

- Instructions :**
- (1) All Questions are Compulsory.
 - (2) Illustrate your answers with neat sketches wherever necessary.
 - (3) Figures to the right indicate full marks.
 - (4) Assume suitable data, if necessary.
 - (5) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (6) Mobile Phone, Pager and other Electronic Communication devices are not permissible in Examination Hall.

- Q.1 (a)** Attempt any **SIX** of the following : **[12]**
- (i) Define Analog signal and digital signal.
 - (ii) Define modulation and state its types.
 - (iii) Draw the waveform for PAM waveform
 - (iv) What is the purpose of limiter in FM receiver?
 - (v) Why FM is less affected by Noise
 - (vi) Define fading with respect to wave propagation.
 - (vii) Define antenna resistance and antenna gain.
 - (viii) Define stub. State its two advantages

- Q.1 (b)** Attempt any **TWO** of the following **[8]**
- (i) Classify electronic communication systems based on direction and communication
 - (ii) Compare ground wave and space wave propagation on basis of frequency range and method of wave propagation.
 - (iii) Draw radiation pattern of yagi – uda antenna. Explain its working principle.

- 2.** Attempt any **FOUR** of the following. **[16]**
- (a) Explain pre-emphasis and de-emphasis networks used in FM transmission and reception.
 - (b) In an AM receiver, the Q of the antenna circuit at the input to the mixer is 100. If Intermediate frequency (IF) is 455KHz. Calculate the image frequency and its rejection at 1MHz.
 - (c) What is folded dipole antenna? Draw its pattern list its advantages.
 - (d) Derive the equation for characteristic impedance of transmission line at low frequency and high frequency.
 - (e) For a transmission line, if R is the reflection coefficient what will be its value.
 - (i) If there is no reflected voltage.
 - (ii) If reflected and incident voltages are same.
 - (iii) If reflected voltage = 12 V and incident voltage = 24V
 - (iv) If reflected voltage = 2V and incident voltage = 2V
 - (f) Draw and explain the frequency spectrum of AM wave.

3. Attempt any **FOUR** of the following. [16]
- (a) Draw and explain the generation of PWM using IC 555.
 - (b) With the help of neat diagram explain how PLL can be used for FM demodulation
 - (c) Describe different types of losses in transmission line.
 - (d) An antennas has a radiation resistance of 72Ω a loss resistance of 8Ω and power gain of 16. What is the its efficiency and directivity.
 - (e) Draw a neat sketch of loop antenna with its radiation pattern. Explain how they are used for direction feeding.
 - (f) Compare AM and FM
4. Attempt any **FOUR** of the following. [16]
- (a) A 500 watts carrier is modulated to depth of 80% calculate.
 - (i) Total power in AM wave
 - (ii) Power in sidebands.
 - (b) Describe superheterodyning principle with the help of block diagram.
 - (c) Draw the circuit diagram of practical AM diode detector. Sketch its input and output waveforms.
 - (d) Explain quarter wavelength transformer.
 - (e) Describe electromagnetic polarization? Explain types of polarization.
 - (f) Draw the sketch of dish antenna. Explain the same with radiation pattern.
5. Attempt any **FOUR** of the following. [16]
- (a) Explain following terms with respect to wave propagation
 - (i) Critical frequency
 - (ii) Skip distance
 - (b) Compare resonant and non-resonant antenna.
 - (c) Compare PAM, PWM and PPM.
 - (d) Why Armstrong method is known as indirect method FM generation? Draw the block diagram of Armstrong method.
 - (e) Compare between simple AGC and delayed AGC (any four points)
 - (f) Draw and explain circuit of AM modulators using BJT.
6. Attempt any **FOUR** of the following. [16]
- (a) Draw and label the circuit diagram of ratio detector.
 - (b) Give the need for stub and explain single stub matching. List the advantages and disadvantages of single stub matching.
 - (c) An AF signal $20\sin(2\pi \times 500t)$ is used to amplitude modulate a carrier of $50 \sin(2\pi \times 10^6t)$ Calculate
 - (i) Modulation index
 - (ii) Total power delivered into a load of 600Ω
 - (d) Compare the bandwidth that would be required to transmit baseband signal with a frequency range from 300 Hz to 3KH_2 using.
 - (i) Narrow band FM with maximum deviation of 5KH_2
 - (ii) Wideband FM with maximum deviation of 75KH_2
 - (e) State and explain the types of noise in communication system.
 - (f) State and explain the concept of transmission bandwidth.

