



# 17437

11819

3 Hours / 100 Marks

Seat No.

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- 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) *Use of Non-programmable Electronic Pocket Calculator is permissible.*
  - (7) *Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.*

**Marks**

1. A) Attempt **any six** :

**12**

- a) With respect to space wave, what is radio horizon ?
- b) What is transverse electromagnetic wave ?
- c) Calculate the characteristics impedance of a transmission line having  $L = 0.5 \text{ mH/Km}$ ,  $C = 0.08 \text{ } \mu\text{f}$  and negligible R and G.
- d) Define the terms directivity and beam width related to antennas.
- e) Draw the block diagram of tuned radio receiver.
- f) State the value of IF frequency in AM receiver and FM receiver.
- g) Draw the I/P and O/P waveforms of diode detector.
- h) Justify how to increase the sensitivity of FM receiver.

B) Attempt **any two** :

**8**

- a) Draw and explain ground wave propagation. State its advantages.
- b) Derive the relation between reflection coefficient (K) and VSWR(S).
- c) Draw neat block diagram of FM radio receiver.

**P.T.O.**

**2. Attempt any four :****16**

- a) Describe space wave propagation with neat sketch.
- b) Explain different types of losses in transmission lines.
- c) Explain the operation of non resonant antenna and draw its radiation pattern.
- d) Draw and explain the constructional sketch of Cassegrain feed parabolic reflector antenna.
- e) With the help of block diagram describe the function of superheterodyne radio receiver.
- f) Draw the circuit diagram of foster Seelay detector and write its working principle.

**3. Attempt any four :****16**

- a) Define the following w.r.t. wave propagation :
  - i) Virtual height
  - ii) Critical frequency
  - iii) Maximum usable frequency
  - iv) Skip distance.
- b) How can a quarter wave transformer be used for impedance matching ?
- c) Compare resonant and non-resonant antenna ? (any 4 point)
- d) With the help of diagram write working principle of horn antenna.
- e) Explain the need of AGC and delayed AGC.
- f) Describe the AFC and its necessity for FM receiver.

**4. Attempt any four :****16**

- a) Draw and explain duct propagation.
- b) Draw the equivalent ckt. of transmission line at RF frequency ? List its types.
- c) Draw the radiation pattern for the resonant dipole with following lengths :
  - i)  $L = \frac{\lambda}{2}$
  - ii)  $L = \lambda$
  - iii)  $L = \frac{3\lambda}{2}$
  - iv)  $L = 3\lambda$ .
- d) Describe the role of Padder (capacitor) in three point tracking.
- e) State the need of alignment and write down the procedure for IF alignment in AM radio receiver.
- f) Describe the operation of amplitude limiter with the help of circuit diagram.

**5. Attempt any four :**

- a) Explain the term fading ? List its major causes.
- b) Describe the need of short length transmission line for open and short circuit.
- c) Describe the working principle of folded dipole antenna and yagi uda antenna with radiation pattern.
- d) Draw the constructional sketch of phased array antenna and describe its working with radiation pattern.
- e) Draw and explain the working of practical diode detector with wave forms.
- f) Draw and explain operation of FM demodulator using PLL.

**6. Attempt any four :**

- a) Define the following terms :
    - i) Standing Wave Ratio (SWR)
    - ii) VSWR
    - iii) Reflection coefficient. State the formula which gives the relation between reflection coefficient and standing wave ratio.
  - b) Write the concept of Hertzian dipole and draw its radiation pattern.
  - c) Draw constructional sketch of half wave dipole antenna and draw its radiation pattern.
  - d) Explain selectivity and sensitivity of radio receiver.
  - e) State various factors influencing the choice of Intermediate Frequency (IF) for radio receivers.
  - f) Describe balance slope detector with neat circuit diagram.
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