TUT 2

Q.1 Total links = 64 (Samples)

T_s = 125 μs

→ time duration available for Tx. of each sample = $\frac{125\,\mu s}{64}$

= 1.95 μs

→ Size of control memory = 32 words
5 bit each
(32 inlet, address requir 5 bits)

→ clock rate = 2 × 32 × 8 kHz } Bidirectional traffic
= 64 × 8 = 512 kHz

Otherwise = 32 × 8 kHz

Q.2 T_s = 125 μs

each pulse = 125 ns

Bidirectional traffic = 2 pulses = 2 × 125 ns

Subscribers = $\frac{125\,\mu s}{2 \times 125\,ns} = 500$

Q.3 1) Address lines = $\log_2 32 = 5$ bit

2) Data line = Always 8 bit (Sample converted to 8 bit)

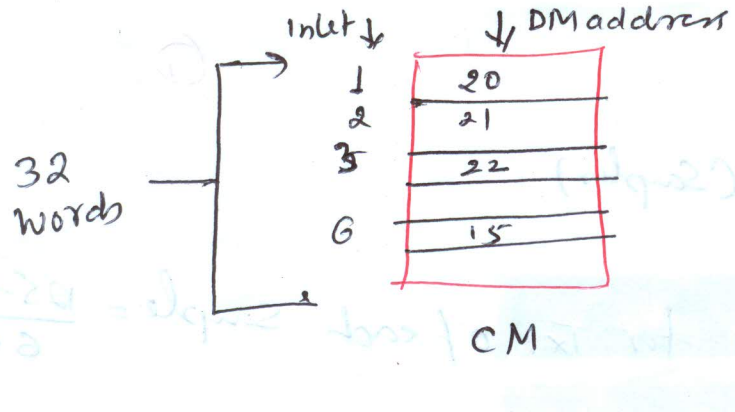
3) Data memory = (depends on Seq. Operation)
(DM)
= O/p read operation is seq.
= 32 outlets will read 1 by 1
(from DM, each DM will carry 8 bit sample)

Size = 32 location × 8 bit

= 32 × 8 bit

4) CM size = depend on Random Operation
= 32 intels has to be written in DM
based on address given by CM

= 32 × 5 bit



(2)

Data of 1 will be written 20th location of DM, 20th outlet will read. So 1 ↔ 20 connection achived etc.

Q.4: (a) Address line = $\log_2$ (DM locations)

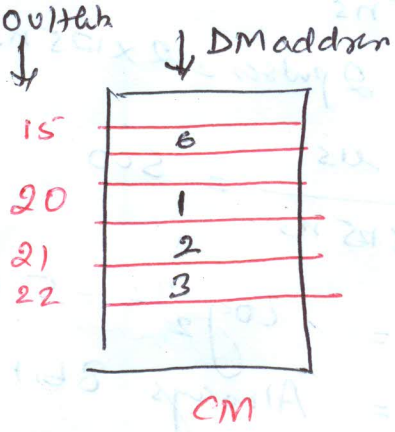
$= \log_2 32 = 5$

(b) Data lines = 8

(c) DM = 32×8 bit

(d) CM = 32×5 bit

(e)



Q.5 32×64 Switch Seq write / Random Read

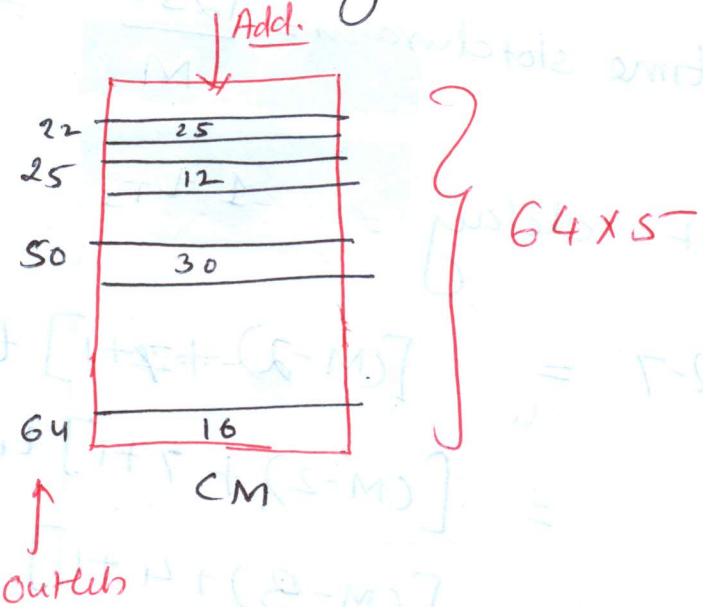
→ (a) 32 inlet written seq. So DM will contain 32 location, 8 bit each.

DM size = 32×8 bit
Data lines = 8

→ 64 outlets read data randomly
CM contains = 64 location for each outlet
location contains address of DM, DM has 32 location so addressing then requires 5 bit

→ CM Size = $64 \times \log_2^{32} = 64 \times 5$ bit (3)

→ Address Line = $\log_2^{(DM\ Location)} = \log_2^{32} = 5$



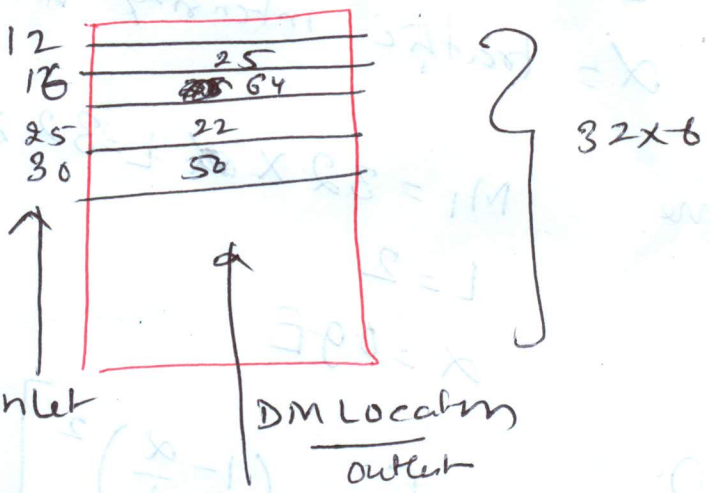
Q-6 ~~64x32~~ 32x64 switch Seq Read / Random unit operation.

→ DM Size = 64 x 8 Bit

→ Address Line = $\log_2^{64} = 6$ Bit

→ Data Lines = 8 Bit

→ CM Size = 32 x 6 Bit



(7) frame = 1 = N

Channel/slots = 32 = M

time slot duration = $\frac{125\ \mu s}{M}$ = t_{Ts}

→ inherent delay = $1\ t_{Ts}$

→ for 2-7 = $[(M-2)+7+1]\ t_{Ts}$

= $[(M-2)+7+1]\ t_{Ts}$

for 3-4 = $[(M-3)+4+1]\ t_{Ts}$

for 1-1 = t_{Ts}

(8) $P_B\ (T_S T) = \left[1-(1-\alpha/L)^2\right]^{M_1}$

M_1 = time slot on o/p side of TSI switch.

$L = M_1/M$ = exp/concentration factor

α = traffic intensity on an link

→ here $M_1 = 32 \times L = 32 \times 2 = 64$

$L = 2$

$\alpha = 0.9E$

$P_B = \left[1-\left(1-\frac{\alpha}{L}\right)^2\right]^{M_1}$