# 17437

**16117**

**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 answer with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(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 terms attenuation and absorption.

(ii) Define the terms Directivity Bandwidth and Beamwidth related to antennas.

(iii) Draw block diagram of tuned radio receiver.

(iv) What are the effects of different ionospheric layers on sky waves.

(v) Draw spectrum of electromagnetic waves.

(vi) Define IF frequency and write down IF frequency for AM and FM radio receiver.

(vii) Explain the function of Baluns transformer.

(viii) Distinguish Resonant and non resonant antenna. (any three points)

**Marks**

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

(i) Define the terms critical frequency and maximum usuable frequency.

(ii) Draw equivalent circuit of transmission line at low frequency and high frequency.

(iii) Draw constructional sketch of half wave dipole antenna and draw its radiation pattern.

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

a) Describe the operation of amplitude limiter with the help of circuit diagram.

b) With the help of block diagram, describe the function of Superheterodyne Radio Receiver.

c) Describe the ground wave propagation with the help of diagram.

d) Draw constructional sketch of Yagi Uda antenna and draw its radiation pattern.

e) Compare loop antenna and ferrite rod antenna (any four points)

f) Describe working principle of transmission line and describe the balance line with diagram.

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

a) What is fading? List its major causes.

b) Describe the purpose of short length transmission line for open and short circuit.

c) With the help of diagram write working principle of Horn Antenna.

d) Write concept of Hertzian dipole and draw its radiation pattern.

e) Describe the importance of AGC in AM receiver with the help of simple circuit.

f) Draw the circuit diagram of foster seelay detector and write its working principle.

**Marks**

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

a) Draw block diagram of FM radio receiver. Write frequency band allocated for FM radio receiver.

b) Describe the effects of image signal on radio receiver and describe the methods of rejecting the image signal frequency.

c) Describe the losses in transmission line.

d) State various factors influencing the choice of intermediate frequency for radio receiver.

e) Define the terms Reflection and Refraction.

f) Draw the constructional sketch of phased array and describe its working with radiation pattern.

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

a) Describe the virtual and actual height in sky wave propagation.

b) Define the standing wave ratio. State the formula for it if the load in purely resistive.

c) Describe the frequency tracking in AM radio receiver.

d) Design focal feed and cassegrain gain feed parabolic reflectometer on the basis of diagram and feed mechanism.

e) Describe the AFC and its necessity for FM radio receiver.

f) State the need of alignment and write down the procedure for RF alignment in AM radio receiver.

**Marks**

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

a) Draw the radiation pattern for the resonant dipole following length:

(i) $L = \lambda/2$

(ii) $L = \lambda$

(iii) $\frac{3\lambda}{2}$

(iv) $L = 3\lambda$

b) Draw and explain the working of practical diode detector circuit with waveforms.

c) Draw and explain the operation of FM demodulator using PLL.

d) Explain fidelity and dynamic range of radio receiver.

e) Define VSWR and reflection coefficient related to transmission line.

f) Describe constructional sketch of loop antenna.