

0907432 Computer Design (Fall 2014)

Quiz 1

الرقم التسلسلي:

رقم التسجيل:

الاسم:

Instructions: Time **15** minutes. Open book and notes exam. No electronics. Please answer all problems in the space provided and limit your answer to the space provided. **No questions are allowed.**

<Good Luck>

Q1. The 5-stage pipelined processor shown in the next page resolves branch instructions in the decode stage and should solve the data hazards through forwarding and stalls. The pipeline diagram shows the execution of following five instructions at Cycle 5.

[5 marks]

```
lw $4, 0($22)
sw $4, 0($21)
sub $1, $4, $8
beq $1, $3, 7
and $12, $2, $5
```

- A) On the diagram next page, draw the forwarding path needed to solve the data hazard between the `lw` and `sub` instructions.
- B) On the diagram next page, draw the forwarding path needed to solve the data hazard between the `lw` and `sw` instructions.
- C) Is there a need to stall the `beq` instruction (answer Yes or No)? Yes
- D) On the diagram next page, draw the needed forwarding paths from the memory stage to the decode stage.
- E) What instruction will be fetched in Cycle 6? and \$12, \$2, \$5

You must mark the forwarding paths you draw by the corresponding question (A, B, and D).

