

22334

11920

3 Hours / 70 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. Attempt any FIVE of the following :

10

- (a) Define the term signal to noise ratio.
- (b) Define modulation index of FM.
- (c) Write Carson's rule to calculate BW of FM wave.
- (d) Draw the labelled circuit dia. of ratio detector.
- (e) Write the IF value of
 - (i) FM radio receiver.
 - (ii) MW band AM.
- (f) Define fading w.r.t. wave propagation.
- (g) Sketch the radiation pattern of Yagi-Uda antenna.

2. Attempt any THREE of the following : 12

- (a) Draw the basic block diagram of Electronic communication system. State the function of transmitter.
- (b) A 10 kW carrier is amplitude modulated by two sine to a depth of 0.5 & 0.6 respectively. Calculate total power of modulated carrier.
- (c) Compare AM & FM w.r.t. following points.
 - (i) Definition
 - (ii) Modulation Index
 - (iii) Bandwidth
 - (iv) Application
- (d) Explain the concept of Deemphasis with neat diagram.

3. Attempt any THREE of the following : 12

- (a) Compare narrow band FM with wide-band FM w.r.t. following points.
 - (i) Modulation index
 - (ii) Maximum deviation
 - (iii) Range of modulating frequency
 - (iv) Application.
- (b) Sketch AM signal in (i) Time domain (ii) Frequency domain.
- (c) Explain why reception for high frequency band is better during night time.
- (d) Explain structure of rectangular microstrip patch antenna with its radiation pattern.

4. Attempt any THREE of the following :**12**

- (a) Explain Electromagnetic spectrum.
- (b) Draw the block diagram of AM. Superheterodyne radio receiver and state the function of each block.
- (c) In FM if max. deviation is 75 kHz and the max. modulating frequency is 10 kHz. Calculate the deviation ratio and Bandwidth of FM.
- (d) Compare sky wave and space wave propagation w.r.t. following points.
 - (i) Frequency range
 - (ii) Effect of Fading
 - (iii) Polarization
 - (iv) Application
- (e) Explain the working of half dipole antenna with its radiation pattern.

5. Attempt any TWO of the following :**12**

- (a) Derive a mathematical expression for AM wave.
- (b) A 400 W carrier is amplitude modulated to a depth of 75%. Calculate the total power in AM wave.
 - (i) Explain the types of noise in a communication system.
 - (ii) Compare simplex and duplex mode of communication.
- (c) (i) Write any one application of the following range.
 - (1) Radio frequency
 - (2) IR frequency
 - (3) Medium frequency
- (ii) Draw and label PLL based FM detector.

P.T.O.

6. Attempt any TWO of the following :

12

- (a) (i) List any two advantages of folded dipole antenna.
- (ii) Draw the radiation patterns of the following resonant dipole antenna.
- (1) $l = \lambda/2$ (2) $l = \lambda$
- (3) $l = 3\lambda/2$ (4) $l = 3\lambda$

Where l is the length of dipole antenna.

- (b) Explain Tropospheric scatter propagation with sketch.
- (c) (i) Draw the practical AM diode detector circuit. Sketch its input and output waveforms.
- (ii) Define the terms :
- (1) Skip distance
- (2) Maximum usable frequency
- (3) Virtual height
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