r all questions   **Time allowed: 02 hours**

Define the terms *Networking* and *Internet* stating how they differ from one another.

Briefly explain the three types of network.

List the advantages and disadvantages of the bus topology.

Write short notes on the following wireless examples:
  i.   Terrestrial microwave;

  ii. Broadcast radio;

  iii. Satellite microwave;

  iv. Infrared;

What are the difference between Shielded Twisted Pair (STP) cables and Unshielded Twisted Pair (UTP) cables?

What is the purpose of using standard models such as OSI in networking systems?

Briefly describe the ISO-OSI reference model, stating the major responsibilities of each layer.

Describe the process of data transmission via the layers of ISO-OSI reference model.

The communication system is responsible for the transmission from the sender to the recipient. Explain three ways of data flow with respective examples.

03.

a) Distinguish between Frequency Division Multiplexing (FDM) and Time Division Multiplexing (TDM).

b) Describe briefly different types of digital modulation techniques and discuss their drawbacks separately.

c) Describe the three types of error detection methods over the network.

d) Discuss the process of Two-Dimensional parity bit error detection method by using following data:

1100111 1011101 0111001 0101001

e) Suppose a message frame is to be transmitted across a data link using a CRC for error detection and correction. If the generator polynomial is,

$$G(x) = x^4 + x^3 + 1;$$

   i. Generate the CRC code for the message bit **1100111110.**
   ii. Find the actual bit stream.
   iii. Suppose third bit from the left is inverted during transmission. Show that this error is detected at the receiver side.

04.

a) Discuss the main concepts behind the switched communication networks.

b) What are the three types of switched networks?

c) Explain briefly the main concepts of those switched networks with an aid of a diagram

d) What are some trends and issues confronting networks? Justify your answer with examples.

e) Analyze the transmission of a data packet for a system that uses Stop and wait protocol for the following situations: (Use appropriate figures to support your answer.)

   i. Lost or damaged frame;
   ii. Lost acknowledgement;
   iii. Delayed acknowledgement;