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G.R. No.	

U218 – 143 (T1)

OCTOBER 2018/IN-SEM (T1)

S. Y. B. TECH. (Information Technology) (SEMESTER - I)

COURSE NAME: FUNDAMENTALS OF DATA COMMUNICATION

COURSE CODE: ITUA21173

(PATTERN 2017)

Time: [**1Hour**] [Max. Marks: **30**]

(*) Instructions to candidates:

1) **Answer Q.1 OR Q.2 and Q.3 OR Q.4.**
2) **Figures to the right indicate full marks.**
3) **Use of scientific calculator is allowed**
4) **Use suitable data wherever required**

Q.1) a) Diagrammatically represent [6 marks]

i. Analog signal with Amplitude= 2v, Frequency= 2Hz in time domain.
ii. Analog signal with Amplitude= 2v, Frequency= 2Hz in frequency domain. iii. Digital signal two transmit 2-bit data.

b) Solve fallowing with appropriate assumptions. [6 marks]

i. If a periodic signal is decomposed into five sine waves with frequencies of 100, 300, 500, 700, and 900 KHz, what is its bandwidth? Draw the spectrum, assuming respective components have a amplitude of 10 V, 30V, 50V, 70V and 90V.
ii. A sine wave is offset 1/6 cycle with respect to time 0. What is its phase in degrees and radians? Draw the same signal.

c) Define Fallowing terms with example. [4 marks]

i. Jitter ii. Periodic Signal
iii. Composite Signal iv. Discrete signal

OR

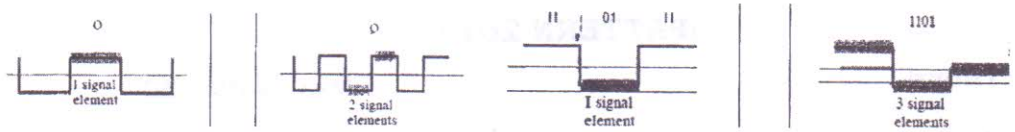
Q.2) a) List out and label the basic features of analog signal using sine wave signal representation (time domain) and describe the features in brief (Any three). [6 marks]

Sate the truth of the sentence and justify your answer "Amplitude can be calculated from given value of frequency"

b)Explain how Transmission Impairments affects the original signal and calculate maximum bit rate, for a noiseless channel with Bandwidth of 3 KHz transmitting a signal with two signal levels. [6 marks]

c) How many signal levels required for fallowing noiseless channel? [4 marks]
A.We need to send 300 kbps over a bandwidth of 20 kHz.
B.We need to send 200 Mbps over a bandwidth of 30 kHz.

3) a) Explain what is Signal rate and Data rate. [6 marks]
Calculate the value of the signal rate for each case in Figure if the data rate is 1 Mbps and c is between 0 and 1.



b) Explain the process of Frequency Modulation in detail with appropriate labeled diagrams. [4 marks]

c) List out all the types of Multiplexing. Identify the best technique to share the channel among multiple digital information sources. Justify you answer. [4 marks]

OR

Q.4) a) Discuss the steps in Analog to Digital conversion in detail with appropriate example and explain the process to generate the binary codes as an output. [6 marks]

b) In a digital transmission, the receiver clock is 0.1 percent faster than the sender clock. How many extra bits per second does the receiver receive if the data rate is 1 kbps? How many if the data rate is 1 Mbps? Discuss it's adverse effect. [4 marks]

c) Four 1-kbps connections are multiplexed together. A unit is 1 bit. Find (a) the duration of 1 bit before multiplexing, (b) the transmission rate of the link, (c) the duration of a time slot and (d) the duration of a frame. [4 marks]