2024

COMPUTER SCIENCE — HONOURS

Paper : CC-8

(Data Communication, Networking and Internet Technology)

Full Marks : 50

The figures in the margin indicate full marks.

Candidates are required to give their answers in their own words as far as practicable.

Answer ***question no.*** **1** and ***any four*** from the rest.

1. Answer ***any five*** questions : 2×5

   (a) What are the different types of errors associated with data communication? Explain the term "redundancy" in the context of error detection and correction.

   (b) What is RARP?

   (c) What is NAT (Network Address Translation) and why is it used?

   (d) What are the advantages of using fiber optic cables over copper cables for data transmission?

   (e) What is line coding? Give examples.

   (f) What is the significance of a subnet mask?

   (g) State two functions of Transport Layer in the internet model.

   (h) Difference between HTTP and HTTPs.

2. (a) What are the various protocols used for medium access control?

   (b) Briefly explain how Carrier Sense Multiple Access (CSMA) 1-persistent and non-persistent protocols are used in a wired medium with appropriate illustrations.

   (c) Why is CSMA/CD not implemented in WLAN? 4+3+3

3. (a) Differentiate between synchronous and statistical TDM with appropriate illustrations.

   (b) An analog signal carries 4-bits in each signal unit. If 1000 signal units are sent per second then calculate the baud rate and bit rate.

   (c) Highlight the main differences between virtual circuit switch and datagram network. 4+2+4

4. (a) What is channelization? Explain TDMA with example.

   (b) What is the purpose of analog transmission? Draw the waveforms of ASK, FSK and BPSK for the data 010011. (2+3)+(2+3)

5. (a) Distinguish between asynchronous and synchronous data transmission.

(b) Determine the number of links required in a mesh network with m number of nodes.

(c) Highlight the main advantages of Ring network over Star network.

(d) Explain the working of ADSL modems. 3+2+2+3

6. (a) Why is dynamic routing preferred over static routing in a network?

(b) What is DNS? Explain its importance.

(c) Explain the use of SMTP. 3+4+3

7. (a) Given a 10 bit sequence 1010011110 and a divisor 1011. Find the CRC.

(b) Five channels, each with a 200 KHz bandwidth are to be multiplexed using frequency division multiplexing (FDM) technique. What is the minimum bandwidth of the Link, if there is a need for a guard band of 20 KHz between the channels to prevent interference? Draw the appropriate and relevant diagram. 4+(3+3)

8. Write short notes on (***any two***) : 5×2

(a) UDP

(b) WDM

(c) IMAP

(d) PCM.