

RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College affiliated to University of Calcutta)

B.A./B.Sc. FOURTH SEMESTER EXAMINATION, MAY 2024

SECOND YEAR [BATCH 2022-25]

COMPUTER SCIENCE [HONOURS]

Date : 27/05/2024

Time : 11 am – 1 pm

Paper : CC 10

Full Marks : 50

Answer **any five** questions:

[5×10]

1. a) Show that the number of physical links in a fully connected mesh network with n nodes is $n(n-1)/2$.
b) Define QPSK and QAM encoding techniques with diagram.
c) Suppose a computer sends a packet at the transport layer to another computer somewhere in the Internet. There is no process with the destination port address running at the destination computer. What will happen? [4+3+3]
2. a) Establish a relationship between the number of redundant bits required to correct d number of data bits for single bit error correction using Hamming Code.
b) Differentiate between the followings:
i) Line Coding and Block Coding
ii) FDM and TDM [4+(3+3)]
3. a) Given the data word 1010011110 and the divisor 10111. Show the generation of codeword at the sender side using binary division.
b) How Kepler's law is related to satellite communication?
c) A signal travels from point A to point B. At point A, the signal power is 100 W. At point B, the power is 90 W. What is the attenuation in decibels? [4+2+4]
4. a) Define virtual circuit switching with a diagram.
b) Compare the networking devices: Hub, Router and Gateway.
c) Explain Socket Address. [3+4+3]
5. a) Assume that in a Stop-and-Wait ARQ system, the bandwidth of the line is 2 Mbps, and 1 bit takes 10 ms to make a round trip. What is the bandwidth-delay product? If the system data frames are 1000 bits in length, what is the utilization percentage of the link?
b) Explain why the size of the sender window in Go-Back-N ARQ must be less than 2^m .
c) What is Piggybacking? [4+3+3]
6. a) An IP router implementing Classless Inter-domain Routing (CIDR) receives a packet with address 131.23.151.76. The router's routing table has the following entries:

Network Address	Interface
131.16.0.0/12	m2
131.28.0.0/14	m3
131.19.0.0/16	m4
131.22.0.0/22	m1

Find out the interface on which the packet will be forwarded.

- b) Why dynamic routing is preferred over static routing algorithm in a network?
c) Explain the use of SMTP. [4+3+3]
7. a) Differentiate between Leaky bucket and Token bucket protocols.
b) What is DNS? Explain its importance.
c) Describe FTP and HTTP protocols. [3+3+(2+2)]