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SARDAR PATEL UNIVERSITY
EXAMINATION - 2012

M. Sc. (INSTRUMENTATION)
SEMESTER - III
INDUSTRIAL COMMUNICATION TECHNIQUES
PS03CINS02

Monday, 3 – 12 – 2012, Time: 2:30 pm to 5: 30 pm

Total Marks: 70

Note: Figures to the right indicate maximum marks.

- Q1. **Multiple Choice Questions-** [8]
- (a) The technique used to compress large numbers of dark and bright phases in sequence [1]
(i) Run Length Encoding (ii) Huffman Coding (iii) Lempel-ziv (iv) Relative Encoding
- (b) The best Line encoding format for clock recovery is [1]
(i) UPNRZ (ii) BPRZ (iii) BPRZ-AMI (iv) UPRZ
- (c) According to Nyquist theorem, minimum sampling rate is equal to [1]
(i) one fourth of the highest audio frequency (ii) half of the highest audio frequency
(iii) thrice the highest audio frequency (iv) twice the highest audio frequency
- (d) Calculate line speed of 8 channel PCM-TDM system having input frequency of 4KHz. [1]
(i) 1.536 Mbps (ii) 128 Kbps (iii) 512 Kbps (iv) 64 Mbps
- (e) In OSI model, dialog management is the responsibility of [1]
(i) Network layer (ii) Session layer (iii) Presentation layer (iv) Transport layer
- (f) In RS 232 cable pin number 2 corresponds to [1]
(i) Transmit data (ii) Receive data (iii) Clear data (iv) Data terminal ready
- (g) The highest success rate of CSMA is in [1]
(i) 1-persistent (ii) 0.5 persistent (iii) 0.1 persistent (iv) 0.8 persistent
- (h) The sequence of ending delimiter in frame format of token ring is [1]
(i) JK1JK1IE (ii) JK0JK000 (iii) JKJKJK00 (iv) JK0JK1IE
- Q2. **Short answer type questions — attempt any 7** [14]
- (a) While selecting line encoding format, which primary factors must be considered? [2]
- (b) List different types of Content errors. [2]
- (c) What is the bit rate, if human voice is digitize? Assume 8-bits per sample. [2]
- (d) Write an equation for Frequency Shift Keying with appropriate interpretations. [2]
- (e) Show working of differential BPSK transmitter. [2]
- (f) Draw timing diagram for basic operation of RS-232. [2]
- (g) What are limitations of Star and Ring topologies? [2]
- (h) List functions of Transport layer. [2]
- (i) How is field bus different from 4 – 20 mA? [2]

Descriptive questions-

[48]

Q3. (a) For a data string of 111100011010, determine the number of Hamming bits required. [6]
Arbitrarily place Hamming code into data string at even number position in data string from left (i.e. MSB), determine the status of each Hamming bit. Assume single bit transmission error at bit 15 and prove that Hamming code will detect the error.

(b) Enlist advantages and disadvantages of Digital transmission and explain synchronous serial transmission. [6]

OR

(b) Determine the Block Check Sequence for the following data and CRC generating polynomial. [6]

$$\text{Data, } G(x) = x^7 + x^5 + x^4 + x^2 + x^1 + x^0 \text{ and}$$

$$\text{CRC, } P(x) = x^5 + x^4 + x^1 + x^0$$

Verify it at receiver end for any error.

Q4. (a) Describe Pulse Code Modulation with its important parameters. [6]

(b) Explain Quadrature Amplitude Modulation (8 -QAM) technique. [6]

OR

(b) Discuss important components of Modem? [6]

Q5. (a) Explain functions of Physical and Data Link layers in OSI model. [6]

(b) Write a note on IEEE-488 Interface lines. [6]

OR

(b) Explain importance of HART and list its advantages. [6]

Q6. (a) What do you mean by CSMA/CD protocol? Discuss its types. [6]

(b) Explain IEEE 802.5, Token Ring standard. [6]

OR

(b) Discuss Field Bus with its advantages and disadvantages. [6]
