

17437

21819

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) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. (A) Attempt any SIX :

12

- (a) Draw frequency spectrum of Electromagnetic waves.
- (b) Define : Radiation & Absorption.
- (c) Draw equivalent circuit representation of transmission line.
- (d) A piece of coaxial cable has characteristic impedance of 75Ω and a nominal capacitance, 69 PF/m . What is its inductance/metre ?
- (e) Explain the terms : Effective Radiated Power (ERP) and Beamwidth.
- (f) Draw neat sketch of Yagi Uda antenna and Horn antenna.
- (g) Define sensitivity of AM receiver.
- (h) Why FM reception is noise free ? Justify.

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

- (a) Draw and explain tropospheric scatter propagation with neat sketch.
- (b) Derive the relation between reflection co-efficient (ρ) and VSWR.
- (c) Explain the operation of FM radio receiver with the help of neat block diagram.

2. Attempt any FOUR :**16**

- (a) Describe ground wave propagation. What is angle of tilt ? How does it affect field strength ?
- (b) Describe the purpose of short length transmission line with open and short circuit.
- (c) Draw the block diagram of super heterodyne AM receiver with output waveforms after each block.
- (d) Describe the frequency tracking in AM radio receiver.
- (e) Draw the constructional sketch of a broad side array antenna and describe its working with radiation pattern.
- (f) Draw and explain with neat diagram Foster-Seeley FM detector.

3. Attempt any FOUR :**16**

- (a) Define virtual and actual height in sky wave propagation with neat labelled sketch.
- (b) Describe the types of losses occur in RF transmission line.
- (c) Explain the concept of Hertzian dipole and draw its radiation pattern.

- (d) Draw the construction of phased array and describe its working.
- (e) Draw block diagram of TRF AM receive. State any four function of RF amplifier in AM receiver.
- (f) Draw neat sketch and explain the operation of PLL based FM demodulator.

4. Attempt any FOUR :**16**

- (a) Explain the concept fading. List its major cause.
- (b) Define characteristic of transmission line. Draw the equivalent circuit of transmission line at low frequency and radio frequency.
- (c) Compare resonant and non-resonant antenna. (any four points)
- (d) With the help of diagram, write the working principle of horn type antenna.
- (e) Draw and explain practical diode detector with its waveforms.
- (f) Draw the circuit diagram of radio detector and state the advantages of ratio detector over Foster-Seeley detector.

5. Attempt any FOUR :**16**

- (a) Draw and explain with neat sketch Duct wave propagation.
- (b) Explain the quarter wavelength transformer for impedance matching.
- (c) Define Antenna. State the functions of antenna and the term polarization of an antenna.
- (d) State and explain different types of AGC.
- (e) Draw a neat setup for measurement of sensitivity of a Radio receiver.
- (f) Draw and explain balance slope detector with neat circuit diagram.

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6. Attempt any FOUR :**16**

- (a) Explain how standing waves occur in an imperfectly matched transmission line.
 - (b) With neat sketch, describe any one method of feeding paraboloid reflector in the primary antenna located at focal point.
 - (c) Define the meaning of term resonant antenna. Draw radiation patterns of resonant dipoles with length $l = \frac{\lambda}{2}$ and $l = \lambda$.
 - (d) Explain the term fidelity and dynamic range of AM receiver.
 - (e) Draw and explain the working of a simple diode detector.
 - (f) Explain step-by-step procedure to be carried out for IF alignment.
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