12223

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

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

Marks

1.   **Attempt any FIVE of the following :**   **10**

(a)   Define Signal to Noise Ratio. State the ideal value of Signal to Noise Ratio.

(b)   List any four needs of modulation in Electronic Communication.

(c)   Sketch neat circuit diagram of Practical Diode Detector.

(d)   Define Principle of Superheterodyne Radio Receiver.

(e)   State the frequency range for Ground wave propagation and Space wave propagation.

(f)   Suggest the types of Propagation for very high microwave frequencies.

(g)   Define Radiation Pattern for antenna.

2. **Attempt any THREE of the following :** 12

   (a) State different transmission modes in communication with suitable diagram and example.

   (b) Define the following terms with respect to FM :

      (A) Definition of FM

      (B) Frequency Deviation Ratio

      (C) Modulation Index ()

      (D) Wide Band FM

   (c) Explain the Generation of FM signal using varactor diode.

   (d) Describe AM superheterodyne radio receiver with the help of neat diagram.

3. **Attempt any THREE of the following :** 12

   (a) Classify and describe the sources of noise in Electronic Communication.

   (b) Choose the correct frequency range for the following applications :

      (A) Voice or Audio Communication   –   _____

      (B) FM radio Broadcasting   –   _____

      (C) Mobile Phone   –   _____

      (D) Satellite and RADAR   –   _____

   (c) Compare AM and FM with the help of following parameters :

      (A) Mathematical Expression

      (B) Frequency Spectrum

      (C) Number of Sidebands

      (D) Effect of Noise

   (d) Define the terms with respect to Sky wave propagation :

      (A) Critical Frequency

      (B) Maximum Utilize Frequency (MUF)

      (C) Actual Height

      (D) Virtual Height

4. **Attempt any THREE of the following :** 12

  (a) Interpret the given block diagram and replace A, B and C with correct name of element. Redraw the complete diagram. (Refer diagram 4.1)
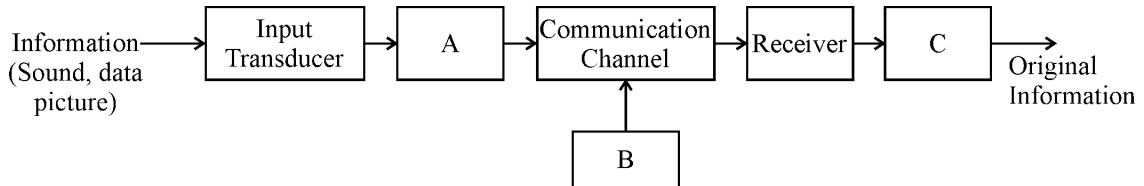
  Information → Input Transducer → A → Communication Channel → Receiver → C → Original Information
  (Sound, data picture)

  B → Communication Channel

  Diagram 4.1

  (b) Describe DSB, SSB and VSB modulations with the help of Frequency Spectrums.

  (c) Illustrate in detail PLL as a FM Demodulator.

  (d) Select the circuit for boosting of higher modulating frequencies at transmitter. Draw its neat diagram. How to nullify the effect of boosting at receiver side ?

  (e) Develop radiation patterns of dipole antenna with respect to their length :

  (i) $\lambda/2$ (ii) $3\lambda/2$ (iii) λ (iv) 3λ

5. **Attempt any TWO of the following :** 12

  (a) If there are 3 AM transmitter named A, B and C using following specifications :

  A transmitter having $Pc = 1000$ W and Modulation Index m = 50 %

  B transmitter having $Pc = 1200$ W and Modulation Index m = 60 %

  C transmitter having $Pc = 800$ W and Modulation Index m = 70 %

  Solve :   (i) Transmitted Power of A, B and C.

     (ii) Justify whether A, B or C is better as far as transmitted Power.

  (b) Elaborate the concept of Optical Horizon and Radio Horizon is Space wave propagation.

  (c) Describe Micro strip antenna with neat diagram. Draw radiation pattern of Micro strip antenna.

6. **Attempt any TWO of the following :** **12**

    (a) A carrier signal with 12 V amplitude and frequency of 15 MHz is applied to AM modulator with 70% modulation. The modulating signal frequency is 1 KHz. State the equation of the AM wave and sketches the waveform in frequency domain.

    (b) Describe Ground Wave Propagation with suitable diagram. State its advantages, disadvantages and applications.

    (c) Elaborate dish antenna are of parabolic shapes. Sketch suitable diagram of Dish antenna and state its applications.

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