



Name :

Roll No. :

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.



- iii) The Nyquist sampling rate for a signal band limited to 4 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 made 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.



vii) Which of the following systems is analog ?

- a) PCM
- b) Delta
- c) DPCM
- d) PAM.

viii) In CDMA, PN sequence is used as a

- a) Chip code
- b) Error correcting code
- c) Error detecting code
- d) None of these.

ix) In T1 system the frame synchronization code repeats every

- a) 125 μ s
- b) 1.5 ms
- c) 1.2 ms
- d) 150 μ s.

x) The communication medium causes the signal to be

- a) attenuated
- b) amplified
- c) modulated
- d) none of these.

xi) The highest modulating frequency used in AM broadcast system is

- a) 15 kHz
- b) 5 kHz
- c) 10 kHz
- d) 2 MHz.

xii) An FM radio receiver is tuned to a 90.6 MHz broadcast station. It has received an image frequency of

- a) 110 MHz
- b) 112 MHz
- c) 114 MHz
- d) 120 MHz.



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.



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 6000Ω . Determine
- i) carrier frequency
 - ii) modulating frequency
 - iii) carrier power. 8
- b) Explain the detail about the superheterodyne receiver. 7



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.

CS/B.Tech (CSE & IT-OLD)/SEM-4/EC-410/2013

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

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