Subject: PADC

SE-IT
III Sem

Q.P. 25270

1.

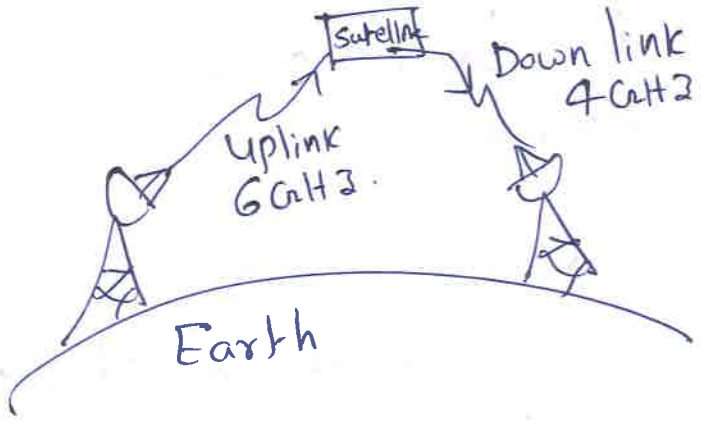
(a) Radio wave Transmission Systems.

Frequency: Between 10KHz and 1 GHz.

Radio waves fall into three categories
(1) Low power, single frequency
(2) High power, Single frequency
(3) spread-Spectrum.

Applications :- Cellular Communication
Wireless LAN
Satellite Communication.

Satellite Communication System:-



(b) $x(t-t_d) \xleftrightarrow{F} e^{-j2\pi f t_d} X(f)$

$$F[x(t-t_d)] = \int_{-\infty}^{\infty} x(t-t_d) e^{-j2\pi f t}\, dt$$

Let $(t-t_d) = z$,

$\therefore t = t_d + z$

$\therefore dt = dz$

$$F[x(t-t_d)] = \int_{-\infty}^{\infty} x(z).e^{-j2\pi f(t_d+z)} dz$$

$$= e^{-j2\pi f t_d} \int_{-\infty}^{\infty} x(z) e^{-j2\pi fz} dz$$

$$\therefore F[x(t-t_d)] = e^{-j2\pi f t_d} X(f)$$

(c) Selectivity of a receiver is its ability to reject unwanted signals. The selectivity of a Superheterodyne receiver is determined by the frequency response characteristics of the IF amplifier. The response of the mixer and RF amplifier stages also play a small but significant role. The selectivity of a receiver depends on the IF amplifier and super heterodyne has better selectivity.

Sensitivity depends on gain of the ~~RF~~ amplifier Superheterodyne has ~~better~~ gain and hence sensitivity is improved

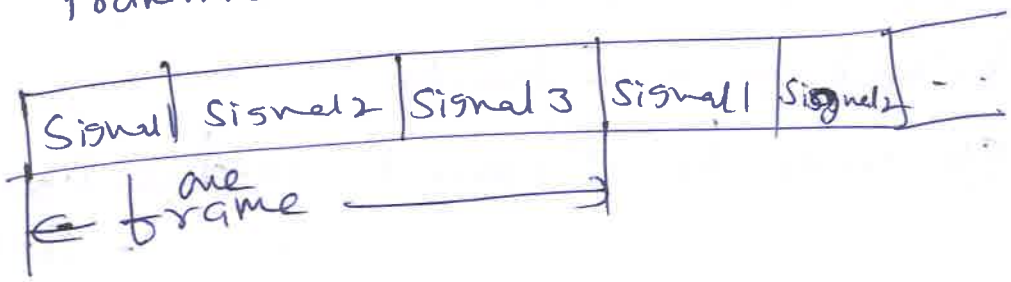
(d) Inter Symbol Interference

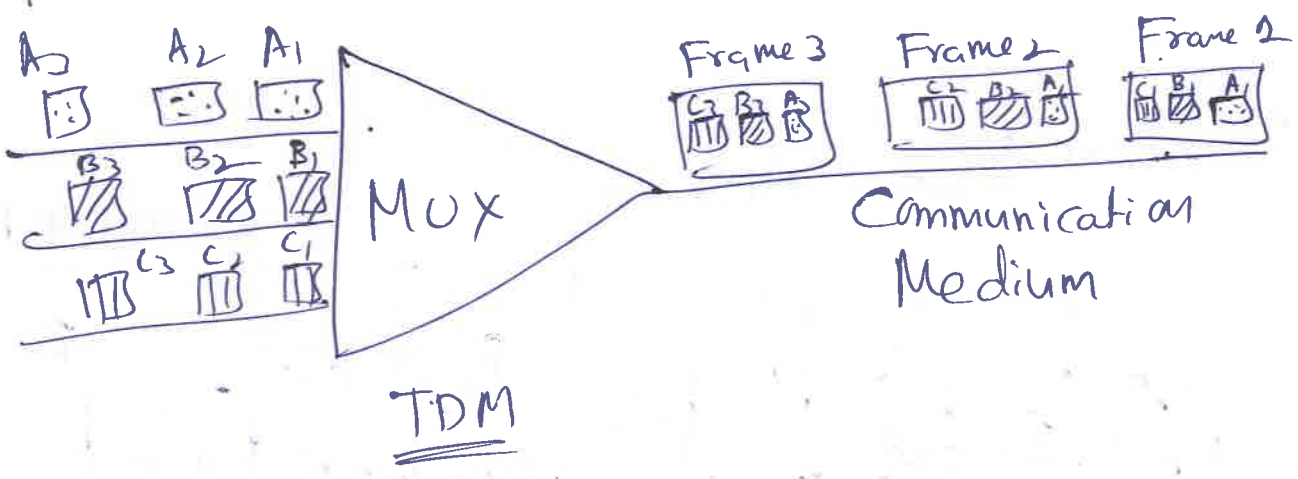
ISI is the interference of one symbol with the other. ~~and it can be~~ The spreading of the pulse beyond its alloted time interval causes it to interfere with neighboring pulses. The presence of ISI in the system introduces error in the decision device at the receiver o/p. Therefore in the design of the transmitting and receiving filters

the objective is to minimize the effects of ISI, and thereby deliver the digital data to its destination with the smallest error rate possible.

ISI can be studied by applying the received wave to the vertical deflection plates of an oscilloscope and to apply a Sawtooth wave at the transmitted symbol rate to the horizontal deflection plates. The resulting display is called an eye pattern.

(e) TDM:- In TDM all the signals to be transmitted are not transmitted simultaneously, Instead, they are transmitted one-by-one.





TDM

2.

(a) Friss formula

$$F = F_1 + \frac{F_2 - 1}{G_1} + \frac{F_3 - 1}{G_1 G_2} + \cdots$$

Diagram – 1 Mark.
Proof – 4 Marks.

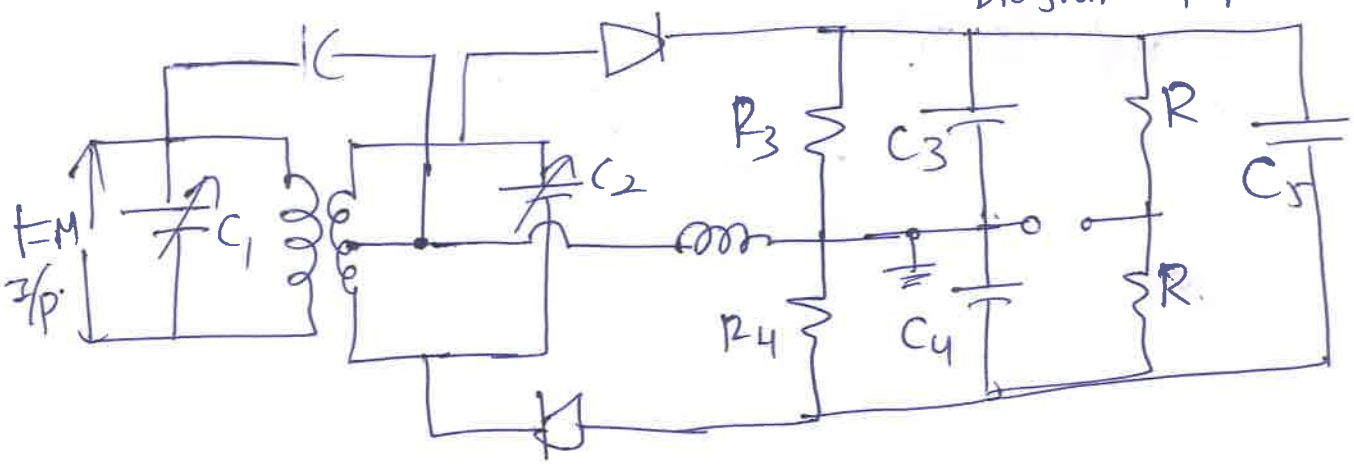
(b) Statement – 1 Mark.
Proof : 4 Marks.

(c) AM expression:-

Definition – 1 Mark.
Derivation – 6 Marks.
Spectrum for different modulation indexes – 3 Marks.

3. (a) Ratio detector

Diagram – 4 Marks.



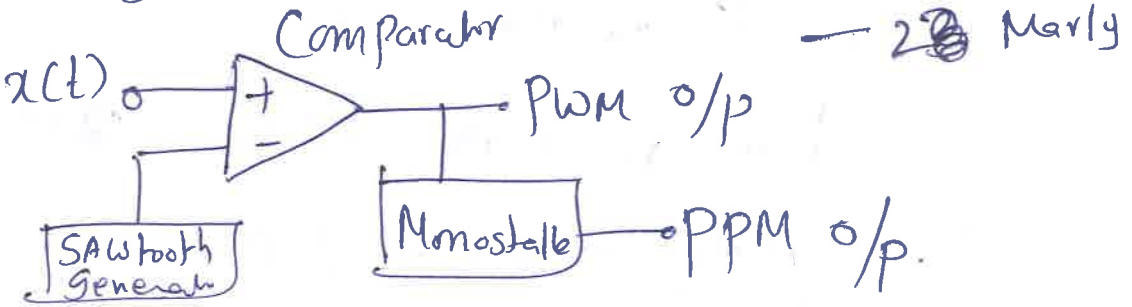
Explanation – 6 Marks.

3

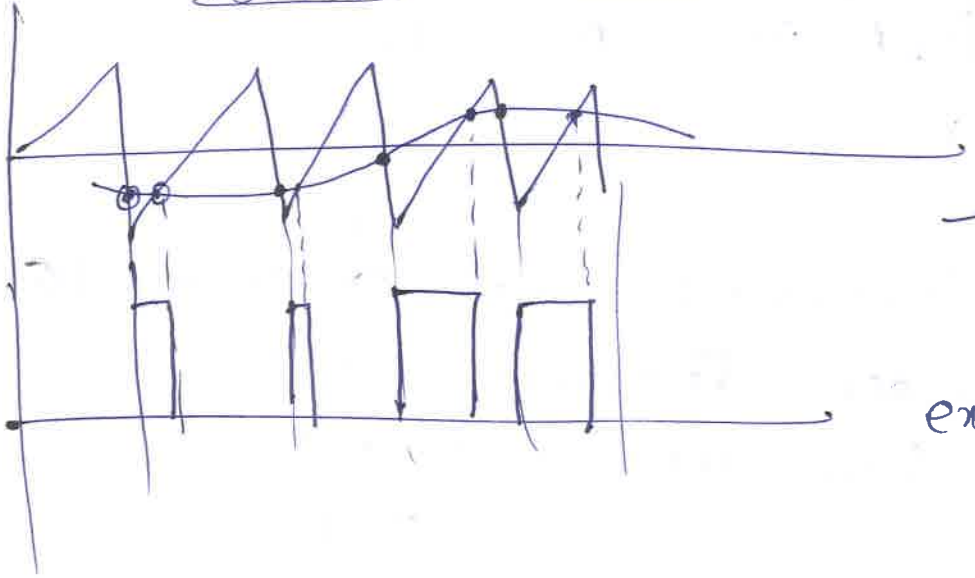
(b) Explain any method of Generation of DSBSCAM like balanced Modulator – 5 Marks
De generation of any method like Synchronous detector – 5 Marks.

4.

(a) PWM generation



— 2 Marks



— 2 Marks.

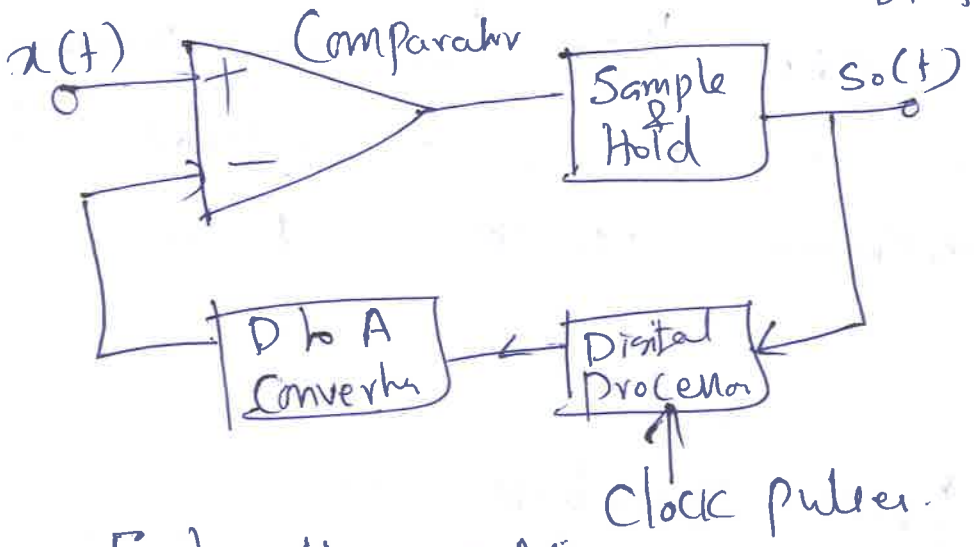
explanation – 1 Mark.

(b) PWM Degeneration

Diagram – 2 Marks.
Explanation with waveform – 3 Marks

(b) Adaptive delta modulation

Diagram – 3M.



Explanation – 2M.

Waveforms of ADM : 2M.

Advantages – 1M.

ADM receiver – 2M.

5.

(a) Generation with diagram – (6M)

Block Diagram – 2M.

Wave form – 2M.

explanation – 2M

Degeneration with diagram – (4M).

(b) Data formats Unipolar NRZ – 2M

Unipolar RZ – 2M

Bipolar RZ – 2M

Split phase – 2M

Polar Quaternery – 2M

6

(i) Sampling theorem
Statement - 1M
Proof - 4M.

(ii) Thermal Noise - 3M
Noise Temparatu - 2M.

(iii) BASK Diagram - 2M
Explanation - 3M

(iv) SSB SC AM → any sideband either USB (or) LSB generation
Diagram - 2M
Explanation - 3M

(v) Need for modulation
→ Five points each carries one Mark.