Graphic Era HILL UNIVERSITY
Established by an Act of the State Legislature of Uttarakhand (Adhiniyam Sankhya 12 of 2011)
University under section 2(f) of UGC Act, 1956

End Term (Odd) Semester Examination December 2024

Roll no.....

Name of the Course and semester: B.Tech CSE, (Vth Semester)
Name of the Paper: Communication Model and Protocols
Paper Code: TCS-531

Time: 3 hour

Maximum Marks: 100

Note:

(i) All the questions are compulsory.
(ii) Answer any two sub questions from a, b and c in each main question.
(iii) Total marks for each question is 20 (twenty). Each sub-question carries 10 marks.

Q1. (2X10=20 Marks)

a. Discuss the components of Data communication in detail. What are the different types of mediums used for data communication? Explain various types of Network topologies and their advantages and disadvantages. (CO1)

b. What is the Throughput, Bandwidth and Latency of a Network? A network with a bandwidth of 15 Mbps can pass 15000 frames per minute where each frame carries an average of 12000 bits. What will be the throughput of this network? (CO1 & CO3)

c. Explain the terms Link, Hub, Router, Repeater, and Switch. What are the different types of Networks? What is the difference between TCP and UDP? (CO1 & CO2)

Q2. (2X10=20 Marks)

a. What is the difference between ISO and OSI? Explain the OSI layered Protocol model in detail. Also compare the TCP/IP model with OSI models. (CO2)

b. What are network criteria? What is the total latency for a frame of size $6x10^6$ bits that is being sent by 5 routers each having a queueing time of 3 μs and processing time of 2 μs? The link has a bandwidth of 6 Mbps. The link length is 3000 Km and the speed of light inside the link is 1.5 x 108 m/s. (CO1 & CO3)

c. Write short notes on DNS, HTTP, SMTP and FTP protocols of the Application Layer. (CO2)

Q3. (2X10=20 Marks)

a. What is line coding? Consider that the bit sequence 101100101 is transmitted. Draw the resulting waveform of different line codes (1) Unipolar NRZ & Polar RZ (2) AMI & pseudo ternary (3) Manchester (4) 2B1Q Multilevel (5) MLT-3 Multi transition, Three-level. (CO5)

b. What is Analog to digital conversion? What is Pulse code modulation? Differentiate PCM and DM with a suitable diagram. (CO4 & CO5)

c. What is Digital to analog conversion? Compare ASK, PSK and FSK techniques in detail. What is synchronous and asynchronous data transmission? Explain with a suitable diagram. (CO3 &CO5)

Q4. (2X10=20 Marks)

a. Explain the communication process at the data link layer. What is Ethernet and its types? What is an Ethernet link layer frame? (CO5)

b. Explain different types of Error detection and correction techniques in detail. Explain CRC with a suitable example. (CO5)

c. Write short notes on VLAN, PPP, ARP and Data center Networking. (CO4)

Q5. (2X10=20 Marks)

a. Explain the characteristics of wireless communication links. Discuss the architecture of IEEE 802.11 Wireless LANs (Wi-Fi) in detail. (CO4)

b. What is CDMA and compare it with TDMA and FDMA. Explain cellular network access and differentiate 3G with LTE. (CO5 & CO6)

c. What is mobility? Explain its principles. What are the mobility management challenges in cellular networks. (CO3 & CO6)