

QP Code : 77088

(2 1/2 Hours)

[ Total Marks : 75

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

Q - 1 Attempt the following (any Three)

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- (A) List and explain five components of data communication?
- (B) Name one or more layers of the OSI model performing following functions :
- Flow control
  - Route determination
  - Provides access for the end user
  - Interface to transmission data
  - Transmission of bit stream across physical medium -
- (C) What are the responsibilities of physical layer in OSI model?
- (D) State Nyquist theorem. Explain the formula proposed by Nyquist to calculate bit rate. Consider a noiseless channel with a bandwidth of 3000Hz. transmitting a signal with two signal levels. Calculate the maximum bit rate.
- (E) Explain parallel and serial data transmission modes.
- (F) Write short note on binary amplitude shift keying.

Q - 2 Attempt the following (any three)

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- (A) Write the characteristics, advantages and limitations of synchronous time division multiplexing.
- (B) What is Frequency Division Multiplexing (FDM)? A voice channel occupies a bandwidth of 40kHz. We need to multiplex 12 voice channels with a guard bands of 5kHz using FDM. Calculate the required bandwidth.

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- (C) What is wireless communication? Explain sky, ground and line-of-sight signal propagation methods in wireless communication.
- (D) Write the advantages of using optical fiber cable in data transmission.
- (E) List any two characteristics of circuit switched network. Consider a multistage switched with three stages, where input points  $N=200$  with crossbar  $k = 4$  and  $N$  input lines are divided into groups of  $n=20$  lines. (ie. each group has  $n=20$  lines.). Calculate the total number of crosspoints.
- (F) Explain the structure of coaxial cable.

**Q - 3 Attempt the following (any three)**

- (A) Describe simple parity check in detail.
- (B) What is Hamming distance? How it is used for error detection? Find the Hamming distance for  $d(000,001)$ ?
- (C) Explain the working of cyclic redundancy check (CRC) encoder with the help of block diagram.
- (D) Briefly explain the need for byte stuffing in character-oriented protocol.
- (E) Explain Stop-and-wait protocol.
- (F) Describe the fields of HDLC frame.

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**Q - 4 Attempt the following (Any three)**

- (A) Explain Polling protocol for controlled medium access.
- (B) Explain Bluetooth network.
- (C) Explain Extended Service Set (ESS) in 802.11 architecture.
- (D) Describe the role of repeater device at physical layer.

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**Q - 5 Attempt the following (Any three)**

- (A) Define protocol. List the key elements of protocol.
- (B) Describe datagram switched network.
- (C) Explain Point-to-point protocol (PPP) transition phases.
- (D) Write a short note on CSMA protocol.
- (E) Give one function for each layer of TCP/IP protocol suite.
- (F) Write a short note on star backbone architecture.