

# **DEPARTMENT OF ELECTRONICS AND COMMUNICATION QUESTION BANK**

# **EC8551-COMMUNICATION NETWORKS**

## **UNIT1-FUNDAMENTALS AND LINK LAYER**

## **PART-A**

1. Define the term protocol and mention its key elements.
  2. Identify the functions of Data Link Layer.
  3. List the advantages of Fiber optics cable.
  4. A network with bandwidth of 10 Mbps can pass only an average of 12,000 frames per minute with each frame carrying an average of 10,000 bits. What is the throughput of this network?
  5. Explain the services provided by Transport layer.
  6. Explain the different types of transmission mode.
  7. What are the three fundamental characteristics that determine the effectiveness of a data communication system?
  8. Write the need of Transmission media? And Write their types?
  9. List the advantages of Star topology?
  10. Draw the flow diagram for stop-and-wait protocol?
  11. What are the three necessary criteria for an effective and efficient network?
  12. Draw and mention the operation of each field in Byte counting Approach frame format
  13. Assuming a framing protocol that uses bit stuffing, show the bit sequence transmitted over a link when the frame contains the bit sequence. 1111011111010011110101111110. Mark the stuffed bits.
  14. Discuss in brief five components of data communication system.

15. Describe the parameters used to measure network performance.
16. Explain the functions provided by Presentation Layer
17. List the advantages of mesh topology?
18. Consider a 32 bit block of data 10100111 11011101 0101001 10101001  
10111010 that has to be transmitted using odd parity. Make use of two dimensional parity and determine the transmitted bit stream?
19. What is hamming distance?
20. Differentiate Go Back –n and Selective repeat protocol.

### **PART-B**

1. Explain the Network Support layers in OSI model.
2. (i) The code 11110101101 was received using hamming encoding algorithm. What is the original code sent? Use odd parity.  
(ii) Explain checksum with an example.
3. (i) Explain how framing is done using byte oriented protocols.  
(ii) Explain stop and wait protocol for normal operation and ACK lost case.
4. Discuss the User support Layers in detail.
5. Explain in detail
  - (i) Categories of topologies
  - (ii) Types of network
6. With a neat sketch explain about
  - (i) Guided medias
  - (ii) Unguided medias
7. (i) Explain in detail about Building a Computer Network.  
(ii) Obtain the 4-bit CRC code for the data bit sequence 10011011100 using the polynomial  $x^4+x^2+1$ .
8. With a neat sketch, explain the architecture of an OSI layer model.
9. (i) Suppose we want to transmit the message 1011 0010 0111 and protect it from errors using the CRC polynomial  $x^4 +x^2 +1$ . Use polynomial long division to determine the message that should be transmitted. Suppose the leftmost bit of the message is inverted due to noise on the transmission link. What is the result of the receiver's CRC calculation? How does the receiver know that an error has occurred?  
(ii) Explain the algorithm used for reliable transmission and flow control.

10. (i) Discuss in detail about the network performance measures.
- (ii) Explain selective-repeat ARQ flow control method.

## **UNIT 2- MEDIA ACCESS & INTERNETWORKING**

### **PART-A**

1. Compare 802 with OSI model.
2. Illustrate the operation of Ethernet format with neat sketch.
3. List the types of stations in 802.11 architecture and explain each station operation.
4. Categorize the media access in data link layer.
5. What do you mean by 1-persistent? Explain with a neat sketch.
6. Examine the networks involved in Bluetooth architecture.
7. Write short notes on Fast Ethernet.
8. Construct the packet format for 6LowPAN.
9. List out the applications of Zigbee protocol.
10. Identify the error if any in the following IP address.
  - (i) 11.56.045.78
  - (ii) 75.45.301.14
11. Explain the process of p-Persistent method with neat sketch.
12. Show the protocol architecture of 802.11.
13. Write short notes on Pure Aloha.
14. Inspect the operation of PICONET.
15. Illustrate the routing concepts involved in 6LoWPAN.
16. A block of addresses is granted to a small organization. We know that one of the addresses is 205.16.37.39/28. What is the first address and last address in the block and also find the number of addresses?
17. What do you meant by switching?
18. Identify the Class and represent the netid of the following IP Address:
  - (i) 110.34.56.45
  - (ii) 212.208.63.23
19. What do you understand by CSMA protocol?
20. List the important components for ZIGBEE protocol.

**PART-B**

1. (i) Explain the functioning of wireless LAN or IEEE 802.11 in detail.  
 (ii) Examine the different implementations of Fast Ethernet and Gigabit Ethernet in detail.
2. (i) Explain the different switching techniques in detail.  
 (ii) Discuss about Bluetooth Technology in detail.
3. (i) Explain in detail about Standard Ethernet and 10 Gigabit Ethernet.  
 (ii) Elaborate about 6LoWPAN with its packet format and Routing techniques.
4. (i) Discuss in detail about IPv4 packet format and its address representation with an example.  
 (ii) Elaborate the ICMP in detail.
5. Explain in detail about packet switching techniques with its suitable example.
6. (i) Discuss in detail about ICMP and its message types.  
 (ii) Suppose all of the interfaces in each of three subnets are required to have the prefix 223.1.17/24. Also suppose that Subnet 1 is required to support at least 60 interfaces, Subnet 2 is to support at least 90 interfaces, and Subnet 3 is to support at least 12 interfaces. Provide three network addresses that satisfy these constraints.
7. (i) Explain the datagram format of IPv4.  
 (ii) Explain in detail about Datagram and Virtual-Circuit approach for Packet switching with an example.
8. (i) Explain in detail about Mobile IP.  
 (ii) Discuss in detail about 6LoWPAN and Zigbee Network.
9. (i) Explain Class based addressing in IP address and analyze the range of addresses available in each class.  
 (ii) Discuss about classless addressing in IPv4 with a suitable example.
10. With neat Sketch, explain about IP service model, Packet format, Fragmentation and reassembly.

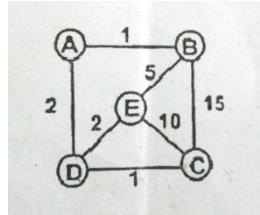
**UNIT 3-ROUTING****PART-A**

1. Define Routing.
2. What is Multicast Routing?
3. What are the metrics used by routing protocols?

4. What is Border Gateway Protocol (BGP)?
5. Define Intradomain multicast routing and Interdomain multicast routing.
6. Compare forwarding table and Routing table.
7. Illustrate the concept of fragmentation and reassembly.
8. Why is IPv4 to IPv6 transition required?
9. Write short notes on Unicast Routing Protocol.
10. Explain about link state Algorithm.
11. Discuss about open shortest path first protocol.
12. Discuss about RIP implementations.
13. What is Flooding?
14. Write short notes on IGMP.
15. Classify different Routing algorithms.
16. Explain about Count-to-Infinity Problem.
17. List the Benefits of OSPF.
18. Inspect the salient features of IPv6.
19. Compare IPv4 and IPv6.
20. Identify the error is present or not in the following IPv6 Addresses:
  - (i) A456:04FF::F678:001F
  - (ii) 0000::FFFF

### **PART-B**

1. Consider the network shown in figure below. Compute the shortest path from C to all other nodes using link state algorithm. Also update the forwarding table of node C.



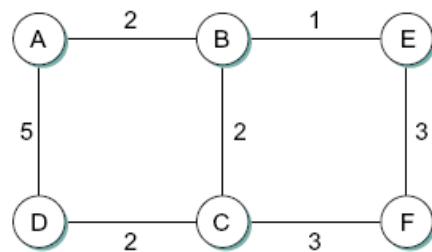
2. (i) For the network shown in Figure below, give global distance–vector.

When

(a) Each node knows only the distances to its immediate neighbours.

(b) Each node has reported the information it had in the preceding step to its immediate neighbours.

(c) Step (b) happens a second time:



(ii) Explain IPv6 packet header format with neat sketch.

3. (i) Explain the operation of Protocol-Independent Multicast (PIM).  
 (ii) Outline the need of Distance Vector Multicast Routing Protocol (DVMRP).
4. Discuss in detail about:  
 (i) Routing Information Protocol (RIP)  
 (ii) Open Shortest Path First (OSPF)
5. If we have the forwarding tables shown in table below for nodes A and F, in a network where all links have cost 1. Give a diagram of the smallest network consistent with these tables.

<b>A</b>		
<b>Node</b>	<b>Cost</b>	<b>Nexthop</b>
B	1	B
C	2	B
D	1	D
E	2	B
F	3	D

<b>F</b>		
<b>Node</b>	<b>Cost</b>	<b>Nexthop</b>
A	3	E
B	2	C
C	1	C
D	2	E
E	1	E

6. Explain the strategies involved in Transition of IPv4 to IPv6 in detail with neat sketch.
7. (i) Explain the function of Routing Information Protocol (RIP).  
 (ii) Draw the IPv6 packet header format.
8. (i) Explain the operation of Protocol-Independent Multicast (PIM).  
 (ii) Outline the need of Distance Vector Multicast Routing Protocol (DVMRP).
9. Briefly explain the BGP used for Inter domain routing.
10. Explain multicast routing protocol DVMRP.

**UNIT 4-TRANSPORT LAYER****PART-A**

1. Distinguish between Connectionless and Connection oriented protocols in Transport layer.
2. List the different phases used in TCP connection.
3. How do fast retransmit mechanism of TCP works?
4. What are the approaches used to provide a range of Quality of Services (QOS)?
5. What do you mean by slow start in TCP congestion Control?
6. List some of the QOS parameters of transport layer.
7. Suppose you are designing a sliding window protocol for 1.5 Mbps point-point link. This has one way latency of 1.5 seconds. Assuming each frame carries 10KB of data, what is the maximum number of bits required for the sequence number if SWS=RWS.
8. What do you mean by QOS?
9. Draw the UDP header format with neat sketch.
10. List the flags used in TCP header format and explain about each flag.
11. What do you mean by the port number?
12. List the services provided by transport layer protocol?
13. Differentiate between TCP and UDP.
14. Define Congestion Control.
15. Compare flow control verses congestion control.
16. Suppose TCP operates over 10-Gbps link. Assuming the full bandwidth continuously how long would it take the sequence number to wrap around completely? If the sequence number space adequate.
17. Explain the TCP connection establishment using with three-way handshaking.
18. Inspect the features of TCP protocol.
19. Explain briefly about Leaky Bucket algorithm.
20. What are the reservation styles involved in RSVP?

**PART-B**

1. (i) Explain in detail about TCP congestion control techniques with neat sketch  
(ii) Explain UDP packet format with neat sketch and UDP checksum with an example.
2. (i) Explain in detail about TCP connection Management.

- (ii) Inspect the flags used in TCP segment format in detail.
3. (i) Explain various fields of the TCP header and protocol operation.  
(ii) Compare TCP and UDP
  4. (i) Explain the services provided by the TCP.  
(ii) The following is a dump of a TCP header in Hexadecimal format. 05320017  
00000001 00000000 500207FF 00000000 Determine the Source port number, Destination port number, Sequence number, Acknowledgement number, Length of the header, Type of the segment and Window size?
  5. Explain three ways of connection termination in TCP using state transition diagram.
  6. Suppose TCP operates over 10-Gbps link. Assuming the full bandwidth continuously how long would it take the sequence number to wrap around completely? If the sequence number space adequate.
  7. Explain any one TCP congestion avoidance mechanism.
  8. Brief about the approaches used to provide QoS support.
  9. (i) Explain how TCP manages a byte stream.  
(ii) Identify and explain the states involved in TCP.
  10. (i) Discuss the operations of UDP with neat sketch.  
(ii) Define UDP. Explain UDP checksum with an example.

## **UNIT 5-APPLICATION LAYER**

### **PART-A**

1. Name four factors needed for a secure network.
2. List the two types of DNS messages:
3. What are the three types of web documents?
4. What are the three domains of DNS?
5. What is the difference between active document and a dynamic document?
6. What are the two parts of addressing system used in SMTP?
7. What is MIME?
8. What is Post office protocol (POP)?
9. What are the four types or groups of HTTP header?
10. Define www or World Wide Web.
11. List the advantages of IMAP over POP.
12. Distinguish between application programs and application protocol.

13. What is non persistent connection in HTTP?
14. What is the function of proxy server in HTTP?
15. What is encryption and decryption?
16. What is the relation between plaintext and cipher text?
17. Define cryptography. State the types of cryptographic algorithms?
18. What is monoalphabetic and polyalphabetic substitution?
19. What is transpositional encryption?
20. What is RSA encryption? (OR) Write about public key encryption?

### **PART-B**

1. Explain Domain Name System (DNS).
2. Discuss the components of an email system and the protocols used.

OR

Explain electronic mail (e - mail) or SMTP, MIME, POP.

3. (i) Write short notes on HTTP.  
(ii) Write short note on Internet Message Access Protocol (IMAP).
4. Define Encryption/ Decryption and write their types with examples.
5. Explain in detail DES encryption scheme with an example and what are the drawbacks of DES algorithms? [NOV-04] OR Explain symmetric key cryptography with a suitable example.
6. Explain the principle of RSA algorithm and how the public and secret keys are derived? [April -04] OR Explain asymmetric key cryptography with suitable example.
7. Distinguish between conventional and public key encryption
8. Discuss in detail about Client/ Server Programming.
9. Explain in detail about WWW.
10. (i) Discuss in detail about Network Security.  
(ii) Elaborate about Firewall.