DMM-1587
M. Sc. (Sem. IV) Examination
April/May - 2016
EL-544 : Electronics
(Electronic Communication - II)

Time : 3 Hours] [Total Marks : 70

Instructions :

(1) Assume the data if required.

(2) Figures to right hand side indicate marks of each question.

(3) Attempt any two of each question.

1 (a) What is intersymbol interference ? Explain the four primary causes of ISI.

(b) What is delta modulation ? Draw the block diagram of delta modulation transmitter and receiver and explain their operation. What is Granular noise and how can it be reduced ?

(c) Draw the block diagram of PCM system with analog companding. Explain it with respect to \( \mu \)-law and A-law compression characteristics.

2 (a) Draw the block diagram of 16-QAM transmitter and explain its operation. Also discuss the band with considerations of 16-QAM modulator.
(b) Define probability of error. Derive the expression of carrier to noise power ratio, noise power density and energy per bit to noise power density ratio in dB.

(c) Draw the block diagram of QPSK transmitter and explain it. Also explain the bandwidth considerations of QPSK along with phasor diagram.

3  (a) (i) List the advantages and disadvantages of geosynchronous satellites.
(ii) Define look angles, angle of elevation and azimuth.
(b) Define the following satellite system parameters:
(i) Back-off loss
(ii) Transmit power and bit energy
(iii) Effective isotropic radiated power
(c) (i) Convert the noise figure of 4dB and 4.1 dB to equivalent noise temperatures, where T = 27°C
(ii) For an equivalent noise bandwidth of 10 MHz and a total noise power of 0.0276 pW, determine noise density and equivalent noise temperature.

4  (a) Describe a protection switching arrangement. Explain the hot standby and diversity protection switching arrangements.
(b) (i) What are the advantages of microwave radio communications?
(ii) Draw the simplified block diagram of an FM microwave radio system and explain it.
(c) What do you mean by diversity? Explain frequency diversity and space diversity.
5 (a) What is switching matrices? Explain how such matrices are used in interconnecting many subscribers. Explain the term concentration and expansion pertaining to switching matrices.

(b) Explain the term Traffic load and Service grade related with telephone system.

(c) Explain the principle of time-slot interchanging.

Use the following data if required:

\[ K_B = 1.38 \times 10^{-23} \text{ J/}^\circ \text{K} \]

\[ h = 6.62 \times 10^{-34} \text{ J. Sec} \]

Electron mass = \( 9.1 \times 10^{-31} \text{ Kg} \)

\[ C = 3 \times 10^8 \text{ m/sec} \]

1 eV = \( 1.6 \times 10^{-19} \text{ Joule} \)