(3 Hours)

N.B. : (1) Question No. **1** is **compulsory**.
(2) Attempt any **four** questions out of remaining **six** question.
(3) Assume any **suitable** data wherever **required** but justify the **same**.

1. Answer any **four** from the following :– **20**
   (a) Discuss bandwidth, as applied to the two major parameters of an antenna. Also define bandwidth.
   (b) What is meant by saying that a satellite is "stationary" ? Why are such satellites used for worldwide communication ?
   (c) What are the factors influencing the bandwidth of a radar receiver ? What are the advantages and disadvantages of a very large bandwidth ?
   (d) Explain the difference between chrominance, and luminance. How is a color picture tube able to display white ?
   (e) What is digital television system ? Explain in brief.

2. (a) Define directivity, antenna gain and polarisation of antenna. **6**
   (b) A half-wave dipole antenna is capable of radiating 1–kW and has a 2·15 dB gain over an isotropic antenna. How much power must be delivered to the isotropic (omnidirectional) antenna, to match the field-strength of directional antenna. **6**
   (c) Explain in brief antenna coupling networks. **8**

3. (a) Explain in brief :– **10**
      (i) Direct broad cast satellite
      (ii) Keppler's Law.
   (b) With the help of neat block diagram. Explain satellite earth station, discuss the function of various blocks in it, also show that a satellite launched into a circular orbit at a height (H) meters from the surface of earth. **10**

4. (a) What is the Doppler effect ? What are some of the ways in which it manifest itself ? **5**
   (b) With the aid of a neat block diagram explain fully the operation of an MTI system using a power amplifier in the transmitter. **10**
   (c) Calculate the maximum range of a radar system which operater at 3 cm with a peak pulse power of 500 kW, if its minimum receivable power is 10^{-13} W the capture area of its antenna is 5 m^2, and the radar cross-sectional area of the target is 20 m^2. **5**

5. (a) Using a circuit diagram, explain how sunc. pulses are obtained from the composite video waveform, and how, in turn, horizontal sync. pulses are extracted. **8**
   (b) Draw the composite video waveform at the end of either field, labeling all the pulses shown. **6**
   (c) Explain with suitable block diagram the interlaced scanning. **6**

6. (a) Draw the block diagram of a PAL color TV receiver, showing all the important functions from the tunners to the picture tube. **10**
   (b) Explain what is meant by the Y, I and Q signals in colour TV, and why they are generated. **10**

7. Write short notes on the following (any **four**) :– **20**
   (a) HDTV
   (b) Pulsed Radar System
   (c) Antenna Array
   (d) Satellite Launching
   (e) Cable T. V.
