



Name : .....

Roll No. : .....

Invigilator's Signature : .....

**CS/B.Tech(ICE)/SEM-5/IC-505/2011-12  
2011**

**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) Indicate false statement regarding the advantages of SSB over DSB full carrier AM from the following :
- a) More channel space is available
  - b) Transmitter circuits must be more stable giving better reception
  - c) The signal is more noise resistant
  - d) Much less power is required for the same signal strength.



ii) The most commonly used filter in SSB generation is

- a) Mechanical                      b) RC
- c) LC                                  d) Low-pass.

iii) 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.

iv) The telemetry system used as wireless telemetry system is

- a) voltage telemetry              b) current telemetry
- c) frequency telemetry          d) none of these.

v) The bandwidth of FM is ..... the bandwidth AM.

- a) less than                          b) equal to
- c) greater than                      d) less than equal to.



- vi) The figure of merit for a satellite transmitter is
- a) G/T ratio                      b) C/N ratio
- c) EIRP                              d) none of these.
- vii) Band pass filter is require at the receiver side for demultiplexing in which system ?
- a) FDM                              b) TDM
- c) Both FDM and TDM      d) None of these.
- viii) Which of the pulse modulation is analog ?
- a) PCM                              b) DPCM
- c) PWM                              d) Delta modulation.
- ix) The envelope detector is
- a) a high pass
- b) a coherent detector
- c) a product demodulator
- d) an asynchronous detector.

- GROUP – B**  
**( Short Answer Type Questions )**

2.	a)	Define modulation.	2
	b)	Why is modulation required in data communication and telemetry ?	3
3.	a)	What is the difference between PAM and PWM ?	2
	b)	What is flat top sampling and natural sampling ?	3
4.	a)	What is sampling theorem ? Explain it.	4
	b)	What is anti-aliasing filter ?	1
5.	a)	Write a short note on major components of telephone network.	2
	b)	What is the mechanism for Go Back-N-ARQ ?	3
6.		Explain the working principle of a ring modulator.	5



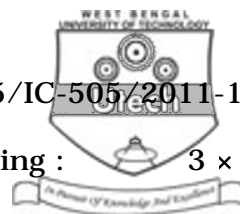
**GROUP - C**  
**( Long Answer Type Questions )**

Answer any *three* of the following.  $3 \times 15 = 45$

7. a) Describe the envelope detection method in connection with demodulation of AM. 4
- b) How do you optimize the time constant in envelope detection ? 2
- c) Make a comparative study among DSB-SC, SSB-SC and VSB-SC modulations. 6
- d) Explain the operation of a balanced modulator. 3
8. a) Define the terms 'transmission efficiency' and 'modulation index' for AM. 3
- b) Explain the operation of a PWM modulator using necessary waveforms. 5
- c) Describe the operation of a PCM transmitter. 5
- d) What are the limitations of delta modulation ? 2
9. a) Show that the current of a single tone AM signal will be  $I_t = I_c \left[ 1 + \frac{1}{2} m_a^2 \right]^{\frac{1}{2}}$ . 3
- b) What is the limitation of AM over DSB-SC ? 2
- c) What is over modulation ? 2



- d) The antenna current of an AM transmitter is 8 amps when only carrier is sent, but it increase to 8.96 amps when the carrier is modulated by a single tone sinusoid.
- i) Find modulation index
- ii) Find the antenna current when the depth of modulation index changes to 0.8. 5
- e) What modulation technique is used in TV broadcasting? Draw the block diagram of transmitter for that modulation technique. 3
10. a) What is the advantage of DPCM over PCM ? 2
- b) What is quantization noise ? Derive the expression for signal-to-quantization noise ratio. 1 + 3
- c) What is companding ? 1
- d) What is slope overload error ? How it can be reduced by ADM ? Describe with diagram. 8
11. a) Define LAN, MAN and WAN. 3
- b) What is local loop ? Explain with a diagram. 4
- c) Define telemetry. Draw and explain the block diagram of basic telemetry system. 2 + 3
- d) How the voltage converted in frequency for use in telemetry ? 3



12. Write short notes on any *three* of the following : 3 × 5

- a) Narrow band FM
- b) T1 system
- c) FDM
- d) Digital private automatic branch exchange
- e) Phase-locked loop.

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