

Invigilator's Signature :

CS/B.Tech (CSE & IT-OLD)/SEM-4/EC-411/2013 2013

PRINCIPLE OF COMMUNICATION ENGINEERING

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 : $10 \times 1 = 10$
 - i) The modulating technique which is most affected by noise is
 - a) PSK b) ASK
 - c) DPSK d) FSK.
 - ii) Recording information from a carrier is known as
 - a) demultiplexing
 - b) carrier recovery
 - c) modulation
 - d) detection.

4301 (O)

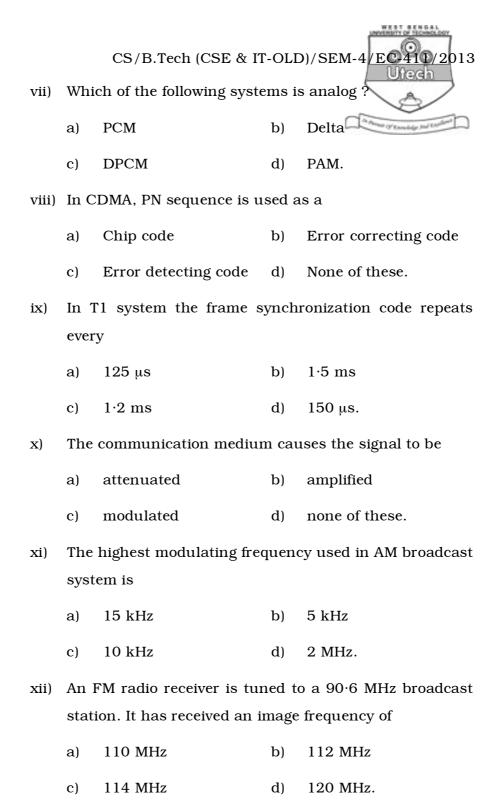
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- iii) The Nyquist sampling rate for a signal band limited to4 kHz is
 - a) 4 kHz b) 8 kHz
 - c) 2 kHz d) 16 kHz.

iv) Pulse amplitude modulation is a process where by

- a) the position of the pulse is changed as a function of the sample value
- b) the width of the pulse is varied as a function of time
- c) the height of a pulse is maid proportional to the sampled value
- d) none of these.
- v) Which of the following methods is employed in telephony ?
 - a) FDM b) TDM
 - c) Both (a) & (b) d) None of these.
- vi) The narrow samples produced at the pulse demodulator output are distributed to appropriate low pass construction filter by means of
 - a) multiplexer b) decommutator
 - c) commutator d) none of these.

4301 (O)



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xiii) The channel capacity of a 5 kHz bandwidth binary system is

- a) 10,000 bits/sec b) 5,000 bits/sec
- c) 8,000 bits/sec d) 4,000 bits/sec.

GROUP – B

(Short Answer Type Questions)

Answer any *three* of the following. $3 \times 5 = 15$

- 2. a) What is Nyquist interval ?
 - b) What is folding frequency?
 - c) Which kind of filter is used to demodulate a PAM signal ?
- 3. a) What is apogee ?
 - b) Define Azimuth angle.
- 4. a) What is the difference between geosynchronous and geostationary orbit ?
 - b) Discuss the disadvantages of geostationary orbit.
- 5. a) What is regenerative repeater ?
 - b) Explain the eye-pattern with proper diagram.
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6. For the binary sequence 10110010, draw the following signaling formats :

- a) Unipolar RZ
- b) Polar NRZ
- c) AMI.

GROUP – C

(Long Answer Type Questions)

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

- 7. a) The output voltage of a transmitter is given by 500 ($1 + 0.4 \sin 3140 t$) cos $6.28 \times 10^7 t$. This voltage is fed to a load of 6000 Ω . Determine
 - i) carrier frequency
 - ii) modulating frequency
 - iii) carrier power. 8
 - b) Explain the detail about the superheterodyne receiver. 7

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- 8. a) A carrier is frequency modulated with a sinusoidal signal of 2 kHz resulting in a maximum frequency deviation of 5 kHz. Find
 - i) modulation index
 - ii) bandwidth of modulating signal. 5
 - b) Explain the method of generating FM signal using indirect method. 10
- 9. a) Explain coherent QPSK system. 10
 - b) What is DPSK ? What is the bandwidth requirement of DPSK ?5
- 10. a) 1 kHz signal is sampled by 8 kHz sampling signal and the samples are encoded with 12 bit PCM system. Find
 - i) required bandwidth
 - ii) total no. of bits in the digital output signal in 10 cycles.
 - b) With a suitable block diagram explain the principle of pulse code modulation (PCM).
 - c) What is companding ? Discuss the two laws of companding.
- 4301 (O)

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- b) ISI
- ARQ c)
- d) D/A converter.