

Q2) [30pts] In a Single-Cycle Processor implementation, assume that memories and the ALU have 2ns delays, and the registers have a 1ns delay. What would be the exact CPU time of the following code segment that clears a string of length 5bytes? \$a1 will loaded with 5.

```
lw $a1,4($a2)
```

```
Loop :sb $zero, 0($a0) # store byte in memory
```

```
add $a0, $a0, 1
```

```
sub $a1, $a1, 1
```

```
bne $a1, $zero, Loop
```

```
End : jr $ra
```

- (a) [10pts] Cycle time =
- (b) [10pts] # of clock cycles
- (c) [10pts] Total CPU time

Q3) [40pts] Consider the following Single-Cycle Processor data-path.

A/ [20pts] High-light the data-path for executing the instruction

```
bne rs, rt, immediate
```

B/ [20pts] Draw implementation of the logical function of PCSrc for this instruction.

