11920

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 SIX of the following :**   **12**

    (a)   State the concept of transmission bandwidth.

    (b)   Represent FM signal intime domain and frequency domain.

    (c)   Explain the concept of fading on transmission of signal.

    (d)   Draw the radiation pattern for resonant antenna having length $\lambda/2$ and λ.

    (e)   Calculate image frequency if the signal frequency is 1000 kHz and intermediate frequency is 455 kHz.

    (f)   Justify the choice of a rectangular frame width to height ratio equal to 4 : 3 of T.V.

    (g)   State the working principle of Vidicon camera.

    (h)   Write the applications of CCTV.

    (B) **Attempt any TWO of the following :**   **8**

        (a) Define modulation. Explain need of modulation.

        (b) Describe duct propagation with neat diagram.

        (c) What are primary and secondary Grassman's law ?

2. **Attempt any FOUR of the following :**   **4 × 4 = 16**

    (a) Define pre-emphasis and de-emphasis with waveforms.

    (b) Define skip distance and maximum usable frequency with suitable sketch.

    (c) Describe the radiation pattern for resonant dipole antenna with $l = \dfrac{\lambda}{2}$, $l = \lambda$,

        $l = \dfrac{3\lambda}{2}$ and $l = 3\lambda$.

    (d) Describe the working of practical diode detector with circuit diagram and waveform.

    (e) Explain interlace scanning with diagram. Write advantages of it.

    (f) Explain with sketch photo emission technique to generate video signal.

3. **Attempt any FOUR of the following :**   **4 × 4 = 16**

    (a) Compare between AM and FM on any four points.

    (b) Explain sky wave propagation with diagram.

    (c) Represent FM signal in time domain and frequency domain.

    (d) Define following characteristics of AM radio receiver :

        (i) Sensitivity

        (ii) Selectivity

        (iii) Fidelity

        (iv) Image frequency rejection

(e) Define the terms :

(i) Viewing distance

(ii) Luminance

(iii) hue

(iv) Saturation

(f) Describe the working of PAL D Colour TV receiver with the help of block diagram.

4. Attempt any FOUR of the following : **4 × 4 = 16**

(a) Give mathematical representation of AM wave to obtain complete expression.

(b) Describe the working of rectangular microstrip antenna.

(c) Draw the block diagram of FM radio receiver and explain the function of mixer and limiter.

(d) Describe the working of balanced slope detector using circuit diagram.

(e) List CCTRB standards for colour TV.

(f) Describe the working of HDTV with its block diagram.

5. Attempt any FOUR of the following : **4 × 4 = 16**

(a) Draw block diagram of Armstrong modulation system and explain.

(b) Define beam width directivity and polarisation with respect to antenna.

(c) Draw the block diagram of superheterodyne receiver and describe the working of each block.

(d) Describe PLL based FM detector with circuit diagram.

(e) Describe pre equalising and post equalising pulses.

(f) Describe the working of HDTV with its block diagram.

6. **Attempt any FOUR of the following :** **4 × 4 = 16**

   (a) Compare between PAM, PWM and PPM.

   (b) Describe the working of generation of PPM using IC-555. Draw the circuit diagram and waveforms.

   (c) Draw the structure of loop antenna and its radiation pattern.

   (d) Explain the working of balanced slope detector.

   (e) Draw sync separator circuit and explain the need of synchronisation pulse.

   (f) Describe the working of solid state camera based on CCD with diagram.

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