

# 17519

**14115**

**3 Hours / 100 Marks**

Seat No.

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- 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) 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
- (i) Define modulation index of AM and FM.
  - (ii) List different types of digital modulation techniques. Draw waveforms for ASK, FSK, PSK technique for binary digits 10110010.
  - (iii) Draw the block diagram of FDMA and describe its working.
  - (iv) Draw AM and FM waveform in time domain.
- b) Attempt any ONE of the following: 06
- (i) Find percentage modulation when  $V_{max} = 132 V_{pp}$  and  $V_{min} = 28 V_{pp}$ .
  - (ii) Draw the block diagram of DBPSK transmitter. State the function of each block.

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- 2. Attempt any FOUR of the following:** **16**
- a) Draw the block diagram of Delta modulation transmitter. Describe its operation with waveform.
  - b) Draw the block diagram of superheterodyne AM Radio Receiver. State the function of each block.
  - c) Draw the block diagram of digital communication system. State the function of each block.
  - d) Define bit rate and band rate.
  - e) Draw the block diagram of telephone system. State function of each block.
  - f) State the applications of satellite communication systems. (any four)
- 3. Attempt any FOUR of the following:** **16**
- a) Draw the block diagram of generation of PWM. Describe working with waveforms.
  - b) State sampling theorem. State natural and flat top sampling.
  - c) State the bandwidth requirement of :
    - (i) ASK
    - (ii) FSK
    - (iii) DPSK
    - (iv) QPSK
  - d) Give the classification of Encoding techniques.
  - e) Differentiate between FDM and TDM (Four points)

4. a) **Attempt any THREE of the following:** **12**
- (i) List the features of ground wave propagation.
  - (ii) State advantages and disadvantages of encoding techniques.
  - (iii) Compare ASK and FSK digital modulation system on the following points.
    - 1) Definition
    - 2) Waveform
    - 3) Bandwidth
    - 4) Noise immunity
  - (iv) Draw the block diagram of satellite communication systems and describe its working.
- b) **Attempt any ONE of the following:** **06**
- (i) Draw block diagram of PCM transmitter. Describe function of each block alongwith waveforms.
  - (ii) Describe the concept of Hand off.
5. **Attempt any FOUR of the following:** **16**
- a) Compare pulse modulation with continuous wave modulation for four points.
  - b) A broadcast AM transmitter radiates 50 kw of carrier power. What will be the radiated power at 85% modulation?
  - c) State the Shanon's Theorem to measure channel capacity.
  - d) State advantages and disadvantages of digital communication.

- e) Draw the following data formats for bit stream 1101100 using following encoding technique.
- (i) Polar R2
  - (ii) Bipolar R2
  - (iii) Bipolar NRZ
  - (iv) AMI
- f) State any two applications of FDMA and TDMA.

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

**16**

- a) Compare PAM and PWM (4 points)
  - b) Draw block diagrams of high level AM transmitter and low level AM transmitter.
  - c) State advantages and limitations of DM over PCM.
  - d) Draw the block diagram of mobile phone system. Describe it's working.
  - e) State the sequential steps for handset to handset call procedure.
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