17535

16172

3 Hours / 100 Marks Seat No. | | | | | | | | |

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 THREE of the following : **12**

(a) Compare analog pulse modulation with digital pulse modulation. (any four points)

(b) Explain with example how hamming code is used for single bit error correction.

(c) State the principle of orthogonality. Explain the concept of single carrier & multi-carrier system.

(d) Draw block diagram of PN sequence generator using 4 D-Flip flop.

(B) Attempt any ONE of the following : **6**

(a) Explain the effects of noise on the channel. Also state the need of channel modelling.

(b) Define line coding. Draw the waveforms for a binary sequence 10110011 for following signal codes :

(i) Polar R Z

(ii) Unipolar NRZ

(iii) Manchester

(iv) Alternate Mark Invasion (AMI)

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

(a) Draw and explain the block diagram of Delta Modulation. Also explain slope overload and granular noise in linear delta modulation.

(b) State bandwidth required for BASK, BFSK, BPSK and QPSK. Also draw waveforms for binary data 10110010 in ASK, FSK, PSK and QPSK modulation.

(c) Explain the CCITT digital multiplexing hierarchy with block diagram.

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

(a) State sampling theorem. Calculate Nyquist rate for voice signal of range 300 Hz to 3400 Hz.

(b) Explain quantization and quantization error.

(c) Compare QPSK and QASK (any 4 points)

(d) Draw and explain the power spectral density of BPSK.

(e) List any four advantages of TDMA over FDMA.

4. (A) Attempt any THREE of the following : **12**

(a) State two advantages and disadvantages of digital communication system.

(b) Draw the block diagram of Adaptive Delta modulation transmitter and illustrate its working with waveforms.

(c) Using Shannon Hartley theorem, calculate channel capacity for a channel having BW of 15 kHz and signal to noise ratio of 20 dB.

(d) Explain fast frequency hopping with diagram.

(B) Attempt any ONE of the following : **6**

(a) Explain the working of CRC generator and checker.

(b) Differentiate between Direct sequence spread spectrum and frequency hopped spread spectrum.

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

(a) Draw the block diagram of QPSK transmitter and receiver. Explain its working principle. Draw its construction diagram.

(b) Draw block diagram of TDMA and explain it. State advantages of TDMA over FDMA.

(c) Draw the block diagram of Direct sequence spread spectrum and state the function of each block.

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

(a) Explain the role of predictor in differential pulse code modulation.

(b) State the types of errors present in the digital communication system. Also explain the causes and effects of errors.

(c) Draw and explain the block diagram of FSK with suitable waveform.

(d) Explain the generation of DPSK with block diagram.

(e) Explain the concept of CDMA technology.
