SE (ELEX) Sem IV R'20 'C' scheme
21-05-2025

Duration: 3hours **Max Marks: 80**

N.B.: (1) Question No 1 is Compulsory.
(2) Attempt any three questions out of the remaining five.
(3) All questions carry equal marks.
(4) Assume suitable data, if required and state it clearly.

1 Attempt **any FOUR** [20]

a Discuss ground wave propagation with a neat labelled diagram.

b In an AM wave, the modulation index is reduced by half. Determine is the percentage reduction in the transmitted power?

c Prove that FM can be derived from PM and vice versa.

d Explain the following characteristics of radio receivers: sensitivity, selectivity, fidelity, and image frequency rejection ratio.

e Compare Delta Modulation and Adaptive Delta Modulation.

2 a A sinusoidal carrier having amplitude of 12V and frequency 25kHz is modulated by a sinusoidal voltage of amplitude 5V and frequency 2kHz. Modulated voltage is developed across a 50Ω resistance. i) Illustrate the AM waveform with values of V_{min} and V_{max}. ii) determine the modulation index, iii) calculate the total power in the modulated wave iv) Draw the spectrum of the modulated wave v) Determine the bandwidth of the AM wave. [10]

b Classify and explain several sources of noises that affect communication. [10]

3 a Discuss generation of DSB-SC using balanced modulator with mathematical proof. [05+05]

b Explain the need of pre-emphasis and de-emphasis in FM. [03]
Also explain the pre-emphasis and de-emphasis in detail. [07]

4 a Explain superheterodyne principle. [03]
Draw and explain the working of superheterodyne receiver. [07]

b Discuss the need of AGC in radio receivers. [03]
Explain the types of AGC. [07]

5 a State sampling theorem. [02]
Discuss natural sampling and flat top sampling. [08]

b Discuss the working of simple diode detector. [06]
Explain diagonal clipping and overmodulation in diode detector. [04]

6 a Explain the modulation and demodulation of PAM, PWM and PPM. [05]

b Draw and explain the transmitter and receiver block diagram of PCM. [05]

c With a neat block diagram explain FDM in detail. [10]

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