**CS2100 (AY2021/22 Semester 1) Answer Sheets**

**Student No: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

(If you are using this file, remember to create a pdf file and rename it with your Student Number (eg: A1234567X.pdf). Write your answers in the box/space provided.)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1** |  | **2** |  | **3** |  | **4** |  | **5** |  | **6** |  |  |  |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **7** |  | **8** |  | **9** |  | **10** |  | **11** |  |

**Q12. Sequential circuits [12 marks]**

1. (i) [4] (ii) [2]

1

2

3

0

1

0

1

0

1

***JA* =**

***KA* =**

0

***JB*=**

***KB* =**

1. (i) [3] (ii) [3]

Clock

*Q*

*Q'*

*D*

Clock

*Q*

*Q'*

*T*

**Q13. Combinational circuits [13 marks]**

(a) [4]

***E*(*A*,*B*,*C*,*D*) = m**

***F*(*A*,*B*,*C*,*D*) = m**

***G*(*A*,*B*,*C*,*D*) = m**

***H*(*A*,*B*,*C*,*D*) = m**

(b) [4]

***K* =**

**4:1**

**MUX**

0

1

2

3

*S*0

*S*1

***F***

(c) [5]

**Q14. MIPS [13 marks]**

(a)

[2]

(b)

[4]

(c) (d)

[2] [2]

(e)

[3]

**Q15. Pipelining [14 marks]**

(a) (b) (c) (d)

[2] [3] [3] [3]

(e)

[3]

**Q16. Cache [18 marks]**

(a)

Index: \_\_\_\_\_\_ ; Byte offset: \_\_\_\_\_\_

[2]

(b)

Hit rate for array *A* = ; Hit rate for array *B* =

[2]

(c)

Hit rate for array *A* = ; Hit rate for array *B* =

[4]

(d)

Lowest hit rate for array *A* =

[2]

How many elements in array *A* would result in this hit rate?

(e)

Set index: \_\_\_\_\_\_ ; Byte offset: \_\_\_\_\_\_

[2+3]

Number of misses: \_\_\_\_\_\_

(f)

Number of misses: \_\_\_\_\_\_

[3]