

17440

15116

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:
 - 1) Analog signal
 - 2) Digital signal
 - (ii) State the importance of modulation.
 - (iii) Write the intermediate frequency value used for:
 - 1) AM
 - 2) FM
 - (iv) Write any two drawbacks of TRF radio receiver.
 - (v) State merits of delayed AGC as compared with simple AGC.

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- (vi) Define:
 - 1) characteristic impedance
 - 2) standing wave ratio
- (vii) Why are electromagnetic waves called as transverse wave?
- (viii) List the major causes of fading.

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

- (i) Draw the block diagram of basic electronic communication system, and label it. Explain the concept of channel.
- (ii) Draw the diagram of half-wave dipole antenna. Show the current and voltage distribution on it. Why is it called as “Half Wave” dipole antenna?
- (iii) Compare ground wave and space wave propagation on the basis of frequency range and method of wave propagation.

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

- a) 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 l = length of dipole.
- b) Draw the circuit diagram of PWM using IC555. State its operation.
- c) List atleast four types of noise. Explain any one of them.
- d) Draw the circuit diagram of transistorised RF amplifier. List any two characteristics of RF amplifier.
- e) Describe the following transmission losses:
 - (i) Radiation losses
 - (ii) Losses due to conductor heating.
- f) Draw the AM signal representation in:
 - (i) Time domain
 - (ii) Frequency domain

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

- a) Compare amplitude modulation with frequency modulation with reference to:
 - (i) definition
 - (ii) modulation index
 - (iii) bandwidth
 - (iv) application
- b) In a broadcast superheterodyne receiver having loaded Q of antenna coupling of 100, if intermediate frequency of 455 kHz, calculate image frequency and its rejection ratio at 1000 kHz.
- c) Describe the term virtual height with the help of diagram showing ionized layer and the path of wave.
- d) A lossless transmission line has a shunt capacitance of 100 pf/m and a series inductance of 4 μ H/m. Calculate its characteristic impedance. What will be the value of series inductance if shunt capacitance is changed to 69 pf/m for same characteristic impedance?
- e) Describe non-resonant antenna with the help of its radiation pattern.
- f) Define pre-emphasis. Why is it used? Sketch a typical pre-emphasis circuit.

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

- a) Draw a basic circuit of basic reactance modulator and describe its operation.
- b) A 400 watt carrier is amplitude modulated to a depth of 75%. Calculate the total power in AM wave.
- c) What is the value of SWR for short circuited transmission line? Describe the effect on transmitted wave in this case.
- d) Describe the following effects of the environment on electromagnetic waves:
 - (i) reflection
 - (ii) refraction
- e) Describe the operating principle of dish antenna. Also draw its radiation pattern.
- f) Describe impedance inversion property of quarter wavelength transmission line.

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

- a) Describe the FM generation using IC566.
- b) Draw the block diagram of practical diode detector. Describe how it is better than simple diode detector.
- c) Describe the application of transmission line as stub. Write the situation where single stub or double stub is used.
- d) Draw the diagram of Yagi-uda antenna. Describe it with reference to its radiation pattern.
- e) Draw block diagram of superheterodyne AM radio receiver. Describe the principle of superhet.
- f) Draw and explain the general equivalent circuit of transmission line.

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

- a) Draw the circuit diagram of balance slope detect and describe its working principle.
 - b) Draw the block diagram of FM superheterodyne radio receiver and state two function of each block.
 - c) (i) Draw the block diagram of AM transmitter.
(ii) What factors govern the selection of feed point of dipole antenna? How do current feed and voltage feed antenna differ?
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