

314329

24225

3 Hours / 70 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) Use of Non-programmable Electronic Pocket Calculator is permissible.

**Marks**

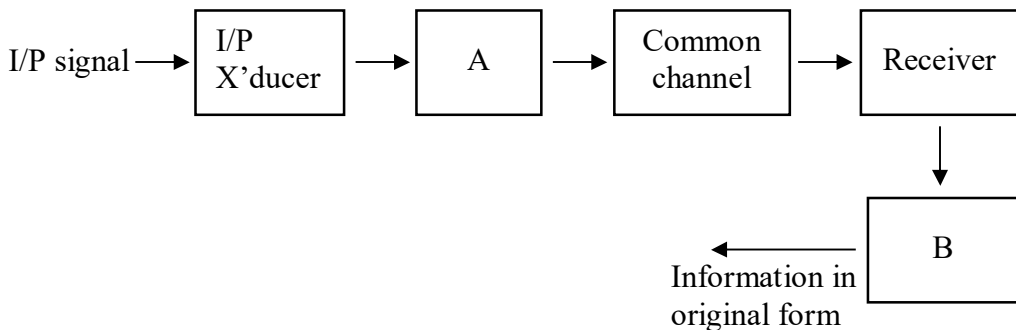
1. Attempt any FIVE of the following :

10

(a) Define :

- (1) Analog Signal
- (2) Base band Signal

(b) Identify Block dia. and name it. Label Block A & B correctly.



- (c) Define the term Modulation.
- (d) Define AM with its mathematical representation.
- (e) Give significance of Multiplexing.
- (f) State the need of Multiplexing.
- (g) List different types of digital modulation technique.

**2. Attempt any THREE of the following :**

**12**

- (a) Write the bandwidth requirement for
  - (1) ASK
  - (2) FSK
  - (3) BPSK
  - (4) QPSK
- (b) Classify pulse modulation tech.
- (c) Derive the bandwidth required for FM in which the modulating frequency is 2 kHz and maximum deviation is 10 kHz ? Assume highest sidebands are 8.
- (d) State and explain the types of noise in communication system.

**3. Attempt any THREE of the following :**

**12**

- (a) Calculate the percent power saving in SSB signal if the AM wave is modulated to a depth of
  - (i) 100%
  - (ii) 50%

- (b) Compare analog pulse modulation & digital pulse modulation (04 pt.)
- (c) Draw the block-diagram of QAM & explain its working.
- (d) Draw labelled dia. of telemetry system. List its application (04).

**4. Attempt any THREE of the following :**

**12**

- (a) Draw block-dia. of TDMA and explain each block.
- (b) Represent the FM in time domain and frequency domain with neat labelling.
- (c) Explain the effect of modulation index on AM wave with waveforms for following values of M.
  - (1)  $M < 1$
  - (2)  $M = 1$
- (d) Differentiate between Delta Modulation & Adaptive Delta Modulation (04 Pts).
- (e) Compare FSK & ASK (four points).

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

**12**

- (a) List and explain different types of electronic communication.
- (b) Draw labelled block-dia. of digital communication system. State its applications (04 points)
- (c) Define M-array encoding. Explain different types of M-array techniques.

6. Attempt any TWO of the following :

12

- (a) Define FDM. Draw and explain block-dia. of FDM.
  - (b) State and explain sampling theorem with necessary waveforms. List different types of sampling.
  - (c) Draw waveforms for binary data 10110010 in ASK, FSK, PSK modulation.
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