

EE101

Assignment 8

Question - 1

Ans 1 →

$$Y = \overline{(A+B)} \cdot \overline{(\bar{A}+B)}$$

$$Y = (A+B) + (\bar{A}+B) = A + \bar{A} + B$$

A	\bar{A}	B	Y	$= 1+B$
1	0	0	1	
0	1	0	1	$= 1$
1	0	1	1	
0	1	1	1	

Ans

To check,

A	B	A+B	$\overline{A+B}$	\bar{A}	\bar{B}	$\overline{\bar{A}+B}$	$(\overline{A+B}) \cdot (\overline{\bar{A}+B})$	Y
1	1	1	0	0	1	0	0	1
0	0	0	1	1	0	0	0	1
0	1	1	0	1	1	0	0	1
1	0	1	0	0	0	1	0	1

Output = Y

~~Ans~~

Question-2

Ans

Input voltage of rectifier $\geq 5 \sin(2\pi \times 50t)$

$$\text{Max voltage} = 5V = 5 \sin(100\pi t)$$

V_{ref} divides as 1.25V, 2.5V and 3.75V.

according to $\frac{V_{ref}}{4}$, $\frac{V_{ref}}{2}$, $\frac{3}{4} V_{ref}$

Truth Table of 2-bit ADC \rightarrow

V_{in}	I_3	I_2	I_1	I_0	B_1	B_0	V
$0 \leq V_{in} < 1.25V$	0	0	0	0	0	0	0
$1.25 \leq V_{in} < 2.5V$	0	0	1	0	0	1	1
$2.5V \leq V_{in} < 3.75V$	0	1	x	0	1	0	1
$3.75V \leq V_{in} \leq 5V$	1	x	x	0	1	1	1

$\therefore V_{out} = 1$ for $V_{in} \geq 1.25V$

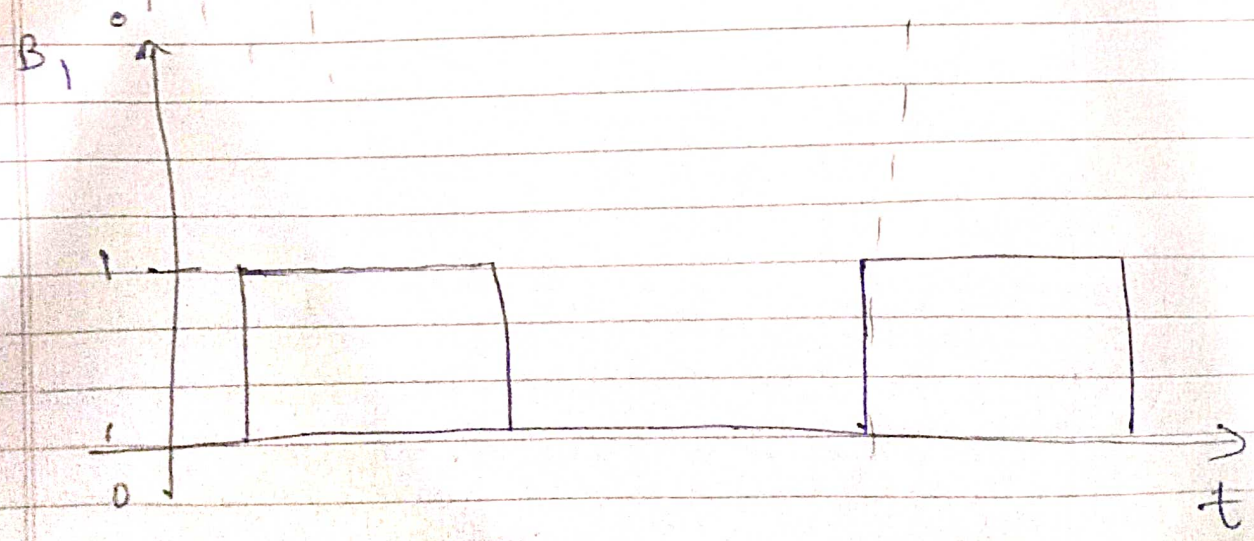
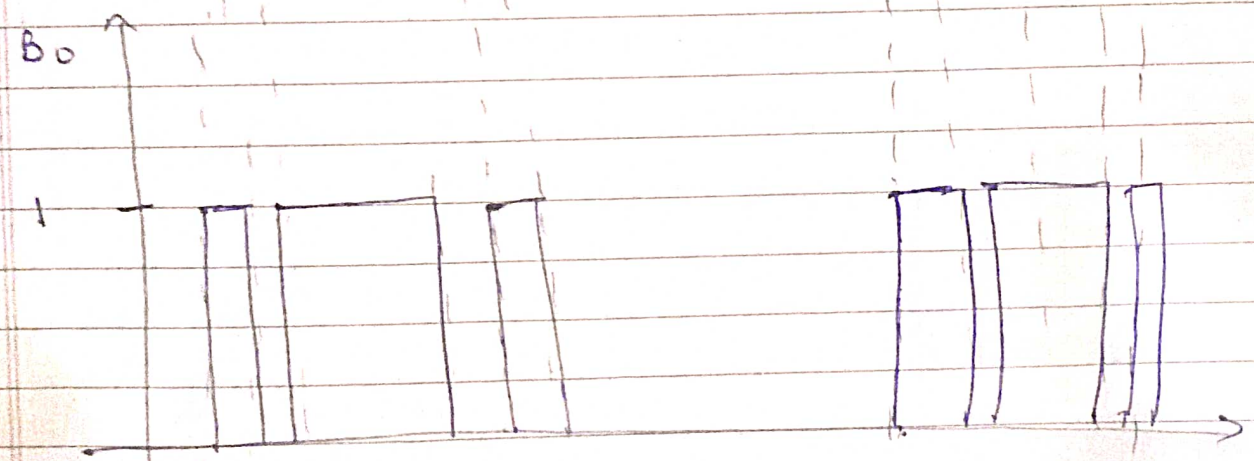
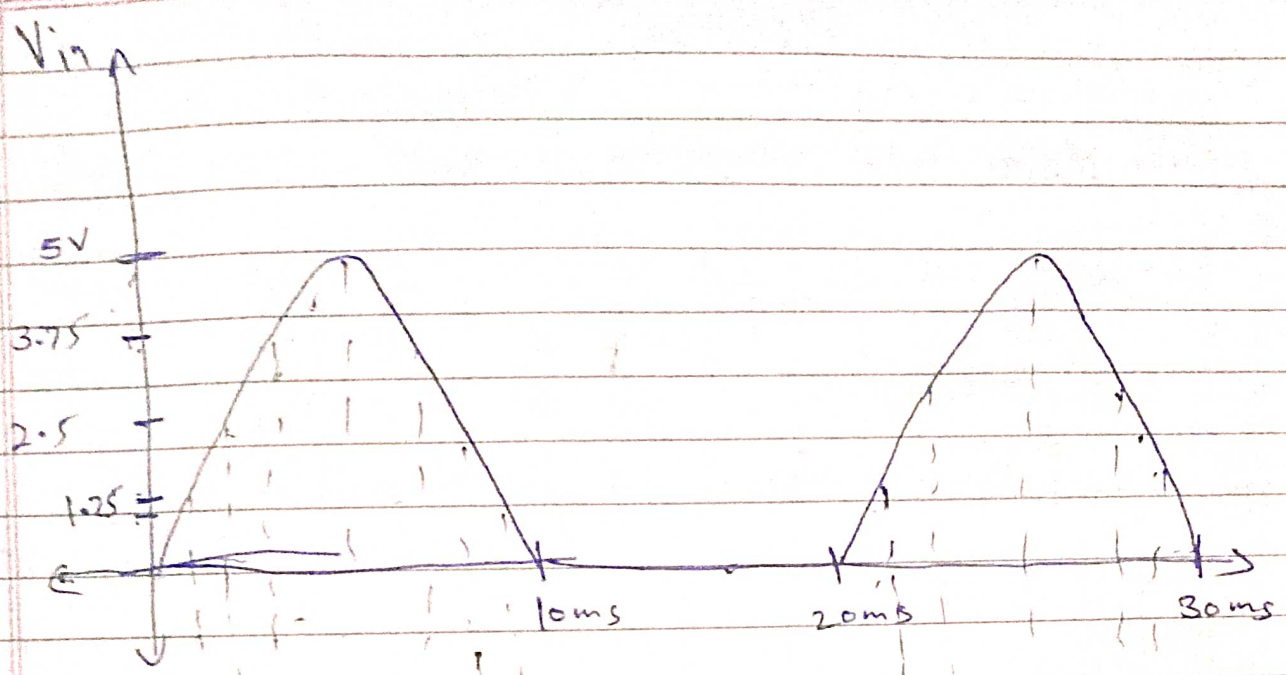
$$t_0 = \frac{1}{100\pi} \sin^{-1}\left(\frac{1}{4}\right)$$

$$\Rightarrow 0.8ms$$

Similarly,

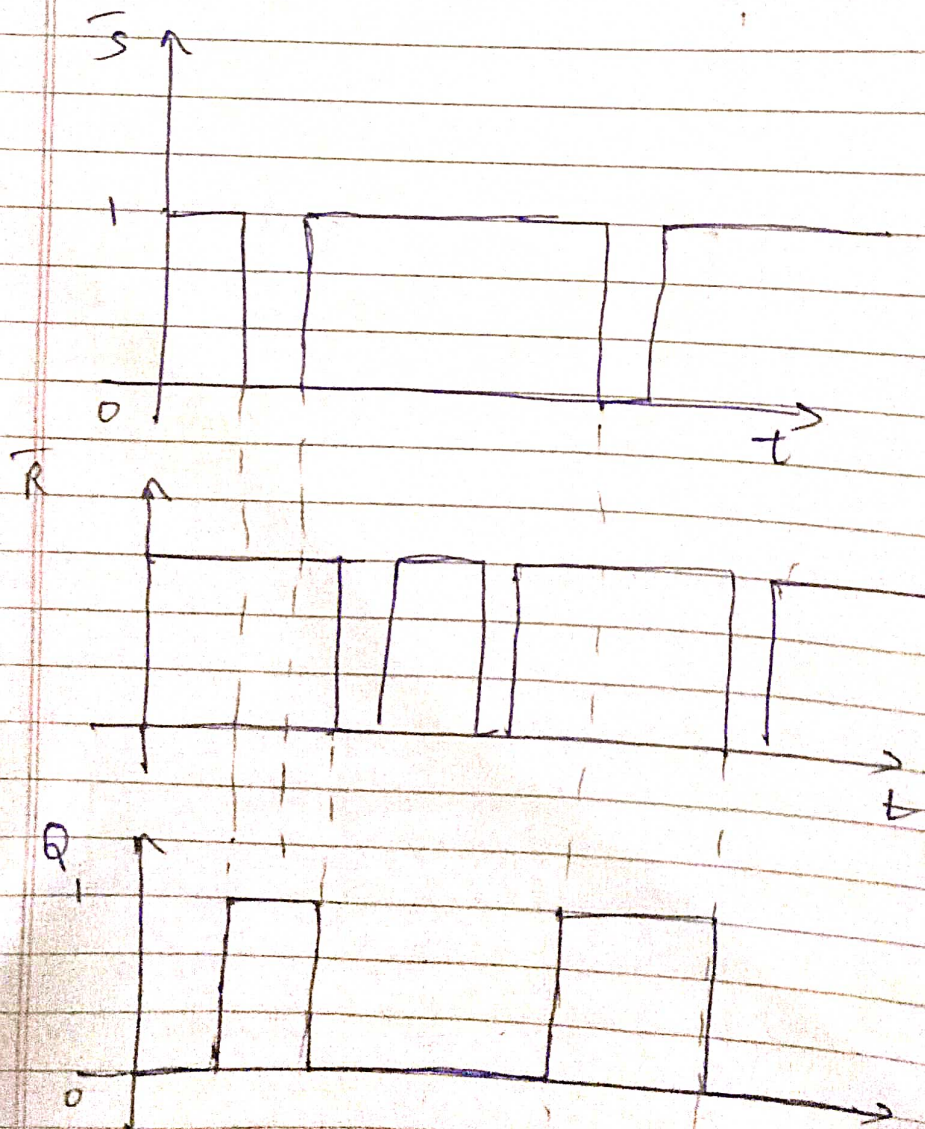
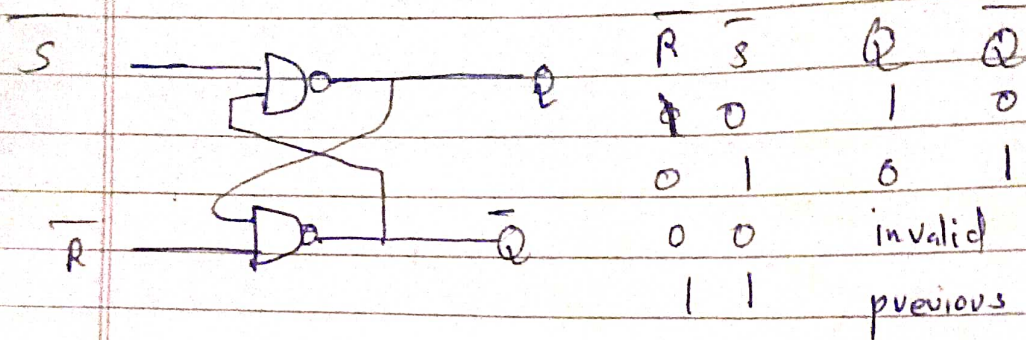
$$t_1 = \frac{1}{100\pi} \sin^{-1}\left(\frac{1}{2}\right) = 1.66ms$$

$$t_2 = 2.699ms \quad \text{and} \quad t_3 = 5ms$$



Question-3

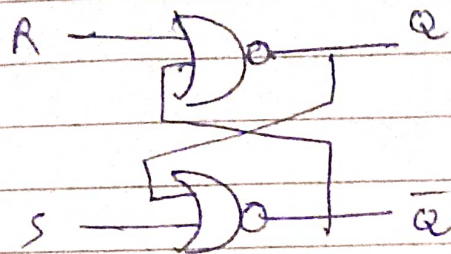
for NAND Latch we have



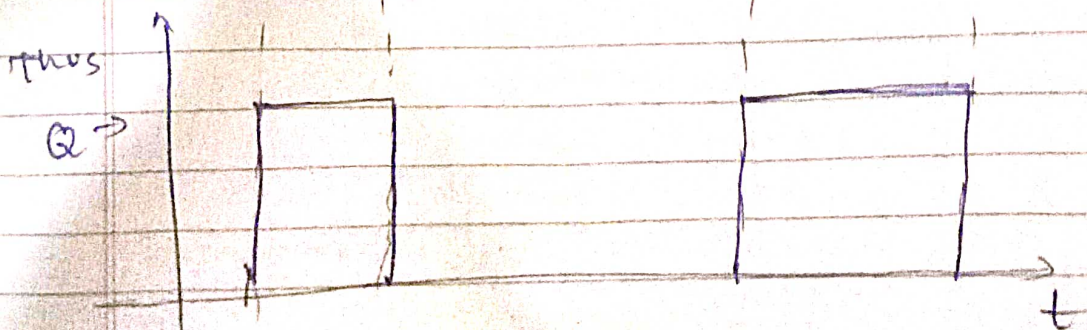
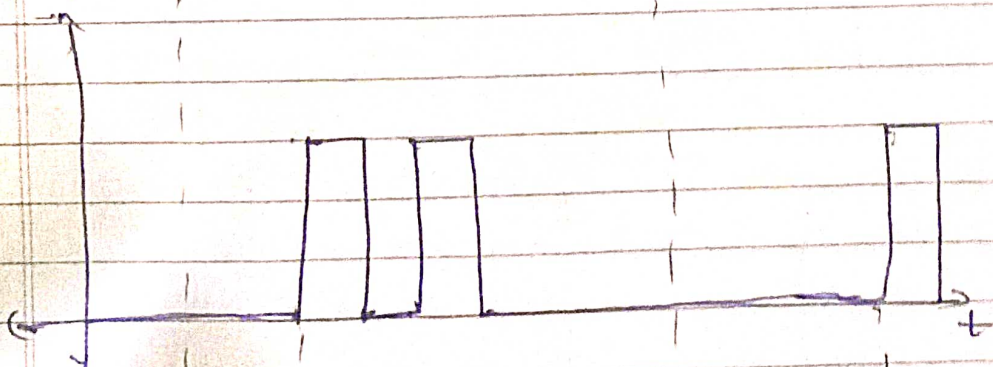
Therefore, Answer is 'B' since, two 'ON' period in the answer are almost same, and second one is a bit small.

Question - 4

for a No R latch, we have



R	S	Q	\bar{Q}
1	0	0	1
0	1	1	0
0	0	previous	
0	0	<u>invalid</u>	



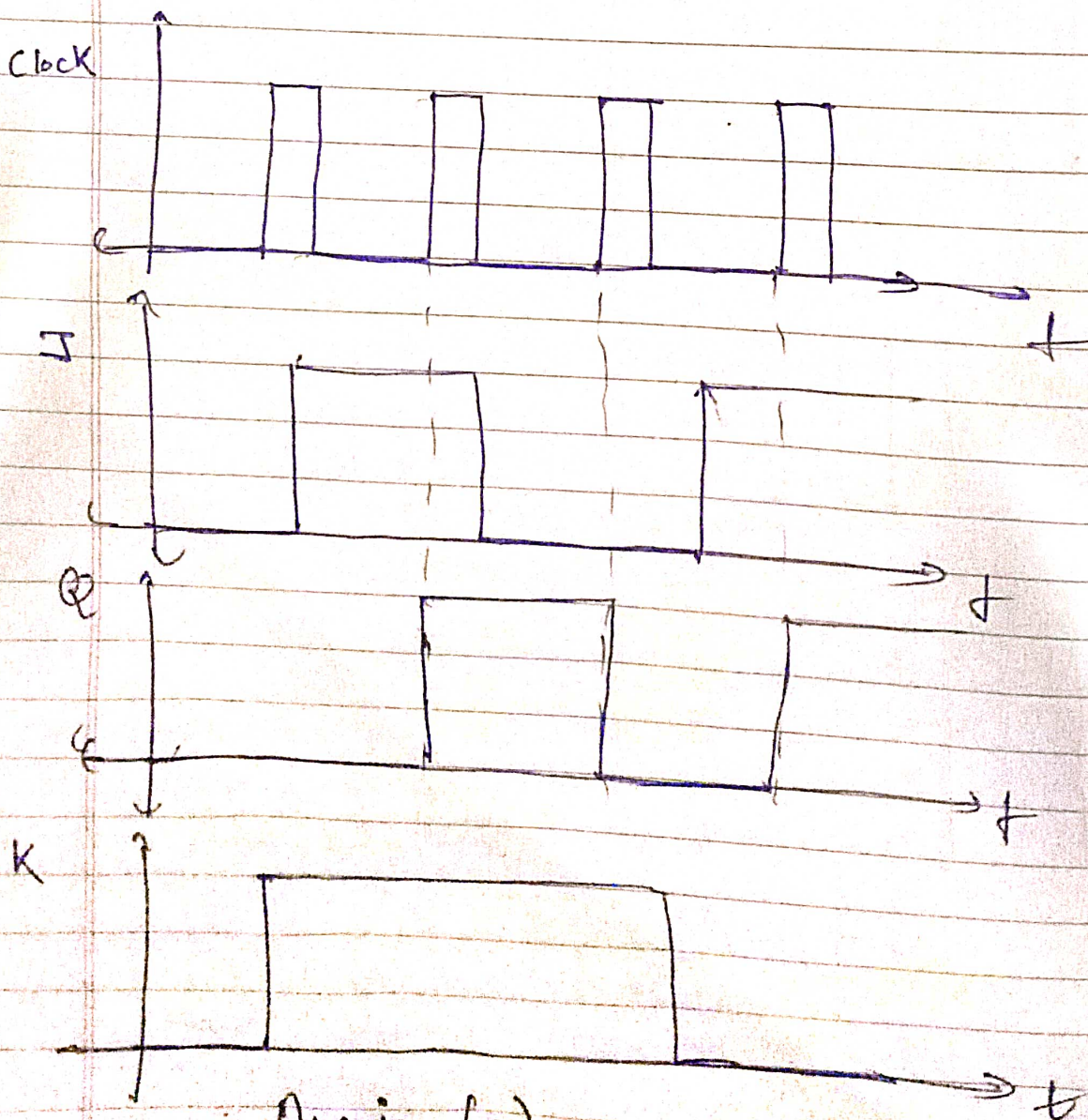
Correct Ans is (B)

since, two 'ON' periods are almost same,
with second one being a little smaller

Question-5

Truth table for J-K flip flop →

CLK	J	K	Q_{n+1}
0	x	x	previous
1	0	0	previous
1	0	1	0
1	1	0	1
1	1	1	toggle



Ans is (c)