



MODEL PAPER-4

- 1a) Define data communication. Explain different components of data communication system. Explain the 3 criteria necessary for an effective and efficient network. (6 Marks)
- 1b) Define network. Explain in detail WAN. (6 Marks)
- 1c) Explain different method of accessing the Internet. (4 Marks)
- 2a) Explain 2 methods for transmitting a digital signal (8 Marks)
- 2b) The power of a signal is 10 mW and the power of the noise is 1 μ W; what are the values of SNR and SNR_{dB} ? (2 Marks)
- 2c) Explain in detail any 6 characteristics of digital signal. (6 Marks)
- 3a) Explain the PCM encoder with neat diagram. (10 Marks)
- 3b) Define PSK. Explain BPSK. (6 Marks)
- 4a) Explain in detail Statistical TDM. (6 Marks)
- 4b) Explain in detail FHSS. (6 Marks)
- 4c) Compare circuit-switched-network, datagram & virtual-circuit. (4 Marks)
- 5a) Write short notes on polynomial codes. (6 Marks)
- 5b) Explain parity-check code with block diagram. (10 Marks)
- 6a) Explain character oriented protocol. (8 Marks)
- 6b) Explain 3 type of frames used in HDLC. (8 Marks)
- 7a) Explain slotted ALOHA & CSMA. (10 Marks)
- 7b) Explain briefly any 2 implementation of standard Ethernet. (6 Marks)
- 8a) Explain addressing in IEEE 802.11. (8 Marks)
- 8b) Explain layers of Bluetooth. (8 Marks)
- 9a) Explain the 3 categories of satellites. (10 Marks)
- 9b) Explain fourth generation 4G of cellular telephony. (6 Marks)
- 10a) Explain changes from IPv4 to IPv6. (4 Marks)
- 10b) Explain 3 address types of IPv6. (4 Marks)
- 10c) Explain various ICMPv6 messages. (6 Marks)



MODEL PAPER-3

- 1a) Define data communications. Explain its 4 fundamental characteristics. (4 Marks)
1b) Explain 3 diff. methods of data flow. Also, explain point to point & multipoint connection. (6 Marks) 1c) Explain in detail LAN. (6 Marks)
- 2a) What is transmission impairment? Explain causes of transmission impairment. (6 Marks)
2b) i) Consider a noiseless channel with a bandwidth of 3000 Hz transmitting a signal with two signal levels. What is the maximum bit rate? (2 Marks)
ii) The loss in a cable is usually defined in decibels per kilometer (dB/km). If the signal at the beginning of a cable with -0.3 dB/km has a power of 2 mW, what is the power of the signal at 5 km? (2 Marks)
- 2c) Explain following encoding schemes with example as the sequence 10110011: (8 Marks)
i) Unipolar Scheme ii) Polar Schemes iii) Bipolar Schemes
- 3a) Explain different types of transmission modes. (8 Marks)
3b) Define FSK. Explain BFSK. (6 Marks)
3c) An analog signal carries 4 bits per signal element. If 1000 signal elements are sent per second, find the bit rate. (2 Marks)
- 4a) Define and explain the concept of WDM. (4 Marks)
4b) What is spread spectrum? Explain in detail DSSS. (6 Marks)
4c) Explain data transfer phase in Virtual-circuit networks. (6 Marks)
- 5a) Explain hamming distance for error detection. (6 Marks)
5b) Explain CRC with block diagram & example. (10 Marks)
- 6a) Explain bit oriented protocol. (6 Marks)
6b) Explain Stop-and-Wait protocol. (10 Marks)
- 7a) Explain pure ALOHA. A pure ALOHA network transmits 200-bit frames on a shared channel of 200 kbps. What is the requirement to make this frame collision-free? (6 Marks)
7b) Explain TDMA & FDMA. (8 Marks)
7c) Explain addressing in standard Ethernet. (2 Marks)
- 8a) Explain frame types of IEEE 802.11. (4 Marks)
8b) Explain exposed station problem. (6 Marks)
8c) Explain frame format of Bluetooth. (6 Marks)
- 9a) What is WiMAX? Explain two types of services of WiMAX. (4 Marks)
9b) Discuss the operation of the cellular telephony. (8 Marks)
9c) Explain fragmentation. Explain 3 fields related to fragmentation (4 Marks)
- 10a) Explain 3 network attacks to IP protocol. Also, explain four services of IPSec. (8 Marks)
10b) Explain various extension header of IPv6. (8 Marks)



MODEL PAPER-2

1a) Explain the following topologies: (8 Marks)

- i) Bus ii) Ring

1b) List the 5 layers and its functionality in TCP/IP model. (8 Marks)

2a) Explain 4 performance parameters of network. (8 Marks)

2b) i) 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? (2 Marks)

- ii) Using Shannon theorem, calculate the maximum bit rate of the channel having bandwidth of 3100 Hz & SNR_{db} of 20 db. (2 Marks)

2c) Define the following: (4 Marks)

- i) Line coding ii) Internet iii) SNR iv) Decibel

3a) A complex low-pass signal has a bandwidth of 200 kHz. What is the minimum sampling rate for this signal? (2 Marks)

3b) Explain different aspects of digital-to-analog conversion. (8 Marks)

3c) Define ASK. Explain BASK. (6 Marks)

4a) Five channels, each with a 100-kHz bandwidth, are to be multiplexed together. What is the minimum bandwidth of the link if there is a need for a guard band of 10 kHz between the channels to prevent interference? (2 Marks)

4b) Explain in detail synchronous TDM. (8 Marks)

4c) Explain in detail datagram networks. (6 Marks)

5a) Explain checksum with example. Also, write algorithm for Internet Checksum. (12 Marks)

5b) Explain two types of errors. (4 Marks)

6a) Explain HDLC frame format. Also, explain control fields in HDLC. (12 Marks)

6b) Explain the concept of piggybacking. (4 Marks)

7a) Explain CSMA/CA & CSMA/CD. (10 Marks)

7b) Explain frame format of standard Ethernet. (6 Marks)

8a) Explain frame format of IEEE 802.11. (6 Marks)

8b) Explain hidden station problem. (4 Marks)

8c) What is Bluetooth? Explain architecture of Bluetooth. (6 Marks)

9a) What is WiMAX? Explain WiMAX MAC frame format. (6 Marks)

9b) What is cellular telephony? Explain third generation 3G of cellular telephony. (4 Marks) 9c)

What is ICMP? With general format, explain various ICMPv4 messages. (6 Marks)

10a) What is Mobile IP? Explain three phases for communication in Mobile IP. (8 Marks)

10b) Explain various field of IPv6. (8 Marks)



MODEL PAPER-1

- 1a) List the differences between LAN & WAN. (4 Marks)
- 1b) Explain the following topologies:
i) Mesh ii) Star (8 Marks)
- 1c) Explain 4 levels of addressing employed in TCP/IP protocol. (4 Marks)
- 2a) Explain the theoretical formula which was developed to calculate the data rate. What are the 3 factors on which data rate depends? (10 Marks)
- 2b) We need to send 265 kbps over a noiseless channel with a bandwidth of 20 kHz. How many signal levels do we need? (2 Marks)
- 2c) Explain manchester & differential-manchester encoding schemes. Represent the sequence 101011100 using the same encoding schemes. (4 Marks)
- 3a) Explain non-uniform quantization & how to recover original signal using PCM decoder. (6 Marks)
- 3b) An analog signal has a bit rate of 8000 bps & a baud rate of 1000 baud. How many data elements are carried by each signal element? How many signal elements do we need? (4 Marks)
- 3c) Describe ASK, FSK and PSK mechanisms and apply them over the digital data 101101. (6 Marks)
- 4a) What is multiplexing? Explain the FDM multiplexing and demultiplexing process with neat diagrams. (6 Marks)
- 4b) Four 1-kbps connections are multiplexed together. A unit is 1 bit. (4 Marks)
Find (i) the duration of 1 bit before multiplexing
(ii) the transmission rate of the link
(iii) the duration of a time slot and
(iv) the duration of a frame.
- 4c) Explain in detail circuit-switched-network. (6 Marks)
- 5a) Explain error detection using block coding technique. (10 Marks)
- 5b) Given the dataword 101001111 and the divisor 10111, show the generation of the CRC codeword at the sender site. (6 Marks)
- 6a) Differentiate between character oriented and bit oriented format for framing. (4 Marks)
- 6b) What is PPP? With a neat diagram, explain the frame structure of PPP. Also, explain framing and transition phases in PPP. (12 Marks)
- 7a) Explain reservation access, polling access & token passing access methods. (12 Marks)
- 7b) List out 5 goals of fast Ethernet. Explain auto-negotiation. (4 Marks)
- 8a) Explain MAC sublayer in gigabit-Ethernet (6 Marks)
- 8b) Explain architecture of IEEE 802.11 (10 Marks)
- 9a) Explain various components of cellular system with neat diagram. (6 Marks)
- 9b) Explain the following terms with reference to satellite (4 Marks)
i) Orbits ii) Footprint
- 9c) Explain various field of IPv4. (6 Marks)
- 10a) Explain the following term with reference to Mobile IP: (8 Marks)
i) Home address ii) Care-of address iii) Home-agent iv) Foreign-agent
- 10b) Explain 3 ways to make transition from IPv4 to IPv6. (8 Marks)

MODULE-WISE QUESTIONS

MODULE 5: OTHER WIRELESS NETWORKS

1. Explain two types of services of WiMAX. (2)
2. Explain layers in Project 802.16. (6)
3. Explain WiMAX MAC frame format. (6*)
4. Discuss the operation of the cellular telephony. (6*)
5. Explain first generation 1G of cellular telephony. (6)
6. Explain second generation 2G of cellular telephony (6)
7. Explain third generation 3G of cellular telephony. (6*)
8. Explain fourth generation 4G of cellular telephony (6*)
9. Explain the following terms with reference to satellite (4*)
i) Orbits ii) Footprint
10. Explain the 3 categories of satellites. (8*)

MODULE 5(CONT.): NETWORK LAYER PROTOCOLS

11. Explain various field of IPv4. (8*)
12. Explain fragmentation. Explain 3 fields related to fragmentation (6*)
13. Explain options of IPv4. (6*)
14. Explain three network attacks to IP protocol. Also, explain four services of IPSec. (8*)
15. With general format, explain various ICMPv4 messages. (6*)
16. Explain two tools that use ICMP for debugging. (6)
17. Explain the following term with reference to Mobile IP: (4*)
i) Home address ii) Care-of address iii) Home-agent iv) Foreign-agent
18. Explain three phases for communication in Mobile IP. (8*)

MODULE 5(CONT.): NEXT GENERATION IP

19. Explain 3 address types of IPv6. (6)
20. Explain changes from IPv4 to IPv6. (4*)
21. Explain various field of IPv6. (8*)
22. Explain various extension header of IPv6. (8)
23. Explain various ICMPv6 messages. (6)
24. Explain various group membership messages. (6)
25. Explain 3 ways to make transition from IPv4 to IPv6. (6)