Reg. No. :

Question Paper Code: U4403

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2024

Fourth Semester

Electronics and Communication Engineering

21UEC403- DATA COMMUNICATION AND NETWORKS

(Regulation 2021)

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. Traffic Problem can be minimized using   CO1-U

    (a) Mesh   (b) Star   (c) Bus   (d) Ring

2. Pipelining is used in   CO1-U

    (a) Stop and wait   (b) Stop and wait ARQ

    (c) Go-Back-NARQ   (d) None of the above

3. What is the purpose of the DHCP server to provide   CO1-U

    (a) Storage for Email   (b) URL

    (c) provide IP address to host   (d) None

4. Beyond IP, TCP provides additional services such as   CO1-U

    (a) Routing and switching   (b) Sending and receiving of packets

    (c) Multiplexing and demultiplexing   (d) Routing and switching

5. In public key encryption (asymmetric encryption) to secure message confidentiality: CO1-U

    (a) encryption is done by private key and decryption is done by public key.

    (b) encryption is done by public key and decryption is done by private key.

    (c) both the key used to encrypt and decrypt the data are public.

    (d) both the key used to encrypt and decrypt the data are private.

6. Calculate the bandwidth of the light for the following wavelength ranges   CO2-App
   (assume propagation speed of 2 x 10^8 m)

        a.1000 to 1200 nm b.1000 to 1400 nm

7. A slotted ALOHA network transmits 200 bit frames on a shared channel of   CO2-App
   200 kbps. What is the throughput if the system (all stations together) produces
   250 frames per second

8. Why DHCP is versatile than BOOTP?   CO1-U

9. Compare TCP and UDP.   CO1-U

10. In symmetric-key cryptography, how do you think two persons can establish a   CO1-U
    secret key between themselves?

PART – C (5 x 16= 80 Marks)

11. (a) Explain the layers of TCP/IP also Compare and contrast OSI and   CO1-U   (16)
         TCP/IP model

                                      Or

    (b) Write a short note on various types of transmission media,   CO1-U   (16)
         highlighting their merits and Demerits.

12. (a) A system uses the Stop-and-Wait ARQ Protocol. If each packet   CO2-App   (16)
         carries 1000 bits of data, how long does it take to send 1 million
         bits of data if the distance between the sender and receiver is 5000
         Km and the propagation speed is 2 x 10^8 m. Ignore transmission,
         waiting, and processing delays? We assume no data or control
         frame is lost or damaged. Also explain about Stop-and-Wait ARQ
         Protocol with flow diagram.

                                      Or

    (b) Draw and explain the frame structure of IEEE 802.3. Also find the   CO2-App   (16)
         minimum frame length for a network of 5 nodes connected using
         10 BaseT cable. Assume the total propagation delay the network is
         50 microsec.

13. (a) A block of address is granted to a small organization. We know that   CO3-Ana   (16)
         one of the addresses is 205.16.37.39/28. What is the first and last
         address in the block and also find the number of addresses.

                                        Or

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(b) Show the autonomous system with the following specifications: CO3-Ana   (16)
There are eight networks (Nl to N8), eight routers (Rl to R8), Nl,
N2, N3, N4, NS, and N6 are Ethernet LANs, N7 and N8 are point-
to-point WANs, Rl connects Nl and N2, R2 connects Nl and N7,
R3 connects N2 and N8, R4 connects N7 and N6, RS connects N6
and N3,R6 connects N6 and N4,R7 connects N6 and NS,R8
connects N8 and N5. Draw the graphical representation of the
autonomous system as seen by Distance vector routing

14. (a) Explain in detail about slow start and congestion avoidance phase.   CO1- U   (16)

Or

(b) Discuss in detail about the techniques to improve QoS.   CO1- U   (16)

15. (a) Perform encryption and decryption using the RSA algorithm, as   CO2-App   (16)
below for the following: i) p=3; q=11, e=7; M=5. Also give details
about encryption and decryption.

Or

(b) Assume two users, A and B, have agreed to use Diffie–Hellman   CO2-App   (16)
Key Exchange with prime p = 19 and generator g = 10. Assuming
A randomly chose private PRA = 7 and B randomly chose private
PRB = 8, find the shared secret key.

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