B.E/ELX/Sem-IV/R-19/'C'Sch and/Sub:-PCE/8.H.2024
Date:-11/12/2024
QP. Code:-10054999

Duration: 3hrs **[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 Explain Under modulation and Over modulation of AM wave. Draw AM wave for modulation index m=1, m=0 and m>1.
b Compare AM, FM and PM.
c Explain the following terms w.r.t. radio receivers: sensitivity, selectivity and image frequency.
d Discuss Sampling Theorem.
e Explain automatic gain control [AGC].

2 a Draw the block diagram of the adaptive delta modulation system and explain its operation. What are its advantages over delta modulation? **[10]**

b Draw diagram and explain TDM and FDM in details. **[10]**

3 a Draw the block diagram of Armstrong frequency-modulation system and explain in details. **[10]**

b Compare PPM, PAM and PWM. **[10]**

4 a Derive and explain Power relation $Pt = Pc [1+m^2/2]$ in the AM Wave equation. Hence obtain the current relation. **[10]**

b Explain in detail Pre-emphasis and de-emphasis. **[10]**

5 a An AM signal is produced by modulating a carrier signal with peak voltage of 10V, and Frequency of 100 kHz by sinusoidal signal of amplitude 4V and Frequency 4 kHz Determine- 1] Modulation Index 2] mathematical expression 3] Bandwidth 4] sketch power spectrum 5] calculate total power [R=50 ohm] **[10]**

b Draw block diagram and Explain Elements of communication system. **[10]**

6 a Explain superheterodyne receiver. **[05]**
In a superheterodyne receiver having no RF amplifier. Find the loaded Q of the antenna coupling circuit if the IF is 455kHz, and the image frequency rejection ratio for the tuning at 1200kHz is 130. 2) hence find the image frequency and its rejection ratio for the tuning at 20MHz. **[05]**

b Draw block diagram and Explain P.C.M. transmitter and receiver system. **[10]**
