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Question Paper Code : X10366

B.E./B.Tech. DEGREE EXAMINATIONS NOVEMBER / DECEMBER 2020

Fifth Semester

Electronics and Communication Engineering

EC8551 – Communication Networks

(Common to: Electronics and Telecommunication Engineering)

(Regulations 2017)

Time: 3 Hours

Answer ALL Questions

Max. Marks 100

PART- A (10 x 2 = 20 Marks)

1. Define transmission impairment. What are some of the main reasons of transmission impairment?
2. Is it possible to have two hosts in different networks to have same link layer address? Explain.
3. Data Link Control (DLC) and Media Access Control (MAC) are part of which layer in OSI model? What is their role?
4. What is the major drawback of IPv4 in terms of security? How it is rectified?
5. Name and compare three different types of Autonomous Systems (ASs).
6. Explain briefly the difference between multicasting and multiple unicasting.
7. Explain briefly how the connectionless and connection-oriented services in transport-layer protocol are different from these services in Network-layer protocol.
8. UDP is a message-oriented protocol while TCP is a byte-oriented protocol. If an application needs to protect the boundaries of its message, which protocol should be used, UDP or TCP?
9. A source socket address is a combination of an IP address and a port number. Explain what each section identifies.
10. In a non-persistent HTTP connection, how can HTTP inform the TCP protocol that the end of the message has been reached?

PART- B (5 x 13 = 65 Marks)

11. a) (i) For the following parameters find theoretical capacity of the channel: (6)
- I. Bandwidth: 10 KHz and $SNR_{dB}=20$
 - II. Bandwidth: 150KHz and $SNR_{dB}=8$
 - III. Bandwidth: 2 MHz and $SNR_{dB}=10$
- (ii) What is Scrambling and why it is used? (4)
- (iii) Is the size of the ARP packet fixed? Explain. (3)

(OR)

- b) (i) Answer the following questions: (7)
- I. What is the polynomial representation of 110111?
 - II. What is the result of shifting 111000 three bits to the left?
 - III. Repeat part (ii) using polynomials.
 - IV. What is the result of shifting 110011 four bits to the right?
 - V. Repeat part (iv) using polynomials.
- (ii) What is line coding? Why it is used? Give 3 examples of line coding schemes. (6)

12. a) (i) Compare the medium of a wired LAN with that of a wireless LAN in today's communication environment. Explain why the MAC protocol is more important in wireless LANs than in wired LANs? (7)
- (ii) Explain briefly why collision is an issue in random access protocols but not in controlled access protocols or channelization protocols. (6)

(OR)

- b) (i) Briefly discuss some of the collision avoidance strategies in CSMA/CA. What is the purpose of NAV in CSMA/CA? (7)
- (ii) Explain how hidden and exposed station problems are addressed in wireless LANs? (6)

13. a) (i) Differentiate between Link-state and Distance-vector routing? (7)
- (ii) Explain IPv6 datagram format with suitable diagram. (6)

(OR)

- b) (i) Explain the steps used By DVMRP router to create a source-based tree. (7)
- (ii) Differentiate between compatible and mapped addresses. Briefly discuss their applications. (6)

14. a) (i) Explain the services offered by TCP to process at the application layer. (6)
- (ii) Describe the token bucket mechanism for congestion control. With which other technique is token bucket usually combined to achieve complete flow control? What problems in the simpler approach are addressed by using a token bucket mechanism? (7)

(OR)

b) (i) Sketch the TCP segment format and discuss it in detail. (6)

(ii) I. Consider a reliable data transfer protocol that uses only negative acknowledgements. Suppose the sender sends data only infrequently. Would a NAK-only protocol be preferable to a protocol that uses ACKs? Why? (4)

II. Now suppose the sender has a lot of data to send and the end-to-end connection experiences few losses. In this second case, would a NAK-only protocol be preferable to a protocol that uses ACKs? Why? (3)

15. a) (i) FTP uses the services of TCP for exchanging control information and data transfer. Could FTP have used the services of UDP for either of these two connections? Explain. (4)

(ii) Differentiate between a substitution cipher and a transposition cipher. (4)

(iii) What are the advantages and disadvantages of a decentralized P2P network? (5)

(OR)

b) (i) What do you think would happen if the control connection were served before the end of an FTP session? Would it affect the data connection? (4)

(ii) Differentiate between message authentication and entity authentication. (4)

(iii) Differentiate between centralized and decentralized P2P networks. (5)

PART- C (1 x 15 = 15 Marks)

16. a) Suppose 6 host machines and 1 router are connected by a company network consisting of 3 subnets. The configuration is given in the following table:

Subnets	Host IP-Addresses	Router IP-Addresses
66.25.48.0/22	66.25.48.1	66.25.48.44
66.25.52.0/23	66.25.52.1	66.25.52.22
66.25.56.0/23	66.25.52.2	66.25.56.11
	66.25.53.1	
	66.25.56.1	
	66.25.56.3	

(i) Draw a diagram to represent this configuration.

(ii) Draw the forwarding table for the host machine with IP address 66.25.52.2.

(iii) Suppose an additional host machine is connected to the company network. For each of the following IP addresses, either give the subnet to which this IP address belongs, or state that it is not a valid IP address for any of the subnets.

(a) 66.25.50.1

(b) 66.25.58.1

(OR)

- b) Consider two hosts, A and B, connected by single link of rate R bps. Suppose that the two hosts are separated by m meters, and suppose the propagation speed along the link is s meters/sec. Host A is to send a packet of size L bits to Host B.
- (i) Express the propagation delay, d_{prop} , in terms of m and s .
 - (ii) Determine the transmission time of the packet, d_{trans} , in terms of L and R .
 - (iii) Ignoring processing and queueing delays, obtain an expression for the end-to-end-delay.
 - (iv) Suppose Host A begins to transmit the packet at time $t = 0$. At time $t = d_{\text{trans}}$, where is the last bit of the packet?
 - (v) Suppose d_{prop} is greater than d_{trans} . At time $t = d_{\text{trans}}$, where is the first bit of the packet?
 - (vi) Suppose d_{prop} is less than d_{trans} . At time $t = d_{\text{trans}}$, where is the first bit of the packet?
 - (vii) Suppose $s = 2.5 \times 10^8$, $L = 100$ bits, and $R = 28$ kbps. Find distance m so that d_{prop} equals d_{trans} .



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Question Paper Code : 90188

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019
Fifth Semester
Electronics and Communication Engineering
EC 8551 – COMMUNICATION NETWORKS
(Common to Electronics and Telecommunication Engineering)
(Regulations 2017)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions

PART – A

(10×2=20 Marks)

1. What are the key benefits of layered network ?
2. List the responsibilities of data link layer.
3. State in brief the Frequency Hopping Spread Spectrum (FHSS) technique.
4. What is exposed station problem ?
5. State few disadvantages of wireless LANs.
6. Distinguish between virtual circuit and datagram type of routing.
7. Distinguish between TCP and UDP.
8. Mention various techniques used to improve Quality of Service (QoS).
9. What is the mail transfer protocol used in the Internet ?
10. State the operation of the packet-filter firewall.



PART – B

(5×13=65 Marks)

11. a) Draw the block diagram and explain the functionalities of different OSI layers. (13)
- (OR)
- b) i) Mention key advantages and disadvantages of stop-and-wait ARQ technique. (4)
- ii) What is piggybacking? What is its advantage? (4)
- iii) For a k-bit numbering scheme, what is the range of sequence numbers used in sliding window protocol? (5)
12. a) State some advantages of Wireless LANs. (13)
- (OR)
- b) What is High-level Data Link Control (HDLC)? What are different modes of operations of HDLC? (13)
13. a) Explain few characteristics of Border Gateway Protocol (BGP)? (13)
- (OR)
- b) Define routing and compare distance vector routing and link state routing. (13)
14. a) i) What is meant by congestion? What two new TCP sender state variables are used in TCP congestion control? What is the purpose of each of these state variables? What two new algorithms were added to provide TCP congestion control? What is the purpose of each? Give a brief overview of the operation of each. (8)
- ii) What are the differences between service point address, logical address and physical address? (5)
- (OR)
- b) i) Give few examples of similarities and dissimilarities between TCP and UDP. (8)
- ii) 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? (5)

15. a) i) What is the difference between a User Agent (UA) and a Mail Transfer Agent (MTA)? (3)
- ii) Why is an application such as POP needed for electronic messaging? (5)
- iii) How is a secret key different from public key? (5)
- (OR)
- b) i) How does MIME enhance SMTP? (6)
- ii) What are the advantages and disadvantages of public key encryption? (7)

PART – C

(1×15=15 Marks)

16. a) An organisation is granted the block 125.238.0.0/16. The administrator wants to create 512 subnets :
- i) Find the subnet mask required. (3)
- ii) Find the number of addresses in each subnet. (2)
- iii) Find the first and last allocatable addresses in subnet 1. (5)
- iv) Find the first and last allocatable address in subnet 14. (5)
- (OR)
- b) There are two popular technologies for Local Area Network (LAN) design, namely IEEE 802.3 Ethernet and IEEE 802.11 WiFi. Use your knowledge of these technologies to answer the following questions :
- i) What Datalink Layer service model is provided by each of these LAN technologies? How are they similar? How are they different? (3)
- ii) List three similarities about LLC frames in Ethernet and WiFi. (3)
- iii) Which of these two LAN technologies has the higher bit error rate, and why? (3)
- iv) Which LAN technology provides better support for mobile users, and how? (3)
- v) List and explain any two other features of WiFi technology that are not available (or even possible) in Ethernet LANs. (3)