17535

Instructions – (1) All Questions are *Compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Use of Non-programmable Electronic Pocket Calculator is permissible.

(7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. a) **Attempt any <u>THREE</u> of the following :**   **12**

   (i)   Compare between analog and digital modulation technique (any four points)

   (ii) Explain Quantization processes with neat W/F.

   (iii) Define:

   (1) Codeword

   (2) Code Rate

   (3) Hamming weight

   (4) Code efficiency

   (iv) Describe FDM techniques with block diagram of TX and RX.

Marks

b) **Attempt any <u>ONE</u> of the following :**   6

(i) Draw the block diagram of basic digital communication system and explain each block. State any two advantages and disadvantages of system.

(ii) Encode the following Binary data stream into unipolar RZ unipolar NRZ, polar RZ, Polar NRZ, AMI and split phase manchestar code, Data stream is 1011010010101.

2. **Attempt any <u>TWO</u> of the following :**   16

a) Draw block diagram of 4 QAM and 8 QAM and explain its and also draw the phaser diagram of 8 QAM and 16 QAM.

b) Describe synchronous Time Division Multiplexing with neat diagram. State any two advantages, disadvantages and applications of TDM.

c) Explain generation and detection procedure of VRC and CRC with neat diagram and give one example of each.

3. **Attempt any <u>FOUR</u> of the following :**   16

a) Explain slope overload error and granular noise in delta modulation with neat diagram. Describe how it can be reduced.

b) List types of errors and their causes.

c) Draw and explain PSK receiver.

d) With the help of OFDM block diagram. Explain its working.

e) Explain fast frequency hopping with suitable diagram.

4. a) **Attempt any <u>THREE</u> of the following :**   12

(i) State sampling theorem and write about its importance.

(ii) With example explain how hamming code is used for single bit error connection implications.

(iii) Draw block diagram of SDM multiplexing and explain each block.

(iv) Explain 4 bit PN sequence generator used in spread spectrum techniques.

Marks

b) **Attempt any ONE of the following :**   **6**

    (i)   Draw block diagram of DPSK transmitter and explain it's working. Draw W/F of given data (dt) = 110101001101.

    (ii)   Draw and explain PCM transmitter with neat block diagram and its waveform.

5.   **Attempt any TWO of the following :**   **16**

    a)   Draw QPSK modulator block diagram. Explain with constellation diagram and phasor diagram and draw its waveform of given data. d(t) = 1011011000101.

    b)   Explain North American digital multiplexing hierarchy with neat diagram.

    c)   State importance of spread spectrum modulation. List out application of spread spectrum modulation. (any two)

6.   **Attempt any FOUR of the following :**   **16**

    a)   Compare QPSK and QAM (four points)

    b)   Explain specification of T carrier system.

    c)   Explain Direct Sequence Spread Spectrum techniques with the help of block diagram. (DSSS)

    d)   Explain DPCM transmitter with neat block diagram.

    e)   State Shannon's Hartleys theorem. What is Shannon's information rate theoreticaly?