

# 17440

**21314**

**3 Hours / 100 Marks**

Seat No.

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- Instructions* – (1) All Questions are *Compulsory*.
- (2) Illustrate your answers with neat sketches wherever necessary.
- (3) Figures to the right indicate full marks.
- (4) Assume suitable data, if necessary.
- (5) 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**
- i) Define with suitable example: Simplex and Duplex communication system.
  - ii) Represent AM wave in time domain and frequency domain.
  - iii) Define pulse modulation and state its types.
  - iv) State the function of limiter circuit used in FM receiver.
  - v) State any two advantages and disadvantages of balanced slope detector.
  - vi) What is single stub transmission line?
  - vii) Why electromagnetic waves are said to be transverse waves?
  - viii) Define plane of polarization.

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- b) **Attempt any TWO of the following:** **8**
- i) Draw and explain the block diagram of communication system.
  - ii) Explain with neat diagram half wave dipole antenna.
  - iii) Describe any three features of ground wave propagation along with neat sketch.
2. **Attempt any FOUR of the following:** **16**
- a) Draw and explain: Horn antenna.
  - b) Define modulation and explain need of modulation.
  - c) Draw and explain the electromagnetic spectrum.
  - d) Draw and explain block diagram of superheterodyne AM radio receiver.
  - e) Define characteristic impedance and explain how to calculate it?
  - f) A 500 watts carrier is modulated to depth of 80%. Calculate:
    - i) Total power in AM wave
    - ii) Power in sidebands.
3. **Attempt any FOUR of the following:** **16**
- a) Explain the effect of modulation index on AM wave with waveforms for following values of M:
    - i)  $m < 1$
    - ii)  $m = 1$
  - b) Explain the function of mixer in AM receiver with neat diagram.
  - c) Explain space wave propagation with sketch. List its advantage and disadvantage.

- d) How the primary constant R.G.L.C. affect distortionless and minimum attenuation conditions of transmission line?
- e) Compare resonant antenna and non-resonant antenna on the basis of:
  - i) Definition
  - ii) Circuit
  - iii) Reflection Pattern
  - iv) Radiation Pattern
- f) Explain with neat diagram and waveform the generation of PPM using IC555.

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

16

- a) Explain the concept of De-emphasis with neat circuit diagram.
- b) Draw and explain the block diagram of Armstrong method to generate FM wave.
- c) Derive the relation between reflection coefficient and VSWR.
- d) Explain ionospheric propagation with proper sketch.
- e) Explain the following terms related to antenna:
  - i) Beamwidth
  - ii) Directivity
- f) State four features of the following:
  - i) Quarter wavelength line and
  - ii) Half wavelength line

**5. Attempt any FOUR of the following:****16**

- a) A frequency modulated signal is represented by the voltage equation  $e_{FM} = 10 \sin (6 \times 10^8 t + 5 \sin 1250 t)$   
Calculate:
- Carrier frequency  $f_c$
  - Modulating frequency  $f_m$
  - Maximum deviation  $\delta$
  - What power will this FM wave dissipates in  $20\Omega$  resistor?
- b) Draw a neat circuit diagram of two stage if amplifier and explain its working.
- c) State and explain any four properties of quarter wave transformer.
- d) Explain with neat sketch of Yagi-uda antenna.
- e) What is the need of AGC? Explain simple AGC with its characteristics graph.
- f) Give the need of stub and explain double stub matching with neat diagram.

**6. Attempt any FOUR of the following:****16**

- Explain the generation of PWM using timer IC555 with neat circuit diagram.
  - Draw the block diagram of FM receiver and explain the function of any three blocks.
  - Draw and explain the balanced slope detector.
  - Draw the circuit diagram and explain the working of phase discriminator.
  - Draw the neat circuit diagram of FET amplitude limiter used in FM receiver.
  - Explain with neat sketch the working of parabolic dish antenna.
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