Question One – 30 Marks

a) i) Define the term Modulation in communication systems and explain why it is important or necessary   (3Marks)

    ii) State the name of the voltages that vary over time   (1Mark)

    iii) A standard AM broadcast station is allowed to transmit frequencies of up to 5KHZ, if the AM station is transmitting on a frequency of 980KHZ, Compute the following:

      I) The Maximum and Minimum upper and lower sidebands   (2Marks)

          (1Marks)

      II) Total Bandwidth occupied by the AM station   (2Marks)

b) i) Describe the term ISDN.   2Marks

    ii) List the attributes /characteristics of services offered by B-ISDN   3Marks

    iii) State and describe the basic and primary interface standards in ISDN   2Marks

c) Answer the following questions on information theory

    i) Explain how Shannon defines and measures information

    ii) Using Shannon's theorem, and considering a noisy channel, calculate the data Transfer rate given the following information: signal frequency = 10,000 Hz, Signal power = 5000 watts, noise power = 1,666 watts.   3Marks

    iii) Using Nyquist's theorem, and assuming a noiseless channel, calculate the channel Capacity of a signal that has 8 different levels and a frequency of 10,000 Hz   (3Marks)

       1Marks

d) i) Explain the term signal bandwidth

    ii) Calculate the bandwidth for a data transmission line that transmits within A frequency range of 100Hz to 3500HZ   (1Marks)

e) i) Explain the termSignal compression in communicationsystems   2Marks

    ii) Explain the types of signal compression below

      I)   Bandwidth compression   2Marks

      II)   Data compression   2Marks

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QUESTION Two- 20 Marks

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a) In relation to packet switching describe the following

    i)   Datagram (2)

    ii)   Virtual circuit

    iii)   Flooding

b) Describe packet switching   4Marks

c) Compare and contrast circuit switching to packet switching   6Marks

d) Though in today's digital world circuit switching may be considered to have Inefficiencies, describe why it achieved widespread dominant position in applications That handles voice traffic.   4Marks

QUESTION Three 20 Marks

a) Computer network designers must often rely on the existing telecommunications facilities; This implies that the telephone system is tightly intertwined with wide area networks (WANs)

    i)   Using a diagram, show the basic structure of the public switched telephone Network (PSTN) and identify the most bandwidth-constrained portion of the network   5Marks

    ii)   The PSTN is the best known example of networks using circuit switching. Give Your understanding of circuit switching, and explain its suitability for use with PSTN   2Marks

    iii)   Telecommunications systems use transmission media of various types. Explain Why, with any communication medium, the received signal will differ from the Transmitted signal   3Marks