Total No. of printed pages = 4

Et-605/MCS/6th Sem/2013/M

MODERN COMMUNICATION SYSTEMS

Full Marks – 70

Pass Marks – 28

Time – Three hours

The figures in the margin indicate full marks for the questions.

Answer question No.1 and any *four* from the rest.

1. (a) Briefly describe the functional characteristics of an uplink, a transponder and a downlink model for a satellite system. 8

   (b) Define the terms : 2×3=6

   (i) Effective isotropic radiated power

   (ii) Equivalent noise temperature

   (iii) Noise density.

2. (a) Explain the necessity for data encryption. 5

(b) Describe what you mean by public key and private key encryption algorithm and compare both. 9

3. (a) Define the terms : 2×2=4

(i) Information capacity

(ii) Signal - to - noise ratio.

(b) Relate Hartley's law and the Shannon's limit for information capacity to performance of a communication system. 5

(c) Define the term thermal noise and describe its relationship to temperature and bandwidth. 5

4. (a) Explain the general principle of circuit switching and store-and-forward switching. Compare both. 10

(b) Define the terms : 2×2=4

(i) Packet switching

(ii) Virtual circuit packet switching.

5. (a) Define the ISDN interfaces and write the ISDN services. 8

(b) Briefly illustrate the BISDN protocol. 6

6. (a) Draw and explain the GSM architecture. 7

(b) Briefly describe the different components of the GSM standard. 7

7. (a) Define the terms : 2×2=4

(i) cell

(ii) cell clustering.

(b) Describe the frequency reuse principle giving the advantages and disadvantages of frequency reuse. 10

8. Complete the link budget for a satellite system with the following parametrs. 14

Uplink :

(i) Earth station transmitter output at saturation 2000W is 33 dBW

(ii) Earth station back off loss 3 dB

(iii) Earth station branching and feeder loss 4 dB

(iv) Earth station transmit antenna gain 64 dB

(v) Additional uplink atmospheric losses 0.6 dB

(vi) Free space path loss 206.5 dB

(vii) Satellite receiver $\frac{G}{Te}$ ratio –5.3 dB k^{-1}

(viii) Satellite branching and feeder closs 0 dB

(ix) Bit rate 120 Mbps.

Downlink :

(i) Satellite transmitter output power at saturation 10W is 10 dBW

(ii) Satellite back off losses 0.1 dB

(iii) Satellite branching and feeder loss 0.5 dB

(iv) Satellite transmit antenna gain 30.8 dB

(v) Additional downlink atmospheric losses 0.4 dB

(vi) Free space path loss 205.6 dB

(vii) Earth station receive antenna gain 62 dB.