'I' Scheme

Sample Question Paper

Program Name : Diploma in Instrumentation / Diploma in Instrumentation and Control

Program Code : IS / IC

Semester : Third

22336

Course Title : Instrumentation Data Communication

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

Instructions:

(1) All questions are compulsory.
(2) Illustrate your answers with neat 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 FIVE of the following. 10 Marks

a. Define Synchronous and asynchronous communication
b. Differentiate with a waveform ideal sampling and practical sampling
c. Classify networks based on architecture
d. List four types fibre optic connectors
e. State two specifications of Devicenet
f. Give two applications of point to point transmission
g. Sketch HART communication protocol

Q.2) Attempt any Three of the following. 12 Marks

a. Describe the block diagram of a basic communication system stating the function of each block
b. Explain with block diagram and waveforms the working principle of PAM .
c. Explain the principle of working of FDM with a sketch.
d. It is required to establish a network with minimum cost with at least 10 computers. It is necessary to use a centralized database. Justify with sketch the relevant topology and network for the stated situation.

Q.3) Attempt any Three of the following. 12 Marks

a. Encode the bit sequence 100101101 using Unipolar RZ, Manchester, Differential Manchester and AMI schemes.
b. Explain with ray diagram the principle of Total Internal Reflection in Fibre optics
c. Compare WAN and LAN on the basis of :
   i. Area Covered
   ii. Propagation Delay
   iii. Speed
   iv. Congestion
d. Compare Star topology and Mesh topology on the basis of:
   i. Architecture
   ii. Routing methodology
   iii. Response time

iv. Reliability

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

a. Describe with sketches the construction of a fibre optic cable
b. Describe with sketch Foundation field bus protocol architecture.
c. State the effects of short circuit in PROFIBUS network with respect to communication.
d. Describe with broad specification the hardware and software requirement to set up HART network system.
e. Choose the relevant connector from the following to couple two fibre optic cables giving justification
    i. RJ 45
    ii.BNC
    iii. MT- RJ
    iv. RJ 11

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

a. For a PCM transmitter:
    i. Draw the labeled block diagram (2M)
    ii. Explain the function of each block by taking a suitable analog signal as the input.(4M)
b. For OSI reference model
    i. Draw the Layered architecture
    ii.Explain the function of each layer
c. It is required to control an instrumentation system in a network with computer located over a long distance of 100 Km.
    i. State the type of transmission medium should be used. (1M)
    ii. Justify by describing its features (3M)
    iii. State two merits of the transmission medium used (2M)

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

a. In a modulation system‘ The height of antenna is reduced’
    i. Justify the above statement
    ii. Give an example to illustrate the same
b. Develop the Devicenet network for 6 Nodes
c. Two modbus enabled devices need to be connected.
    i. Suggest the minimum MODBUS communication settings (2M)
    ii. Justify the same (4M)

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Sample Test Paper - I

Program Name : Diploma in Instrumentation / Diploma in Instrumentation and Control

Program Code : IS / IC

Semester : Third

22336

Course Title : Instrumentation Data Communication

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

Instructions:

(1) All questions are compulsory.
(2) Illustrate your answers with neat 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. Identify the communication mode in the following communication systems
   i) Telephone
   ii) Television
   iii) Walkie Talkie
   iv) Computers
b. List factors that affect signal propagation
c. Define Sampling Theorem. The frequency of the modulating signal is 1KHz. Determine the minimum sampling frequency.
d. State the need for multiplexing in data communication
e. Give the functions of data link layer and network layer of the OSI reference model
f. Draw a schematic of star topology.

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

a. Give four reasons to justify the need for modulation.
b. For the bit sequence 10011011, draw ASK, FSK, BPSK and QPSK waveforms.
c. Encode the bit sequence 1011001 using Unipolar NRZ, Polar NRZ, Polar RZ and Bipolar AMI schemes
d. Draw the layered architecture of TCP/IP model and state the function of each layer
e. State the advantages of Client server model over Peer – Peer model

'I' Scheme

Sample Test Paper - II

Program Name : Diploma in Instrumentation / Diploma in Instrumentation and Control

Program Code : IS / IC

Semester : Third

22336

Course Title : Instrumentation Data Communication

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

Instructions:

(1) All questions are compulsory.
(2) Illustrate your answers with neat 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. State the function of Hubs & Repeaters

b. Define acceptance angle and Numerical aperture of a fibre optic cable

c. Name two light source devices and two light detector devices

d. Select standard communication setting for MODBUS.

e. List types of transmission media supported in profibus system.

f. Differentiate HART & foundation field bus on the basis of number of nodes and communication speed.

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

a. Describe the various modes of propagation in a fibre optic cable with suitable diagram

b. Compare LED and Laser diode on the basis of

i) Output Power

ii) Spectral width

iii) Numerical Aperture

iv) Principle of working

c. State the Pin functions of RS 232 standard

d. Draw the layered architecture of Fieldbus and state the function of each layer

e. Describe hardware and software requirement to set up profibus system.