Scheme – I

Question Paper Profile

Program Name : **Diploma in Information Technology**

Program Code : **IF**

Semester : **Third**

22322

Course Title : **Data Communication**

Max. Marks : **70** **Time: 3 Hrs.**

Instructions:

(1) All questions are compulsory.
(2) Illustrate your answers with sketches wherever necessary.
(3) Figures to the right indicate full marks.
(4) Assume suitable data if necessary.
(5) Preferably, write the answers in sequential order.

Q.1) A) Attempt any FIVE of the following. **10 Marks**

a) Define the term Standard. State its two categories.

b) List any two advantages of Unguided Media.

c) Define Line of Sight propagation.

d) State the goals of Multiplexing.

e) Define the following terms:

i) FHSS

ii) DSSS

f) State the advantages of using Layered architecture.

g) Define Mobile Telephone System. Enlist generations of Mobile Telephone System.

Q.2) Attempt any THREE of the following. **12 Marks**

a) Compare Amplitude modulation, Frequency modulation and Phase modulation.(Any four points)

b) Explain process of ASK modulation with diagram.

c) Explain the construction of Fiber optic Cable with diagram.

d) Explain the process to avoid interference in frequency division multiplexing

Q.3) Attempt any THREE of the following. **12 Marks**

a) Calculate the Baud rate for the given Bit rate and type of modulation.

i) 2000 bps, FSK

ii) 4000 bps, ASK

b) Coaxial cable is a two-wire transmission system. Explain the advantage of connecting the outer conductor to ground?

c) In a digital medium with a data rate of 10MBPs, how many 64 Kbps voice channels can be carried if DSSS is used with Barker sequence.

d) Explain the process of Cyclic Redundancy Check (CRC) with Example.

Q.4) Attempt any THREE of the following. 12 Marks

a) Draw the Constellation diagram for the following

   i) ASK with Peak amplitude value of 1 and 3

   ii) PSK with Peak amplitude value 2

b) In satellite communications, different frequency bands are used for the uplink and the downlink. Discuss why this pattern occurs.

c) Calculate minimum number of bits in a PN sequence if we use FHSS with a channel bandwidth of B=4 KHz and Bss=100 KHz.

d) Assuming even parity, find the parity bit for each of the following data unit.

   i) 1001011

   ii) 0001100

   iii) 1000000

   iv) 1110111

e) In Bluetooth if all secondaries listen to even numbered slots but only one secondary sends in odd numbered slot, sketch this scenario and elaborate.

Q.5) Attempt any TWO of the following. 12 Marks

a) Compare ASK, FSK, PSK on the basis of following parameters:

   i) Variable Characteristics

   ii) Bandwidth

   iii) Noise Immunity

   iv) Complexity

   v) Performance

   vi) Bit rate

b) Explain two approaches used in Variable-Size Framing.

c) Explain the Frame format of MAC sublayer.

Q.6) Attempt any TWO of the following. 12 Marks

a) Two channels one with a bit rate of 190Kbps and another with a bit rate of 180 Kbps are to be multiplexed with Pulse-Stuffing TDM with no synchronization bits. Answer the following questions.

i) Calculate size of Frames in bits.

ii) Calculate the Frame rate.

iii) Calculate the duration of Frame.

b) Consider the use of 1000 bits frames on a 1-Mbps satellite channel with a 270ms **delay.** What is the maximum link utilization for :

i. Stop-and-Wait flow control

ii. Continuous flow control with a window size of 7?

iii. Continuous flow control with a window size of 255?

c) An FHSS system uses a 4-Bit PN sequence. If the Bit rate of PN is 64 bits per second, Answer the following questions.

i) Find the total number of possible Hops.

ii) Find out the total time needed to complete the PN cycle.

Scheme – I

Sample Test Paper - I

(40% of 5-Unit curriculum and 50% of 6-Unit curriculum)

Program Name : **Diploma in Information Technology**
Program Code : **IF**
Semester : **Third**
Course Title : **Data Communication**

22322

Max. Marks : **20** **Time: 1 Hour**

Instructions:

(1) All questions are compulsory.
(2) Illustrate your answers with sketches wherever necessary.
(3) Figures to the right indicate full marks.
(4) Assume suitable data if necessary.
(5) Preferably, write the answers in sequential order.

Q.1 Attempt any FOUR. **08 Marks**

a) Describe the process of Data Communication
b) State any two advantages of Fiber Optic cable over Twisted pair and Co-axial Cable
c) Enlist any four Standard Organizations.
d) Explain the purpose of Cladding in Optical fiber.
e) Calculate the Bit rate for 1000 baud and type of modulation in FSK.
f) Coaxial cable is a two-wire transmission system. Explain the advantage of connecting the outer conductor to ground?

Q.2 Attempt any THREE. **12 Marks**

a) Compare Half Duplex and Full Duplex modes of communication based on following points.
   i) Direction of communication
   ii) Send/receive
   iii) Performance
   iv) Example
b) Describe the construction of Co-axial Cable with diagram
c) Draw the Constellation diagram for the following
   i) ASK with Peak amplitude value of 1 and 3.
   ii) PSK with Peak amplitude value 2
d) In satellite communications, different frequency bands are used for the uplink and the downlink. Discuss why this pattern occurs.

Scheme – I

Sample Test Paper - II

(60% of 5-Unit curriculum and 50% of 6-Unit curriculum)

Program Name : **Diploma in Information Technology**
Program Code : **IF**
Semester : **Third**
Course Title : **Data Communication**
Max. Marks : **20** **Time: 1 Hour**

22322

Instructions:

(1) All questions are compulsory.
(2) Illustrate your answers with sketches wherever necessary.
(3) Figures to the right indicate full marks.
(4) Assume suitable data if necessary.
(5) Preferably, write the answers in sequential order.

Q.1 Attempt any FOUR. **08 Marks**

a) Define Multiplexing. Enlist its types.
b) Explain Routing Table in Datagram network.
c) Define:
   i) Single-Bit Error
   ii) Burst Error
d) Define Bluetooth. Enlist types of Bluetooth networks
e) Describe Second Generation of Mobile Telephone System.
f) In Bluetooth, if Primary device sends in 'Slot 0', Secondary device receives, and in 'Slot 1' secondary device sends and the primary device receive, sketch this scenario and elaborate.

Q.2 Attempt any THREE. **12 Marks**

a) Calculate minimum number of bits in a PN sequence if we use FHSS with a channel bandwidth of B=4 KHz and B_{ss}=100 KHz?
b) Distinguish between Multilevel TDM, Multiple Slot TDM and Pulse-Stuffed TDM. (Any Four Points).
c) Consider the use of 1000 bits frames on a 1-Mbps satellite channel with a 270ms delay**.** What is the maximum link utilization for :
   i) Stop-and-Wait flow control
   ii) Continuous flow control with a window size of 7?
d) Explain the working of Go-back-n protocol used for error recovery?