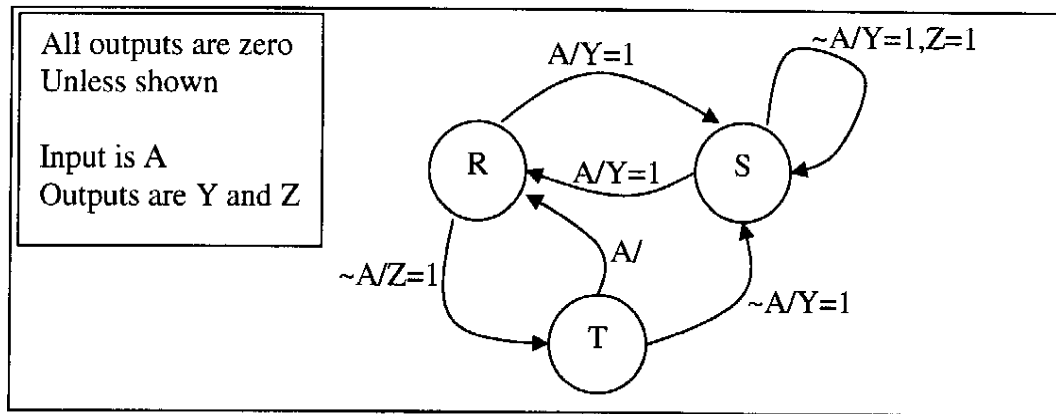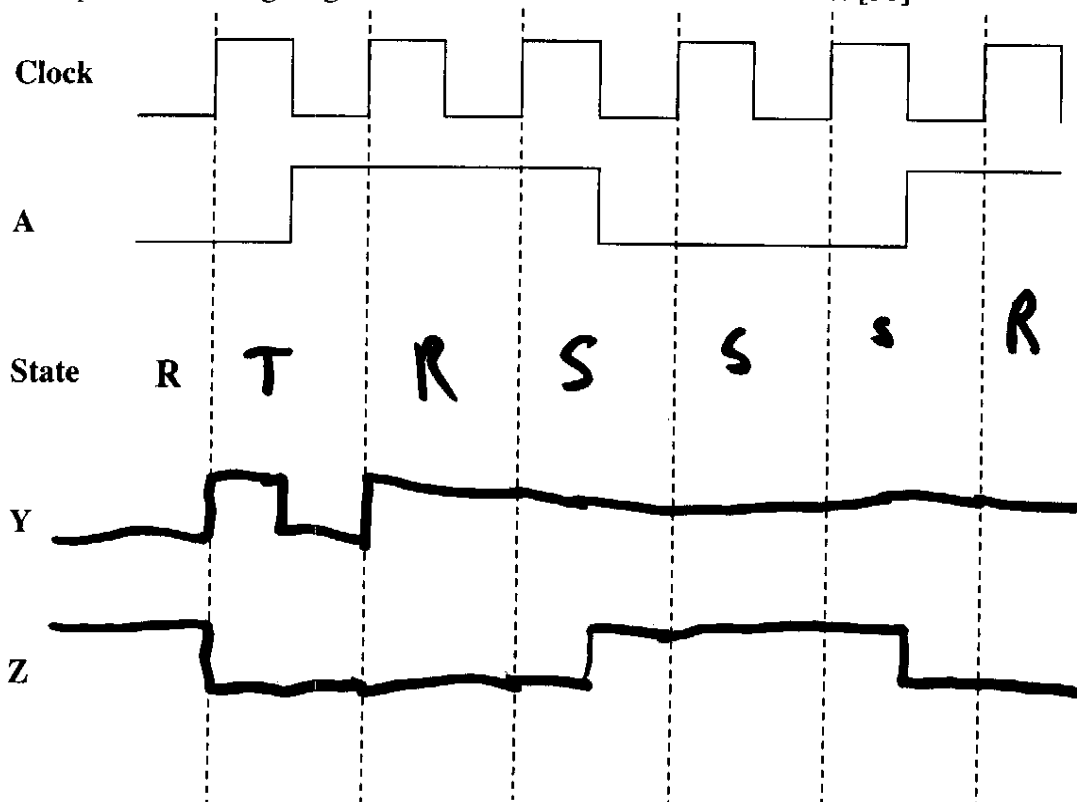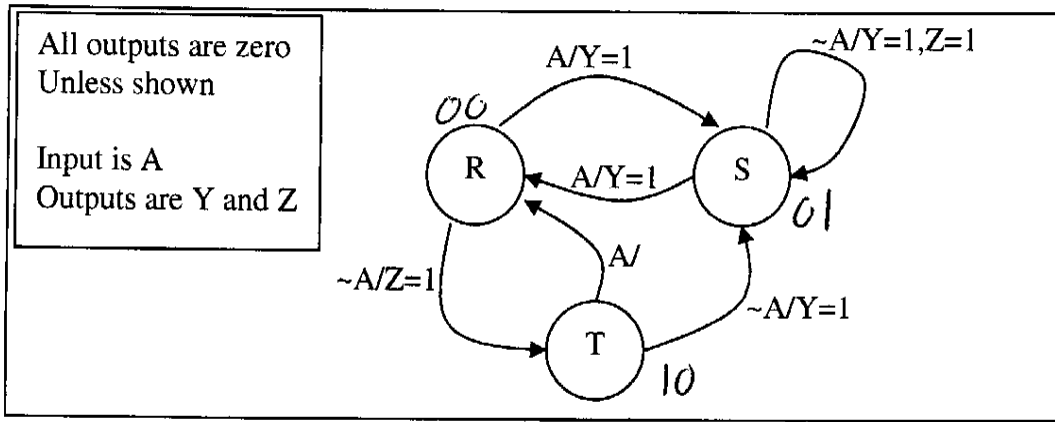# Quiz 5 – Spring 2007 – EECS 270

Name: _____ uname: _____

This quiz is graded out of 100 points. Please remember you can drop your lowest quiz score. You will have 25 minutes for the quiz. It is closed book and closed notes. <u>Show your work</u> and ***circle your answer!***

All outputs are zero
Unless shown

Input is A
Outputs are Y and Z

1. Complete the timing diagram for the state machine shown above: **[50]**

All outputs are zero
Unless shown

Input is A
Outputs are Y and Z

A/Y=1

~A/Y=1,Z=1

OO

R

A/Y=1

S

01

A/

~A/Z=1

~A/Y=1

T

10

2. For this problem, assign state bits S[1:0] as 00 for state R, 01 for state S, and 10 for state T. _Using a K-map_, find the _minimal sum-of-products_ for next state (NS[1:0]) and the outputs (Y and Z). _You must show your work to get **any** credit!_ **[50]**

A	Sϕ	S0	N1	N0	Y	Z
0	0	0	1	0	0	1
0	0	1	0	1	1	1
0	1	0	0	1	1	0
0	1	1	D.c.	D.C	D.C	D.C
1	0	0	0	1	1	0
1	0	1	0	0	1	0
1	1	0	0	0	0	0
1	1	1	D.C.	D.C	D.C	D.C.

AS$_1$ $\boxed{N1}$

S$_0$ | 00 | 01 | 11 | 10 |
| 0 | 1 | 0 | 0 | 0 |
| 1 | 0 | X | X | 0 |

AS$_1$ $\boxed{N0}$

S$_0$ | 00 | 01 | 11 | 10 |
| 0 | 0 | 1 | 0 | 1 |
| 1 | 1 | X | X | 0 |

AS$_1$ $\boxed{Y}$

S$_0$ | 00 | 01 | 11 | 10 |
| 0 | 0 | 1 | 0 | 1 |
| 1 | 1 | X | X | 1 |

AS$_1$ $\boxed{Z}$

S$_0$ | 00 | 01 | 11 | 10 |
| 0 | 1 | 0 | 0 | 0 |
| 1 | 1 | X | X | 0 |

$\overline{A}\,\overline{S1}$

NS1= $\overline{A}\,\overline{S_0}\,\overline{S_1}$

NS0= $\overline{A}\,S_0 + \overline{A}\,S_1 + A\overline{S_1}\,\overline{S_0}$

Y= $S_0 + \overline{A}\,S_1 + A\overline{S_1}$

Z= $\overline{A} \cdot \overline{S1}$