Creating a connection involves three steps:

- Connection establishment
- Data transfer
- Connection release

## 17. Define a socket with respect to connecting a user end computer to the internet.

[JUNE -2009]

Socket is communication end point. It uses IP address and port number.



## 18. What is leaky bucket?

Leaky bucket is a traffic shaping mechanism. In leaky bucket, the input rate can vary but the output rate remains constant. A technique called leaky bucket can smooth out bursty traffic.

## 19. What is meant by Concatenation?

The size of the data unit belonging to single sessions are so small that several can fit together into a single datagram or frame, the transport protocol combines them into a single data unit. The combining process is called concatenation.

## 20. What is framing bits?

One or more synchronization bits are usually added to the beginning of each frame. These bits are called framing bits.

## 21. What is the difference between service point address, logical address and physical address?

Service point addressing Logical addressing Physical addressing the transport layer header if a packet passes the If the frames are to be which makes a data delivery destination systems. The header, which defines the from a specific process on network layer adds a source machine's address one computer to a specific header, which indicate the and the destination process on another logical address of the sender machine's address.

## 22. What is frame?

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

## 23. What is interleaving?

The switch moves from device to device at a constant rate and fixed order. This process is called interleaving.

## 24. What is function of transport layer?

The protocol in the transport layer takes care in the delivery of data from one application program on one device to an application program on another device. They act as a link between the upper layer protocols and the services provided by the lower layer.

## 25. List out the various features of Sliding Window Protocol.

[NOV/DEC 2012]

A Sliding window protocols are used where reliable in-order delivery of packets is required. A sliding window protocol allows an unlimited number of packets to be communicated using fixed-size sequence numbers. The term "window" on the transmitter side represents the logical boundary of the total



number of packets yet to be acknowledged by the receiver. The receiver informs the transmitter in each acknowledgment packet the current maximum receiver buffer size (window boundary).

## 26. Differentiate delay and jitter.

[NOV/DEC 2013]

**Delay:** is the amount of time data (signal) takes to reach the destination. A higher delay generally means congestion of some sort of breaking of the communication link.

**Jitter:** is the variation of delay time. eg. Video Streaming suffers from jitter a lot because the size of data transferred is quite large

## 27. Define slow start. [MAY/JUNE 2014], [MAY/JUNE-2016]

Slow-start is part of the congestion control strategy used by TCP. Slow-start is used in conjunction with other algorithms to avoid sending more data than the network is capable of transmitting, that is, to avoid causing network congestion.

## 28. When can an application make use of UDP? [MAY /JUNE 2014]

UDP uses a simple connectionless transmission model with a minimum of protocol mechanism. It has no handshaking dialogues. There is no guarantee of delivery, ordering, or duplicate protection. UDP provides checksums for data integrity, and port numbers for addressing different functions at the source and destination of the datagram.

## 29. Difference between connections oriented service and Connectionless service.

[MAY/JUNE 2013,16]

In connection oriented service authentication is needed while connectionless service does not need any authentication.

Connection oriented protocol makes a connection and checks whether message is received or not and sends again if an error occurs connectionless service protocol does not guarantees a delivery.

Connection oriented service interface is stream based and connectionless is message based

## 30.What is function of transport layer?

The protocol in the transport layer takes care in the delivery of data from one application program on one device to an application program on



another device. They act as a link between the upper layer protocols and the services provided by the lower layer

### 31. What are the duties of the transport layer? [APR/MAY-2015]

The services provided by the transport layer End-to-end delivery

- Addressing
- Reliable delivery
- Flow control
- Multiplexing

### 32. How does transport layer perform duplication control? [APRIL/MAY -15]

Duplication control is important to consider as well because as the speed of networks continue to increase, it becomes possible for different messages to be identified as duplicated and discarded. Similarly, if a packet can become corrupted or erroneous, it is possible then for the sequence number of a real message to be incorrect and cause a duplicate. Also it is entirely possible for a duplicate message to be sent by the sender itself, and therefore this duplicate should be detected to avoid errors.

### 33. What are the four aspects related to the reliable delivery of data?

The four aspects are,

- Error control
- Sequence control
- Loss control,
- Duplication control

### 34. What is the difference between congestion control and flow control?

[Nov/Dec15]

Flow control is a mechanism used in computer networks to control the flow of data between a sender and a receiver, such that a slow receiver will not be outran by a fast sender. Flow control provides methods for the receiver to control the speed of transmission such that the receiver could handle the data transmitted by the sender. Congestion control is a mechanism that controls data flow when congestion actually occurs. It controls data entering in to a network such that the network can handle the traffic within the network.



## 35. What is meant by congestion?

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Congestion in a network occurs if user sends data into the network at a rate greater than that allowed by network resources. Congestion occurs because the switches in a network have a limited buffer size to store arrived packets

## 36. What is QoS? What are the two categories of QoS attributes? [Nov/Dec-15]

Quality of Service (QoS) refers to the capability of a network to provide better service to selected network traffic over various technologies

The two main categories of QoS attributes are:

- User Oriented
- Network Oriented

## 37. List some of the QoS parameters of transport layer. [APRIL / MAY – 2015]

- Throughput
- Priority
- Resilience
- Transit delay



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38. Differentiate TCP and UDP .

[NOV/DEC 2014,16]

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## TCP

**Reliability:** TCP is connection-oriented protocol. When a file or message send it will get delivered unless connections fails. If connection lost, the server will request the lost part. There is no corruption while transferring a message.

**Ordered:** If you send two messages along a connection, one after the other, you know the first message will get there first. You don't have to worry about data arriving in the wrong order.

**Heavyweight:** - when the low level parts of the TCP "stream" arrive in the wrong order, resend requests have to be sent, and all the out of sequence parts have to be put back together, so requires a bit of work to piece together.

**Streaming:** Data is read as a "stream," with nothing distinguishing where one packet ends and another begins. There may be multiple packets per read call.

File Transfer Protocol (FTP port 21) and Secure Shell (OpenSSH port 22) etc.

## UDP

**Reliability:** UDP is connectionless protocol. When you send a data or message, you do't know if it'll get there, it could get lost on the way. There may be corruption while transferring a message.

**Ordered:** If you send two messages out, you don't know what order they'll arrive in i.e. **no ordered**

**Lightweight:** No ordering of messages, no tracking connections, This means it's a lot quicker, and the network card / OS have to do very little work to translate the data back from the packets.

**Datagrams:** Packets are sent individually and are guaranteed to be whole if they arrive. One packet per one read call.

such as IPTV or movies, Voice over IP (VoIP), Trivial File Transfer Protocol (TFTP) and online multiplayer games etc

## PART-B

1. Compare and contrast UDP over TCP. (8) [DEC -2011]
2. Explain the three way handshake operation of reliable byte stream. (8) [DEC- 2011]
3. Write down the algorithm of RED congestion avoidance mechanism and describe the same. (16) [DEC- 2011]
4. Discuss at least two mechanisms used by TCP to ensure reliable delivery of data. (16) [MAY- 2011]
5. Explain the TCP header and working of the TCP protocol.(6)
6. Explain the various fields of TCP header with the help of a neat diagram.(6)
7. Explain the various steps that are followed in releasing a TCP connection.(6)



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8. Explain the three way handshake protocol to establish the transport level connection. (16)
9. Discuss about congestion control in frame relay.(8) [DEC- 2011] <sup>28</sup>
10. Discuss the various issues of transport layer in details. (8)
11. i. Discuss connection establishment and connection release in TCP.(6)  
ii. Discuss how TCP provides reliability using error control.(6)  
iii. Discuss the strategies TCP uses to avoid congestion.(6)
12. Discuss various approaches that have been developed to provide QoS for real time application.(6) [MAY -2011]
13. Write a detailed note on: i) RPC ii) RTP. (16) [MAY -2011]
14. Explain adaptive flow control in detail and its uses. (16) [DEC- 2010]
15. Explain the principle of congestion control in TCP.(16) [MAY,NOV-2014]
16. Explain the various fields of the TCP header and the working of the TCP protocol.(16) [MAY -2015]
17. (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) [MAY -2015]
18. Draw and explain TCP state transition diagram [NOV/DEC-2015]
19. With neat Architecture, Explain TCP in detail. [MAY/JUNE 2013]

**UNIT-5**

**PART-A**

**1. What is the function of SMTP? [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.

**2. What is the difference between a user agent (UA) and a mail transfer agent (MTA)?**

The UA prepares the message, creates the envelope, and puts the message in the envelope. The MTA transfers the mail across the Internet.

**3. How does MIME enhance SMTP? [MAY- 2011]**



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MIME is a supplementary protocol that allows non-ASCII data to be sent through SMTP. MIME transforms non-ASCII data at the sender site to NVT ASCII data and delivers it to the client

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SMTP to be sent through the Internet. The server SMTP at the receiving side receives the NVT ASCII data and delivers it to MIME to be transformed back to the original data.

### 4. Why is an application such as POP needed for electronic messaging?

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, version 3(POP3). 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.

### 5. What is the purpose of Domain Name System? [DEC -2013]

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

### 6. Discuss the three main division of the domain name space. [DEC- 2013]

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.

### 7. Discuss 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.

### 8. Discuss the basic model of FTP. [DEC- 2011]

The client has three components: the user interface, the client control process, and the client data transfer process. The server has two components: the server control process and the server data transfer process. The control connection is made between the control processes. The data connection is made between the data transfer processes.

### 9. 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 be able to prove that a received message came from a specific sender.

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## **10. What are the applications of telnet?**

[MAY- 2011,2014]

Telnet is a text based way of connecting to other computers and networks. It works between hosts that use different operating systems. It provides a standard interface to remote systems.

## **11. What is a 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.

## **12. What are the advantages & disadvantages of public key encryption?**

Advantages:

- Remove the restriction of a shared secret key between two entities. Here each entity can create a pair of keys, keep the private one, and publicly distribute the other one.
- The no. of keys needed is reduced tremendously. For one million users to communicate, only two million keys are needed.

Disadvantage:

If you use large numbers the method to be effective. Calculating the cipher text using the long keys takes a lot of time. So it is not recommended for large amounts of text.

## **13. What are the advantages & disadvantages of secret key encryption?**

Advantage:

Secret Key algorithms are efficient: it takes less time to encrypt a message. The reason is that the key is usually smaller. So it is used to encrypt or decrypt long messages.

Disadvantages:

- Each pair of users must have a secret key. If N people in world want to use this method, there needs to be  $N(N-1)/2$  secret keys. For one million people to communicate, a half-billion secret keys are needed.
- The distribution of the keys between two parties can be difficult.

## **14. List out the function of POP3.**

[MAY -2011]

It is used to allow a workstation to retrieve mail that the server is holding for it.

## **15. Define substitution & transposition encryption?**

. Substitution: A character level encryption in which each character is replaced by another character in the set.



Transposition: A Character level encryption in which the characters retain their plaintext but the position of the character changes.

## 16. Define CGI?

. CGI is a standard for communication between HTTP servers and executable programs. It is used in creating dynamic documents.

## 17. What are the requests messages support SNMP and explain it? [DEC -2011]

- GET
- SET

The former is used to retrieve a piece of state from some node and the latter is used to store a new piece of state in some node.

## 18. Define PGP? [DEC- 2010, MAY -2014]

Pretty Good Privacy is used to provide security for electronic mail. It provides authentication, confidentiality, data integrity, and non-repudiation.

## 19. Define SSH?

Secure Shell is used to provide a remote login, and used to remotely execute commands and transfer files and also provide strong client/server authentication / message integrity.

## 20. State the purpose of SNMP. [DEC- 2011]

The primary purpose of SNMP is to allow the network administrator to monitor and configure devices on the network, remotely via the network. These configuration and monitoring capabilities are collectively referred to as management.

## 21. What is fast retransmitting mechanism? [MAY -2011]

Fast retransmit is a heuristic that sometimes triggers the transmission of a dropped packet sooner than the regular timeout mechanism. This mechanism does not replace regular timeouts.

## 22. What is DNS? [NOV -2009]

DNS is a client/server application that identifies each host on the internet with a unique user friendly name.

## 23. List the functions of POP3 [APR/MAY-2011]

POP3 stands for Post Office Protocol. POP3 allows an email client to download an email from an email server. The POP3 protocol is simple and does not offer many features except for download. Its design assumes that the email client downloads all available email from the server, deletes them from the server and then disconnects. POP3 normally uses port 110.



## 24. What is URI [Regulation 2013]

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### URI-Uniform Resource Identifiers

The URLs that HTTP uses as addresses are one type of Uniform Resource Identifier (URI). A URI is character string that identifies a resource, where a resource can be anything that has identity, such as a document, an image, or a service.

The first part of a URI is a scheme that names a particular way of identifying a certain kind of resource, such as mail to for email addresses or file for file names.

The second part of a URI, separated from the first part by a colon, is the scheme-specific part.

## 25. Define Hypertext links.

Web browser has some way in which you can recognize URLs (often by highlighting or underlining some text) and then you can ask the browser to open them. These embedded URLs are called hypertext links.

## 26. What is IMAP? [REGULATION-2013]

### IMAP stands for, Internet Message Access Protocol

It is an Internet standard protocol used by e-mail clients to retrieve e-mail messages from a mail server over a TCP/IP connection. IMAP4 has several distinct advantages:

- Stronger authentication
- Support for multiple mailboxes
- Greater support for online, offline, or disconnected modes of operation

## 27. What is persistent HTTP and get in HTTP? [Nov 16]

**HTTP persistent connection**, also called HTTP keep-alive, or HTTP connection reuse, is the idea of using a single TCP connection to send and receive multiple

**HTTP requests/responses**, as opposed to opening a new connection for every single request/response pair.

**GET:** The GET method is used to retrieve information from the given server using a given URI. Requests using GET should only retrieve data and should have no other effect on the data.



## PART-B

1. Explain DNS with reference to its components and working. (16) [DEC- 2010]
2. Explain the message transfer using simple mail transfer protocol. (8) [MAY -2011]
3. Explain the final delivery of email to the end user using pop3. (8)
4. Write short notes on email services of the application layer. (8)
5. Explain in details the SMTP. (8) [DEC- 2010]
6. Explain in details WWW. (8)
7. Explain the architecture and services of e-mailing system.(16)
8. i. With a relevant example discuss how the domain space is divided.(6)  
ii. Distinguish between a fully qualified domain name and a partially qualified domain name.  
Give relevant example. (6)  
iii. List the various risks faced by messages that are transmitted over the internet.(4)
9. i. Discuss how simple mail transfer protocol (SMTP) works? Can multimedia messages be Transmitted using SMTP? Discuss. (10)  
ii. Is common gateway interface a languages. Discuss.(6)
10. Explain how does E-Mail work. (8) [MAY- 2011]
11. Write note on the following. [DEC- 2011]
  - i. Security issues in Telnet and FTP. (8)
  - ii. MIME / SMIME. (8)
12. What are the different functions performed by PGP? Discuss in detail. (16)[DEC- 2011]
13. Explain the SNMP protocol in detail.(16) [MAY-2014]
14. Write short notes on:  
(i)DNS (ii) FTP. (8+8) [MAY-2014]
15. Write notes on URLS.(16) [NOV-2014]
16. (i) Explain the message transfer using Simple Mail Transfer Protocol. (8)  
(ii)Explain the final delivery of email to the end user using POP3. (8) [MAY-2015]
17. Write short notes on [MAY-2015]
  - (i) Web services (8)
  - (ii)SNMP (8)
18. Explain with example, the HTTP (World Wide Web). [NOV/DEC-2013], [NOV/DEC-2012],[MAY/JUNE-2016,17]



**B.E/B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015**

**Fourth Semester**

**Computer Science and Engineering**

**CS 6551 – COMPUTER NETWORKS**

**(Common to Fifth Semester – Information Technology)**

**(Regulations 2013)**

**Time: Three hours**

**Maximum: 100 Marks**

**Answer All questions.**

**PART – (10x2=20 Marks)**

1. State the issues of data link layer.
2. Define the term protocol.
3. Define sub-netting.
4. What is the need of ARP?
5. Identify the class of the following IP Address:  
(a) 110.34.56.45  
(b) 212.208.63.23
6. Define routing.
7. What is the difference between congestion control and flow control?
8. What do you mean by QOS?
9. Mention the types of HTTP messages.
10. What is SMTP?

**PART B – (5x16=80 Marks)**

11. (a) Draw the OSI network architecture and explain the functionalities of every layer in detail.

Or

- (b) Explain the Various flow control mechanisms.

12. (a) Write short notes on:

- (i) Ethernet.
- (ii) Wireless Lan.

Or

- (b). Explain in detail ARP, DHCP, ICMP .



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13.(a) Describe distance vector routing. .

Or

(b) Explain multicast routing in detail.

14. (a) With neat architecture, explain TCP in detail.

Or

(b) Explain TCP congestion control methods.

15. (a) Explain in detail of about domain name system.

Or

(b) Write short notes on the following:

- (i) Email.
- (ii) HTTP.

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

### Fifth Semester

### Computer Science Engineering

### CS6551 - Computer Networks

### (Regulation 2013)

Time: 3 hours

maximum: 100 marks

Answer ALL questions

PART A - (10 × 2 = 20 marks)

1. What do you mean by error control?
2. Define flow control.
3. What do you understand by CSMA protocol?
4. List the functions of bridges.
5. How does a router differ from a bridge?
6. What are the metrics used by routing protocols?
7. List some of the Quality of Service parameters of transport layer.
8. How does transport layer perform duplication control?
9. Define SMTP.
10. what are the groups of HTTP header?

PART B - (5 × 16 = 80 marks)

- 11.(a) Discuss in detail about Internet Architecture. (16)  
Or
- (b) What is the need for error detection? Explain with typical examples. Explain methods used for error detection and error correction. (16)
12. (a) Explain in detail about the access method and frame format used in Ethernet and token ring (16)  
Or



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(b) (i) discuss the MAC layer functions of IEEE802.11 (8)

(ii) Briefly define key requirements of wireless LAN (8)

13. (a) Explain the shortest path algorithm with suitable illustrations. (16)

Or

(b) Explain the distance vector routing algorithm. Mention the limitation of the same. (16)

14. (a) Explain the various fields of the TCP header and the working of the TCP protocol. (16)

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)

15. (a) (i) Explain the message transfer using Simple Mail Transfer Protocol. (8)

(ii) Explain the final delivery of email to the end user using POP3. (8)

Or

(b) Write short notes on

(i) Web services (8)

(ii)SNMP (8)



Reg. No. :

## Question Paper Code: 35

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2017  
Fourth/Fifth/Sixth/Seventh/Eighth Semester  
Computer Science and Engineering  
CS6551 : COMPUTER NETWORKS  
(Common to Biomedical Engineering, Electronics and Communication Engineering,  
Mechatronics Engineering, Information Technology)  
(Regulations 2013)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions

PART – A

(10×2=20 Marks)

1. Define the terms : Bandwidth and Latency.
2. Compare Byte-oriented versus Bit-oriented protocol.
3. Show the Ethernet frame format.
4. Highlight the characteristics of datagram networks.
5. Differentiate between forwarding table and routing table.
6. What is Border Gateway Protocol (BGP) ?
7. Compare flow control versus congestion control.
8. What are the approaches used to provide a range of Quality of Service (QoS) ?
9. Write the use of Hyper Text Transfer Protocol (HTTP).
10. What do you mean by Web Services Description Language (WSDL) ?

PART – B

(5×13=65 Marks)

11. a) With a neat sketch, explain the architecture of an OSI seven layer model. (13)  
(OR)  
b) Discuss the approaches used for error detection in networking. (13)



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12. a) Explain the functions of Wi-Fi and Bluetooth in detail. (13)  
(OR)  
b) i) Explain the datagram forwarding in IP. (7)  
ii) Show and explain the ARP packet format for mapping IP addresses into Ethernet addresses. (6)
13. a) With an example, explain the function of link state routing protocol. (13)  
(OR)  
b) Elaborate on multicast routing protocols. (13)
14. a) i) Draw a TCP state transition diagram for connection management.  
ii) Brief about approaches used for TCP congestion control. (OR)  
b) Write a detailed note on congestion avoidance mechanisms used in TCP.
- 
- t (13)
15. a) i) Explain the function of Internet Message Access Protocol (IMAP) with a state diagram. (8)  
ii) List and explain the various HTTP request operations. (5)  
(OR)  
b) i) What is Domain Name System (DNS)? Explain. (8)  
ii) Brief about the importance of Simple Network Management Protocol (SNMP). (5)  
(1×15=15 Marks)
16. a) Outline the steps involved in building a computer network. Give the detailed description for each step. (15)  
(OR)  
b) For the network given in Figure 1, give global distance – vector tables when  
i) Each node knows only the distances to its immediate neighbors. (5)  
ii) Each node has reported the information it had in the preceding step to its immediate neighbors. (5)  
iii) Step (ii) happens a second time. (5)



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B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Seventh Semester

Bio Medical Engineering

CS 6551 — COMPUTER NETWORKS

(Common to Fourth Semester – Computer Science and Engineering/  
Fifth Semester – Information Technology and Sixth Semester Electronics  
and Communication Engineering)

(Regulations 2013)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. List the services provided by data link layer. 11
2. Write the mechanism of stop and wait flow control. 19
3. What is meant by exponential backoff? 29
4. What is scatternet? 29
5. Define VCI. 49
6. What is fragmentation and reassembly? (122)
7. Give the comparison of unicast, multicast and broadcast routing. (69)
8. Differentiate between TCP and UDP. 67
9. Expand POP3 and IMAP4. 91
10. What is persistent HTTP? 91

PART B — (5 × 16 = 80 marks)

11. (a) Draw the OSI network architecture and explain the functionalities of each layer in detail. 12 (16)  
Or  
(b) (i) Discuss in detail about the network performance measures. 118 (8)  
(ii) Explain selective-repeat ARQ flow control method. 19 (8)



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- Dayivakurichi 636112, Attur (TK), Salem (DT). Website: www.tagoreiet.ac.in
- (a) Explain the physical properties of Ethernet 802.3 with necessary diagram of Ethernet transceiver and adapter. (30) (16)

Or

- (b) With a neat sketch explain about IP service model, packet format, Fragmentation and reassembly. (12) (16)

- (a) Discuss in detail about open source shortest path routing with neat diagrams. (52) (16)

Or

- (b) Discuss in detail about any two Multicast routing with neat sketches. (16) (57)

- (a) Explain various fields of the TCP header and the working of the TCP protocol. (84) (16)

Or

- (b) How is congestion controlled? Explain in detail about congestion control techniques in transport layer. (71) (16)

5. (a) Give a detailed note on DNS operation. (109) (16)

Or

- (b) (i) Explain in detail about SNMP messages. (103) (8)

- (ii) Illustrate the role of POP3 in Electronic mail Applications. (8)

(92)



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

Fourth/Fifth/Sixth/Seventh/Eighth Semester

Computer Science and Engineering

CS 6551 — COMPUTER NETWORKS

(Common to Biomedical Engineering, Electronics and Communication Engineering, Mechatronics Engineering, and Information Technology)

(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. Pg No: 28
2. What is meant by bit stuffing? Give an example. 9
3. State the functions of bridges. 25
4. When is ICMP redirect message used? 51
5. How do routers differentiate the incoming unicast, multicast and broadcast IP packets.
6. Why is IPV4 to IPV6 transition required? 55
7. List the advantages of connection oriented services over connectionless services. 66
8. How do fast retransmit mechanism of TCP works? 74
9. State the usage of conditional get in HTTP. 115
10. Present the information contained in a DNS resource record. 89

PART B — (5 × 13 = 65 marks)

11. (a) (i) Explain the challenges faced in building a network. (17) (10)
- (ii) Obtain the 4-bit CRC code for the data bit sequence 10011011100 using the polynomial  $x^4 + x^2 + 1$ . (15) (3)

Or



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- (b) (i) With a protocol graph, explain the architecture of internet. (11) (1)
- (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? (6)
12. (a) (i) Discuss the working of CSMA/CD protocol. (34) (6)
- (ii) Explain the functions of MAC layer present in IEEE 802.11 with necessary diagrams. (34) (7)
- 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)
- (ii) Explain the working of DHCP protocol with its header format. (41) (7)
13. (a) Explain in detail the operation of OSPF protocol by considering a suitable network. (52) (13)
- Or
- (b) Explain the working of Protocol Independent Multi-cast (PIM) in detail. (57) (13)
14. (a) (i) Explain the adaptive flow control and retransmission techniques used in TCP. (82) (8)
- (ii) With TCPs slow start and AIMD for congestion control, show how the window size will vary for a transmission where every 5th packet is lost. Assume an advertised window size of 50 MSS. (72) (5)
- Or
- (b) (i) Explain congestion avoidance using random early detection in transport layer with an example. (71) (7)
- (ii) Explain the differentiate services operation of QOS in detail. (6)
15. (a) (i) Describe how SMTP transfers message from one host to another with suitable illustration. (92) (6)
- (ii) Explain IMAP with its state transition diagram. (100) (7)

Or



## B.E./B.Tech DEGREE EXAMINATION APRIL/MAY 2011

### Fifth Semester

### Computer Science Engineering

### CS2302 - Computer Networks

### (Regulation 2008)

Time: 3 hours

Maximum: 100 marks

Answer ALL questions

#### PART A - (10 × 2 = 20 marks)

1. What are the functions of application layer?
2. Define bit stuffing.
3. Mention some of the physical properties of Ethernet.
4. What is the role of VCI?
5. List the differences between circuit switching and packet switching.
6. What are all the different kinds of multicast routing?
7. What is the difference between congestion control and flow control?
8. Give the approaches to improve QoS.
9. List the function of POP3.
10. What are all the applications of TELNET?

#### PART B - (5 × 16 = 80 marks)

11 a) Explain in detail about the following:

- |             |     |
|-------------|-----|
| (i) PPP     | (5) |
| (ii) HDLC   | (5) |
| (iii) SONET | (6) |

[OR]

b) With a neat diagram explain the network architecture. (16)

12 a) i) Explain how bridges run the distributed spanning tree algorithm. (8)

ii) Explain the following:

- |                 |     |
|-----------------|-----|
| a) Segmentation | (4) |
| b) Reassembly   | (4) |

[OR]



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b) Explain CSMA in detail. (16)

13 a) What is internetworking? Explain its service model, global address and datagram in detail. 45

(16)

**[OR]**

b) i) What is the significance of subnetting? Discuss in detail. (8)

ii) Discuss the interoperability issues between IPv4 and IPv6. (8)

14 a) Explain in detail about the simple demultiplexing and reliable byte stream. (16)

**[OR]**

b) Write detailed notes on:

(i) RPC

(ii) RTP (16)

15 a) i) Explain in detail about message format and message transfer in E-mail. (8)

ii) Discuss about WWW in detail (8)

**[OR]**

b) Explain in detail about Name Services. (16)





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- |    |    |   |      |    |
|----|----|---|------|----|
| 13 | a) | Discuss briefly about RIP and OSPF.                                     | (16) | .7 |
|    |    | [OR]  |      |    |
|    | b) | Write about IPv6 in detail. What are its new features and improvements? | (16) |    |
| 14 | a) | Draw and explain TCP state transition diagram.                          | (16) |    |
|    |    | [OR]  |      |    |
|    | b) | Explain the following:  |      |    |
|    |    | (i) DEC bit   | (8)  |    |
|    |    | (ii) RED  | (8)  |    |
| 15 | a) | Discuss briefly about Electronic mail (SMTP, MIME and IMAP)             | (16) |    |
|    |    | [OR]  |      |    |
|    | b) | Explain the following:  |      |    |
|    |    | (i) DEC bit   | (8)  |    |
|    |    | (ii) RED  | (8)  |    |



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**B.E./B.Tech DEGREE EXAMINATION NOVEMBER/DECEMBER 2012**

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. What is the use of two dimensional parity in error detection?
2. What are the issues in data link layer?
3. Differentiate fast Ethernet and gigabit Ethernet.
4. What is the difference between switch and a bridge?
5. What is DHCP?
6. What are the salient features of IPV6?
7. What is meant by PORT or MAILBOX related with UDP?
8. List out the various features of sliding window protocol.
9. What is Simple Mail Transfer Protocol?
10. Why name servers are sometimes called as middleware?

PART B – (5 × 16 = 80 marks)

- 11 a) Draw the OSI Network architecture and explain the functionalities of every layer in detail. (16)

[OR]

- b) Explain the following Error detection mechanism in detail.
- i. Cyclic Redundancy Check (8)
  - ii. Discuss briefly about Link level flow control (8)



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- 12 a) Explain the physical properties of Ethernet 802.3 with necessary diagram of Ethernet transceiver and adaptor. (16)
- [OR]
- b) i) How does a bridge come to learn on which port the various hosts reside? Explain with an example (8)
- ii) Write briefly about CSMA. (8)
- 13 a) i) Explain in detail about Address Resolution protocol (10)
- ii) What is subnetting? Explain. (6)
- [OR]
- b) Explain the following
- i. Error reporting (ICMP) (8)
- ii. Interdomain routing (8)
- 14 a) i) With the help of a neat diagram, explain how TCP messages a byte stream. Give an example. (10)
- ii) Explain any one congestion control algorithm. (6)
- [OR]
- b) i) Explain the additive increase/multiplicative decrease methods used in TCP for congestion control. (10)
- ii) Give and explain the TCP header format (6)
- 15 a) i) Explain the various process involved after typing URL in the taskbar. (8)
- Write short notes on TELNET. (8)
- [OR]
- b) Write short notes on the following:
- i. E-mail (8)
- ii. HTTP (World wide web) (8)





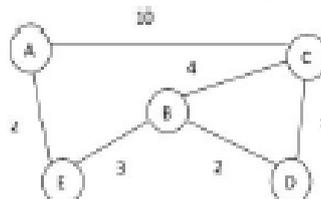
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- ii) Assume that a frame consists of 6 characters encoded in 7-bit ASCII. Attach a parity bit for every character to maintain even parity. Also attach a similar parity bit for each bit position across each of the bytes in the frame. Show that such 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)



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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 512 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 MAY/JUNE 2014

### Fifth Semester

### Computer Science Engineering

### CS2302 - Computer Networks

### (Regulation 2008)

Time: 3 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  $n-1$ ?
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 achieved using the data link layer? (16)
12. (a) Describe the CSMA/CD protocol and comment on its performance for medium access. (16)  
Or



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(b) Write short notes on:

(i) FDDI (II) bridges and switches. (8+8)

56

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 principle 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. (8+8)



## B.E./B.Tech DEGREE EXAMINATION NOVEMBER/DECEMBER 2014

### Fifth Semester

### Computer Science Engineering

### CS2302 - Computer Networks

### (Regulation 2008)

Time: 3 hours

maximum: 100 marks

Answer ALL questions

### PART A - (10 × 2 = 20 marks)

1. what is meant by framing?
2. Define hamming distance.
3. Differentiate persistent and non –persistent CSMA.
4. State the uses of valid transmission timer.
5. Write down any two differences between circuit switching and packet switching.
6. Define BGP.
7. Differentiate UDP and TCP.
8. what is QOS.
9. State the difference between SMTP and MIME.
10. List down the key lengths supported by PGP.

### PART B - (5 × 16 = 80 marks)

11. (a) Discuss the issues in the data link layer. (16)  
Or  
(b) Explain in detail the error –detecting codes. (16)
12. (a) Explain and differentiate FDDI and Ethernet. (16)  
Or  
(b) Write short notes on:
  - (i) Transparent bridges. (8)
  - (ii) MACA and MACAW. (8)
13. (a) (i) Differentiate ARP and RARP. (8)  
(ii) Explain OSPF in detail (8)

Or



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(b) (i) What is Internet multicasting? Explain in detail (8)

(ii) Show the IPv6 header details and explain them (8)

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14.(a) Explain the following:

(i) TCP header (8)

(ii) Adaptive flow control (8)

Or

(b) How is congestion controlled? Explain in detail the TCP congestion control (16)

15.(a) Write notes on URLs. (16)

Or

(b) (i) Discuss the advantages of DNS. (8)

(ii) Explain Telnet in detail. (8)

