



Name :

Roll No. :

Invigilator's Signature :

CS/B.Tech (ICE)/SEM-5/IC-505/2010-11

2010-11

DATA COMMUNICATION & TELEMETRY

Time Allotted : 3 Hours

Full Marks : 70

The figures in the margin indicate full marks.

*Candidates are required to give their answers in their own words
as far as practicable.*

GROUP – A

(Multiple Choice Type Questions)

1. Choose the correct alternatives for any *ten* of the following :

10 × 1 = 10

i) Voltage telemetry system, the preferred single to triose
ratio is

- | | |
|------------------|------------------|
| a) < 0.5 | b) > 1.0 & < 2.0 |
| c) > 0.5 & < 1.0 | d) < 0.5. |

ii) Theoretically the bandwidth required in 'F'th is

- | | |
|---------|--------------|
| a) Zero | b) Unity |
| c) 10 | d) Infinite. |



- iii) The envelope detector is
- a) a high pass-filter
 - b) a coherent detector
 - c) a product demodulator
 - d) an asynchronous detector.
- iv) In a communication system, noise is most likely to affect the signal
- a) at the transmitter
 - b) in the channel
 - c) in the information source
 - d) at the destination.
- v) AM is the process of
- a) Superimposing a low frequency on a high frequency
 - b) Superimposing a high frequency on a low frequency
 - c) Carrier interruption
 - d) Frequency shift & phase shift.

a) PCM b) DPCM

c) PWM d) DELTA.

a) AM b) DSB-SC

c) SSB-SC d) VSB.

a) Cross-point b) Cross-bar

c) Modem d) RAM.

- high duplex line communication
- high level data link control
- half duple digital link combination
- host double level circuit.

a) n

b) $2n$

c) $n - 1$

d) $n + 1$



- xi) Modem is an acronym of
 - a) modulation
 - b) demodulation
 - c) modulation & demodulation
 - d) all of these.
- xii) In order to reduce quantizing noise one must
 - a) increase the no. of standard amplitudes
 - b) send pulses whose sides are more nearly vertical
 - c) use an RF amplifier in the receiver
 - d) increase the no. of samples per second.
- xiii) The biggest disadvantage of PCM is
 - a) its inability to handle analog signals
 - b) the high error rate which its quantizing noise introduces
 - c) its incompatibility with TDM
 - d) the large bandwidth that are required for it.
- xiv) Time division multiplexing requires
 - a) constant – data transmission
 - b) transmission of data at random
 - c) transmission of data samples
 - d) transmission of data of only one measurand.



GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following.

3 × 5 = 15

2. a) Define AM & PM. 2
- b) Show an AM wave and its frequency spectrum. 3
3. How are FM modulation & PM modulation related ? 5
4. Explain the working principle of a ring modulator. 5
5. State and explain sampling theorem for band limited signals. 1 + 4
6. a) Define transmission efficiency and modulation index for AM. 3
- b) What is the difficulty of filtering technique for generation of SSB-SC signal ? 2

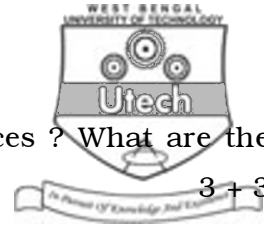
GROUP – C

(Long Answer Type Questions)

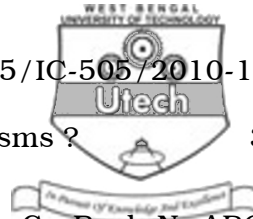
Answer any *three* of the following.

3 × 15 = 45

7. a) Describe how DSB-SC signal is obtained. 3
- b) Describe demodulation technique of DSB-SC signal by using Synchronous Detection Method. 3
- c) Define how SSB-SC signal is obtained by Frequency Discrimination Method. 3
- d) Describe generation of VSB signal. 3
- e) Explain demodulation technique of VSB signal. 3



8. a) How Amplitude Modulation take places ? What are the characteristics of AM wave ? 3 + 3
- b) Draw the spectrum of AM wave on Frequency Domain Representation with mathematical representation. 3
- c) What is modulation index ? How its over modulation happens ? 1 + 1
- d) Show that the Carrier power $P_c = A^2/2$ and Sideband power $P_{s(LSB)} = P_{s(USB)} = 1/4 x^2(t)$. 2 + 2
9. a) Make a comparison between TDM and FDM systems. 3 + 5 + 5 + 2
- b) How is PWM signal generated from PAM signal ? Describe using necessary waveforms.
- c) How is baseband signal recovered from PCM signal ? Explain with a block diagram.
- d) What is the advantage of DPCM over PCM ?
10. a) What are the three main components of a telephone system ? 3
- b) What is the local loop ? Explain with a suitable diagram. 4
- c) Define the term telemetry. Draw and explain the block diagram of general telemetry system. 2 + 3
- d) How is voltage converted in frequency for use in telemetry ? 3



11. a) What are three popular ARQ mechanisms ? 3
- b) What are the control variables in Go-Back-N ARQ technique ? Discuss about their functions. 3
- c) How does Go-Back-N technique take care of damaged or lost frame case ? 5
- d) Discuss about the sender and receiver sliding windows in Go-Back-N ARQ technique. 4
12. Write short notes any *three* of the following : 3 × 5
- a) Balanced modulator
- b) Pulse modulation
- c) Companding
- d) BISYNC
- e) HDLC.
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