

17440

21819

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) 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: Baseband signal with one example.
- (ii) State the need of modulation.
- (iii) Define modulation index in AM and give its formula.
- (iv) State the super heterodyne principle.
- (v) State the need of AGC.
- (vi) Define standing wave ratio.
- (vii) Define the terms:
 - 1) Maximum usable frequency
 - 2) Fading
- (viii) What is skip distance?

P.T.O.

b) **Attempt any TWO of the following:****8**

- (i) Compare between simplex and duplex communication (four points).
- (ii) Draw the structure of horn antenna and its radiation pattern. List its any two applications.
- (iii) Explain the following in wave propagation:
 - 1) Actual height
 - 2) Virtual height

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

- a) List the types of noise in communication system. Explain any one of them.
- b) Draw amplitude modulated waveform in time domain and frequency domain with proper labelling.
- c) Draw the block diagram of AM transmitter, explain its operation.
- d) Define:
 - (i) Image frequency and
 - (ii) Double spotting
- e) State and explain the losses in transmission line.
- f) Draw the radiation pattern for Dipole antenna:
 - (i) Half wave dipole
 - (ii) Folded dipole.

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

- a) Explain pre-emphasis and de-emphasis concept in FM.
- b) Draw the block diagram of PWM. List its advantages.
- c) Explain the demodulation of AM signal using diode detector.
- d) For a transmission line, the incident voltage, $E_i = 6V$ and $E_r = 2V$, Calculate:
 - (i) Reflection Coefficient
 - (iii) SWR.
- e) Explain the transverse electromagnetic waves in wave propagation.
- f) An antenna has a radiation resistance of 72Ω a loss resistance of 8Ω and a power gain of 16. Find efficiency and directivity.

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

- a) For AM, $f_c = 500 \text{ kHz}$, $f_m = 5 \text{ kHz}$ Determine:
 - (i) Upper and lower sideband frequencies
 - (ii) Bandwidth
- b) Compare between FM and PM.
- c) Explain the use of baluns for impedance matching.
- d) List and explain the properties of quarter wave transformer.
- e) Describe the effect of ionosphere on skywave propagation.
- f) Compare resonant and non-resonant antennas.

- 5. Attempt any FOUR of the following:** **16**
- a) Draw the circuit diagram of varactor diode FM modulator and explain its working.
 - b) Draw the block diagram of FM super heterodyne radio receiver with waveforms.
 - c) Compare TRF and super heterodyne receivers.
 - d) The parameters of Transmission line are $R = 50 \Omega / \text{km}$, $L = 1\text{mH/km}$, $C = 0.1 \mu\text{f} / \text{km}$, $G = 2 \mu\text{V/km}$. Calculate characteristic impedance.
 - e) Differentiate between single stub and double stub (four points).
 - f) List the types of microstrip antennas. Explain any one of them.
- 6. Attempt any FOUR of the following:** **16**
- a) Draw the diagram for PAM generation using transistors. Explain its working.
 - b) Draw the TRF receiver block diagram and explain its working.
 - c) List the types of FM detector. Explain any one of them.
 - d) Draw the circuit diagram of limiter and explain its working.
 - e) Explain the following characteristics of AM radio receiver:
 - (i) Sensitivity
 - (ii) Selectivity.
 - f) Define the following terms:
 - (i) Polarization
 - (ii) Antenna gain
 - (iii) Antenna resistance
 - (iv) Directivity
-