Name : ………………………………………………………

Roll No. : ………………………………………………………

Invigilator's Signature : ………………………………………

CS/M.Tech(IT)/SEM-2/PGIT-204/2013

2013

COMMUNICATION SYSTEM

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.*

Answer any *seven* questions.   7 × 10 = 70

1.   Anser any *five* questions :   5 × 2

   a)   What is the relationship between time, information capacity and channel baondwidth ? What will happen to the output signal if sampling rates are too low ?

   b)   Explain the term AWGN.

   c)   Define power spectral density (PSD).

   d)   What is meant by signal scintillation ? Name the primary source of scintillatioin at L-band frequency.

   e)   What do you understand by EIRP ?

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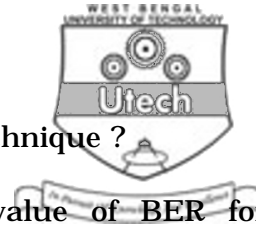
f) What are the advantages of TDMA technique ?

g) Define BER. What is the typical value of BER for satellite communication links ?

h) What are the differences between power signal & energy signal ?

2. a) Draw a typical block diagram of digital communication system with analog source, analog destination and analog channel. Explain the working of different blocks. 2 + 3

b) What are the advantages of digital communication over analog communication ? 5

3. Define the term C/N and C/No. Why are these parameters important in digital communication ? Explain with an example. 5 + 5

4. a) Describe Pulse Amplitude Modulation (PAM) technique. Explain the term "pulse regeneration" with a descriptive example. 2 + 3

b) Why is signal modulation scheme used in communication ? Describe the principle of BPSK modulation. 2 + 3

5. Describe the working of the different components of space segment in satellite communication system.
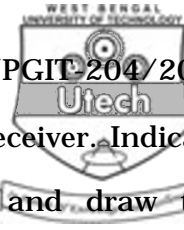
6. Draw a block diagram of a communication receiver. Indicate the various noise sources in the system and draw the equivalent noise model of the receiver.   3 + 7

7. For a satellite system, following information are given :

   Satellite range   =   40,000 km

   Frequency   =   11 GHz

   Transmitted power   =   2W

   Antenna gain   =   17 dB (global beam)

   Calculate :

   a)   flux density on earth's surface

   b)   power received by antenna with effective aperture of 10 m^2.

   c)   received C/N assuming T_s = 152K and BW = 500 MHz

   $\left[\text{Boltzmann contant} = 1{\cdot}38 \times 10^{-23} \right]$

8. What are the benefits of satellite communication over terrestrial network ? Explain the terms "uplink", "downlink" and "transponder" in a satellite communication system. Why is uplink frequency always higher that downlink frequency ?

          4 + 3 + 3
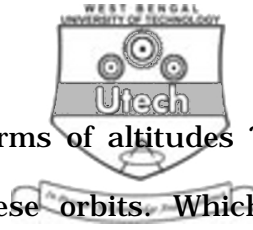
9. What are the various satellite orbits in terms of altitudes ? Indicate the major characteristics of these orbits. Which orbit do you feel best suitable for communication satellite and why ? 2 + 5 + 3

10. a) What are the major signal impairments in satellite communication links due to earth's atmosphere ? 5

    b) Define the term XPD. Why is depolarization important factor for designing the communication link ? 3 + 2

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