

17440

15162

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 of the following:** **12**
- (i) Define with suitable example :
Simplex and Duplex communication system.
 - (ii) State the need for modulation.
 - (iii) What is deviation ratio for frequency modulation.
 - (iv) Write the intermediate frequency value for.
 - (1) AM
 - (2) FM
 - (v) Why limiter stage is not used before ratio detector.
 - (vi) Explain why electromagnetic waves are called as transverse waves.

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- (vii) Draw general and RF equivalent circuit of transmission line.
- (viii) Define an antenna.
- b) **Attempt any TWO of the following:** **8**
- (i) Draw the block diagram of communication system and state the function of each block.
- (ii) The parameters of transmission line are $R = 65 \Omega/\text{km}$, $L = 1.6 \text{ mH}/\text{km}$, $C = 0.1 \mu\text{F}/\text{km}$, $G = 2.25 \mu\Omega/\text{km}$. Calculate the characteristic impedance.
- (iii) Draw a neat sketch of Yagi-Uda antenna and its radiation pattern. State its two applications.
2. **Attempt any FOUR of the following:** **16**
- a) Differentiate between AM and FM on the basis of :
- (i) Definition
- (ii) Bandwidth
- (iii) Modulation Index
- (iv) Application
- b) Explain the different types of losses in transmission line.
- c) Compare ground wave and space wave propagation on the basis of –
- (i) Frequency range
- (ii) Method of wave propagation
- d) Draw the ckt. of balance slope detector and describe its working.
- e) A 800 watts carrier is amplitude modulated to a depth of 80%. Calculate –
- (i) Total power in modulated wave
- (ii) Power in sidebands.
- f) Explain the following terms related to antenna.
- (i) Beamwidth
- (ii) Directivity

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

- a) State and explain the types of noise in communication system.
- b) Draw the circuit diagram of practical diode detector and explain its working.
- c) Draw the diagram of radiation patterns of following resonant dipoles.
 - (i) $l = \lambda/2$
 - (ii) $l = \lambda$
 - (iii) $l = 3\lambda/2$
 - (iv) $l = 3\lambda$where λ = length of dipole.
- d) Describe with neat diagram and waveform the generation of PPM using IC555.
- e) Explain ionosphere layer and the ionospheric propagation.
- f) What is the value of SWR for open circuited transmission line ? Describe the effect on transmitted wave in this case.

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

- a) What is stub ? What do you mean by single stub matching and double stub matching.
- b) Define selectivity and sensitivity of radio receiver.
- c) Explain the concept of pre-emphasis with neat circuit diagram.
- d) Draw the structure and radiation pattern of parabolic dish antenna.
- e) For a transmission line, if R is the reflection co-efficient what will be its value
 - (i) If there is no reflected voltage.
 - (ii) If reflected and incident voltages are same.
 - (iii) If reflected voltage = 12V and incident voltage = 24V.
 - (iv) If reflected voltage = 2V and incident voltage = 2V.
- f) Draw a neat sketch of loop antenna with its radiation pattern. Explain how they are used for direction feeding.

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

- a) Draw and explain PLL as FM demodulator.
- b) Describe electromagnetic polarisation ? Explain types of polarization.
- c) Compare resonant and non-resonant antenna on the basis of
 - (i) Definition
 - (ii) Reflection co-efficient
 - (iii) Radiation pattern
 - (iv) Application
- d) State the need of AGC ? Explain its types.
- e) Explain quarter wave and half wavelength line.
- f) The equation of an angle modulated voltage is $e = 10 \sin(10^8 t + 3 \sin 10^4 t)$. What form of angle modulation is this ? Calculate the carrier and modulating frequencies, the modulation index, deviation and power dissipated in 100Ω resistor.

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

- a) Draw the neat block diagram of Armstrong method of FM generation and explain its working in detail.
 - b) Draw the superheterodyne type FM radio receiver. How it differs from superheterodyne type AM receiver. State two functions of each block.
 - c)
 - (i) With the help of neat diagram explain the working of phase discriminator.
 - (ii) In FM, if maximum deviation is 65 KHz. and the maximum modulating frequency is 10 KHz. Calculate the deviation ratio and bandwidth of FM.
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