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 Justify the use of VSB modulation in television broadcasting.

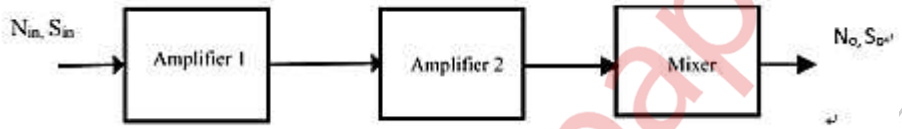
b Explain the basic block diagram of communication system in detail.

c What is the need of pre-emphasis and de-emphasis in FM?

d An analog signal with the maximum frequency 500 KHz is sampled at sampling frequency of 200 KHz. Can this signal be reconstructed back in to analog signal? If not why? What can be done to avoid this?

e Define sensitivity, selectivity, image rejection ratio and fidelity of a receiver.

2 **a** Define noise factor and noise figure. The figure shown below is front end of a receiver. **[10]**



The noise figures and gains of individual system are as follows
Amplifier 1: G1= 10dB, F1= 3dB
Amplifier 2: G2= 23dB, F2= 6dB
Mixer: G3= 0dB, F3= 17dB
Calculate the overall noise figure of the system.

b Explain the working of Ratio detector with the help of circuit diagram and s curve. How is it better than balanced slope detector? **[10]**

3 **a** The AM transmitter generates a carrier signal of amplitude 5V and frequency 2MHz. The carrier is modulated to a depth of 70% by an audio signal of 5KHz. **[10]**
Assume R=1Ω.
i) Determine the total transmitted power
ii) Determine the SSB power
iii) Percentage of power saving if SSB is transmitted
iv) Draw the Power spectrum and find the bandwidth.

b Explain the working of Superheterodyne receiver in detail. Show the waveforms at the output of various stages. **[10]**

4 **a** Define modulation. What is its need in communication? Derive the expression for AM wave and draw its time and frequency domain representation. **[10]**

b Explain the PCM transmitter and receiver with the help of proper block diagram. What is the advantage of DPCM over PCM? **[10]**

5	**a**	What is multiplexing? Explain the working of FDM transmitter and receiver with its block diagram.	**[10]**
	b	Explain indirect FM transmitter in detail with neat block diagram.	**[10]**
6	**a**	Compare DSB FC, DSB SC, SSB and VSB types of AM.	**[8]**
	b	How is PPM generated from PWM? Explain the same using waveforms.	**[6]**
	c	Explain the generation of FM wave using FET reactance modulator.	**[6]**

****