

- NB: 1. Question number 1 is compulsory
 2. attempt any 3 questions from the remaining five questions
 3. Assume suitable data wherever needed

- Q.1 Attempt any 5 questions 20**
- Why do we modulate a signal for transmission? Explain.
 - A single tone FM signal is given by $e_{FM}(t) = 20 \cos(16\pi \cdot 10^6 t + 25 \sin 2\pi \cdot 10^3 t)$. find the modulation index, modulating frequency, deviation, carrier frequency and power in the FM signal
 - Compare Amplitude Modulation and Frequency Modulation in terms of
 - bandwidth,
 - signal quality,
 - effect of noise on the signal and
 - range
 - Draw a well labeled diagram of a super-heterodyne receiver.
 - Explain Shannon's Sampling theorem and explain aliasing error.
 - Compare TDM and FDM.
- Q.2 a) An AM signal is produced by modulating a carrier signal with peak voltage of 10V and frequency of 100KHz by an information signal with max. modulating frequency of 5KHz and max amplitude 4V. Determine: 10**
- Frequency limits for lower and upper sideband
 - Bandwidth of AM
 - Total power of the modulated wave if the load resistance, $R_L = 10 \Omega$
 - Draw the power spectrum.
 - Calculate the total transmitted current.
- b) What are the methods employed for generation of SSB? Explain the third method of SSB generation with its advantages and disadvantages. (10)**
- Q.3 a) Explain the indirect method of FM generation. (8)**
- What is image frequency and its rejection? Also explain double spotting. (6)
 - In a Super heterodyne receiver having no RF amplifier, the loaded Q of the antenna coupling circuit is 80. If the IF is 455Khz, calculate the image frequency and its rejection ratio for tuning at (i) 100 kHz (ii) 20 MHz. (6)
- Q.4 a) What is multiplexing in communication system? Draw a block diagram of frequency division multiplexing to transmit 5 SSB signals. (6)**
- Draw and explain the transmitter and receiver of Delta modulation. What is meant by slope overload distortion? (10)
 - Bring out the merits and demerits of adaptive Delta modulation (4)
- Q.5. a) With the help of a neat block diagram explain the generation and detection of a PPM signal. Also explain the merits and demerits of a PPM transmission. (8)**
- Explain the terms :Selectivity, Fidelity, Sensitivity, AGC (8)
 - Explain companding (4)
- Q.6 Write short notes : any four (20)**
- Block diagram of PCM Transmitter and receiver
 - T1 digital carrier system
 - TRF receiver, its merits and demerits
 - Foster Seelay discriminator method
 - Pre-emphasis and deemphasis circuits
