*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 × 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.

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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 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.

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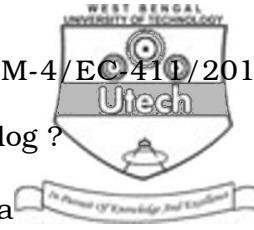
vii) Which of the following systems is analog ?

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 μs  b) 1·5 ms

c) 1·2 ms  d) 150 μs.

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.

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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 × 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 )

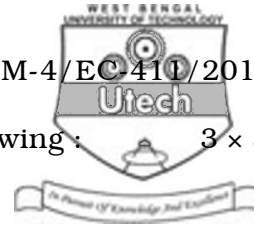Answer any *three* of the following.        $3 \times 15 = 45$

7.  a)  The output voltage of a transmitter is given by $500 ( 1 + 0 \cdot 4 \ \sin 3140 \ t ) \cos 6 \cdot 28 \times 10^{7} \ t$. 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.

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

    a)    TDM

    b)    ISI

    c)    ARQ

    d)    D/A converter.

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