

## (REVISED COURSE)

(3 Hours)

[Total Marks : 100

N.B.(1) Question No. 1 is compulsory.

(2) Attempt any four questions out of the remaining six questions.

(3) Assume any suitable data wherever required but justify the same.

1. Answer any four questions : 20
  - (a) What is meant by the gain of an antenna ? What part does the isotropic antenna play in its calculation ? How is the isotropic radiator defined ?
  - (b) Why are equalizing pulse transmitted during the vertical synchronous pulses ?
  - (c) In colour TV, colour difference signals are transmitted instead of the three Primary Colour Signal. Why ?
  - (d) What advantages and disadvantages do satellite in Low Earth Orbit (LEO) have compared with geostationary satellite for mobile communication system ?
  - (e) What does an MTI radar actually do ? Give at least one instance of a radar application for which MTI cannot be used.
  
2. (a) Explain the difference between driven and parasitic elements in an antenna array. Describe the end fire array and its radiation pattern, and explain how the pattern can be made unidirectional. 10
- (b) The radiation resistance of an antenna is  $72 \Omega$  and loss resistance is  $8 \Omega$ . What is the directivity of antenna in db if the power gain is 16. 5
- (c) Prove that the resonant length of a dipole is half wavelength. 5
  
3. (a) Draw the standard T.V. Channel. Spectrum and explain total T.V. Channel bandwidth is 7 MHz. 5
- (b) Draw the block diagram of Horizontal Stage of T.V. receiver. What are the special features which makes the operation of the line output stage very efficient ? 10
- (c) Draw the block diagram of sound section in a T.V. receiver with waveform and explain the function of trap circuit. 5
  
4. (a) Explain with suitable block diagram. How the 'Y' and colour difference signals are developed from Camera outputs. 5
- (b) Explain the following with respect to Colour T.V. System : 10
  - (i) Compatibility with monochrome system
  - (ii) Colour burst signal
  - (iii) Frequency Interleaving
  - (iv) Luminance, hue and saturation.
- (c) Differentiate between NTSC, SECAM and PAL Colour T.V. system. 5
  
5. (a) What is the importance of frequency in satellite communication ? With a neat sketch explain the working of a Telemetry, Tracking and Command System on board satellite. 10
- (b) Explain the following :— 10
  - (i) Kepler's Law's
  - (ii) Satellite launching
  
6. (a) Explain Antenna Tracking and Display Method for Radar System. 10
- (b) A MTI radar operates at 4 GHz with a pulse repetition frequency of 600 PPS. Calculate the lowest two blind speeds of this Radar. 5
- (c) Calculate the maximum range of a radar system which operates at 3 cm with Peak Pulse Power of 500 kW, and It's Minimum receivable Power is  $10^{-13}$  watts. The capture area of its antenna is  $5 \text{ m}^2$  and radar cross-sectional area of the target is  $20 \text{ m}^2$ . 5
  
7. Write short notes on the following (any four) :— 20
  - (a) Effect of Ground on Antenna
  - (b) Composite Video Signal
  - (c) Digital T.V.
  - (d) Satellite System Link Models
  - (e) Radar Performance Factors.