

17437

16172

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) 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 :

12

- (a) Explain :
  - (i) Polarization
  - (ii) Absorption
- (b) Draw electromagnetic spectrum.
- (c) A lossless transmission line has a shunt capacitance of 100 pf/m and series inductance of 4 mH/m. What is its characteristics impedance ?
- (d) Define beam width and antenna gain with respect to antenna.
- (e) State the functions of antenna and draw horn antenna radiation pattern.
- (f) List the different methods used for FM detection. (any four)
- (g) What is IF for AM and FM receiver ?
- (h) Draw the graph of simple and delayed AGC.

**(B) Attempt any two :****8**

- (a) Describe Tropospheric scatter propagation with diagram.
- (b) Describe the function of quarter wave transformer for impedance matching.
- (c) Draw and explain the operation of Balanced slope detector.

**2. Attempt any FOUR :****16**

- (a) Define the following with respect to wave propagation :
  - (i) Virtual height
  - (ii) Critical frequency
  - (iii) Maximum usable frequency
  - (iv) Skip distance
- (b) Distinguish between resonant and nonresonant antennas.
- (c) Describe the working principle of parabolic reflector antenna with cassegrain feed.
- (d) Draw block diagram of TRF radio receiver and state its operation.
- (e) Draw the equivalent circuit of transmission line for low and radio frequency. What are the different components in it ?
- (f) Draw the block diagram of FM radio receiver and describe its operation.

**3. Attempt any FOUR :****16**

- (a) Define the term standing wave ratio. Why is a high value of SWR undesirable ?
- (b) Draw and explain ground wave propagation.
- (c) Define :
  - (i) Directivity
  - (ii) ERP
  - (iii) Antenna resistance
  - (iv) Bandwidth w.r.t. Antenna
- (d) With the help of diagram explain the operation of Yagi Uda antenna.
- (e) What is AGC ? Draw and explain the circuit of simple AGC.
- (f) Draw and explain the operation of Ratio detector.

**4. Attempt any FOUR :****16**

- (a) What is fading ? List its causes.
- (b) Explain radiation and dielectric losses in transmission line.
- (c) Define the terms sensitivity, selectivity w.r.t. AM Receiver and draw its characteristic curve.
- (d) Draw the radiation pattern for resonant dipole with following lengths :
  - (i)  $L = \lambda/2$
  - (ii)  $L = \lambda$
  - (iii)  $L = 2\lambda$
  - (iv)  $L = 3\lambda$
- (e) State various factors influencing the choice of IF for radio receivers.
- (f) Draw and explain the operation of Fosterseeley discriminator.

**P.T.O.**

**5. Attempt any FOUR :****16**

- (a) Derive the relation between reflection coefficient and standing wave ratio.
- (b) Describe space wave propagation with neat sketch.
- (c) Draw and explain the operation of phased arrays.
- (d) Draw the block diagram of superheterodyne AM receiver and describe the function of each block.
- (e) Describe frequency tracking in AM receiver.
- (f) Describe the concept of AFC and its necessity in FM receiver.

**6. Attempt any FOUR :****16**

- (a) Describe the properties of lines of different length for open and short circuit.
  - (b) Explain fidelity and dynamic range of AM radio receiver.
  - (c) Draw and explain the operation of loop antenna.
  - (d) Draw and explain the operation of dipole antenna.
  - (e) Draw and explain the working of practical diode detector with waveform.
  - (f) Draw and explain the operation of amplitude limiter used in FM receiver.
-