QP Code : 12854

(2 ½ Hours)

[Total Marks : 75

N.B. : (1) **All** questions are compulsory
  (2) **Figures** to the **right** indicate **full** marks.
  (3) Illustrations, in-depth answers and diagrams will be appreciated.
  (4) Mixing of sub-questions is not allowed.

1. Attempt the following (any **three**)
    (a) Write a short note on Bus topology?   15
    (b) Define protocol? Explain the key elements of protocol?
    (c) Name the layer of the OSI model responsible for the following functions :
        (i) Layer communicators directly with user's application program.
        (ii) Layer defines mechanical, electrical and functional interface.
        (iii) Layer defines mechanical, electrical and functional interface.
        (iv) Reliable process -to-process message delivery.
        (v) Layer establishes, manages and terminates sessions.
    (d) Define network throughput.
        A network can pass only 1200 frames in 60 seconds with each frame carrying 10000 bits.
        Calculate the throughput of this network in bits/sec?
    (e) Explain Binary amplitude shift keying (BASK) in detail.
    (d) Draw the graph for data stream 00010011 using NRZ, NRZ-L and NRZ-I Line coding schemes.

2. Attempt the following (any **three**)   15
    (a) Explain the concept of frequency division multiplexing (FDM).
        Assume that a voice channel occupies a bandwidth of 400Hz. We need to multiplex 10 voice channels with guard bands of 10Mz. using FDM. Calculate the required bandwidth.
    (b) What is spread spectrum technique? List the two techniques to spread the bandwidth. Give two advantages of spread spectrum technique.
    (c) Draw and explain the structure of coaxial cable.
    (d) Write any three advantages and two disadvantages of optical fibre cable.
    (e) What is circuit switched network? Explain the setup, data transfer and tear down phases of circuit switching.
    (f) What is digital subscriber line (DSL)? Give the characteristics of ADSL and HDSL.

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CM-Con.-2735 -15

3. Attempt the following (any **three**)   15
   (a) Explain the error detection process used by CRC?
   (b) Explain the following terms and show the relation among them.
       (i) Data ward.
       (ii) Code word
       (iii) Redundancy
   (c) What is Hamming distance? How Hamming distance is used for error detection and error correction? Calculate the Hamming distance for d(00000, 01101)
   (d) Describe the frame structure of Point-to-point Protocol (PPP).
   (e) List the fields of control -frame of HDLC protocol. Write one use of each field.
   (f) How data flow is controlled using stop and wait protocol?

4. Attempt the following (any **three**)   15
   (a) Explain token passing medium access mechanism.
   (b) What are goals of fast ethernet?
   (c) Describe the hidden station problem in wireless LAN. State the solution for the hidden station problem.
   (d) Explain the Bluetooth network architectures.
   (e) What is hand off in wireless mobile system? Explain the hard and the soft handoff.
   (f) State the layer/layers at which following network device operates. Give one reason to support your answer.
       (i) Repeater   (ii) Bridge   (iii) Gateway
       (iv) Router   (v) Two-layer switch.

5. Attempt the following (any **three**)   15
   (a) What are the four fundamental characteristics of Data Communication?
   (b) Write short note on infrared.
   (c) State and explain different types of persistent methods in CSMA.
   (d) What are the characteristics that can be used to group stations in a VLAN?
   (e) Explain any five functions of data link layer of OSI model.
   (f) What is repeater and how does it function?