

NATIONAL UNIVERSITY OF SINGAPORE

CS2100 – COMPUTER ORGANISATION

(Semester 2: AY2017/18)

ANSWER BOOKLET

Time Allowed: 2 Hours

INSTRUCTIONS TO CANDIDATES

1. This answer booklet consists of **SIX (6)** printed pages.
2. Fill in your Student Number **with a pen clearly** below. Do **NOT** write your name.
3. You may write your answers in pencil (2B or above).

STUDENT NUMBER
(fill in with a **pen**):

A	0	1						
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For examiner's use only		
<i>Question</i>	<i>Total</i>	<i>Marks</i>
Q1	10	
Q2	15	
Q3	20	
Q4	12	
Q5	15	
Q6	14	
Q7	14	
<i>Total</i>	100	

Write your answers in the box/space provided.

1a.
[4]

1b.
[3]

1c.
[3]

$F =$

Circuit delay =

Q1:

/10

2a.
[10]

$DA =$

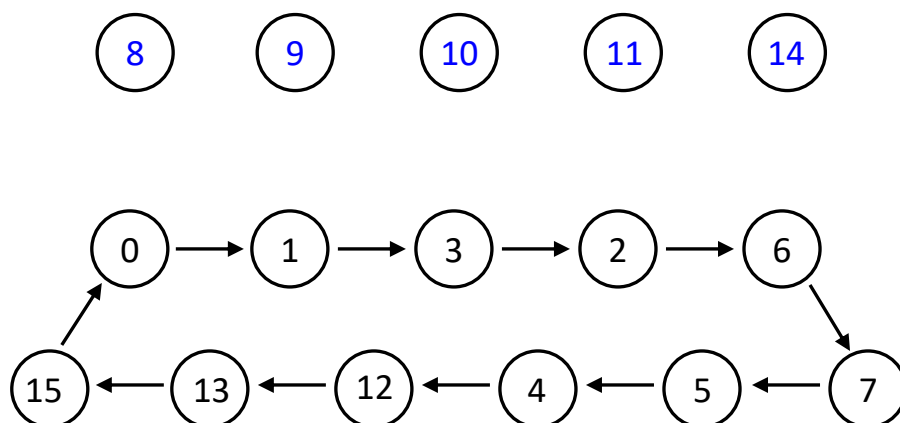
$DB =$

$TC =$

$JD =$

$KD =$

2b.
[5]



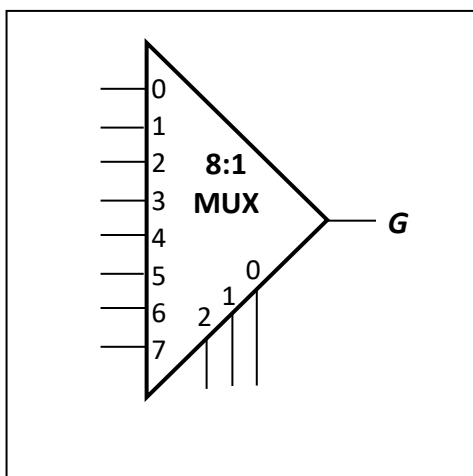
Q2:

/15

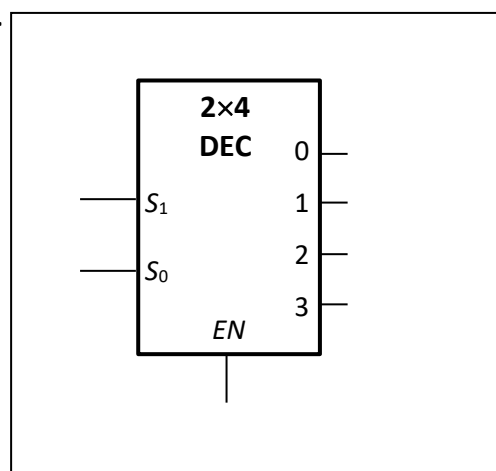
3a.
[4]

$$F = A$$

3b.
[4]



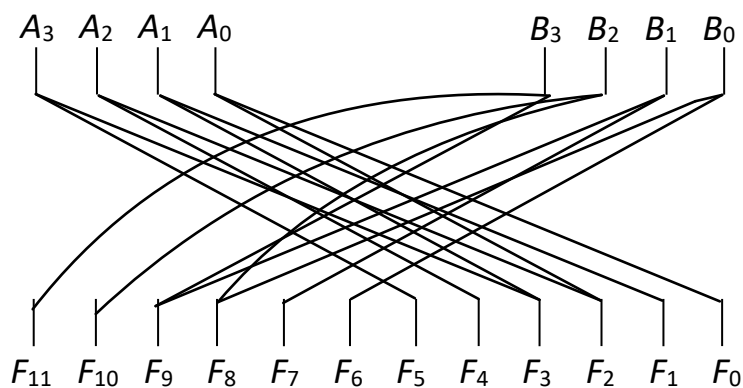
3c.
[4]



3d.
[8]

	A				$5 \times A$							
	A_3	A_2	A_1	A_0	128	64	32	16	8	+	2	1
0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	1	0	0	0	0	0	1	0	1
2	0	0	1	0	0	0	0	0	1	0	1	0
3	0	0	1	1	0	0	0	0	1	1	1	1
4	0	1	0	0	0	0	0	1	0	1	0	0
5	0	1	0	1	0	0	0	1	1	0	0	1
6	0	1	1	0	0	0	0	1	1	1	1	0
7	0	1	1	1	0	0	1	0	0	0	1	1
8	1	0	0	0	0	0	1	0	1	0	0	0
9	1	0	0	1	0	0	1	0	1	0	1	1

Complete your circuit here.



Q3:

/20

4a.
[2]

Maximum total instructions =

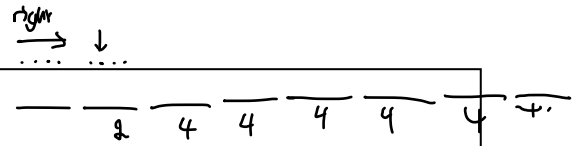
4b.
[3]

Stuck-at-0 fault at bit 6 of the instruction \$s0

00000000
64 31 16 8 4 2 1
6 5 4 3 2 1 0

addi \$t0, \$0, 64.

If \$s0 is 0, fault is found ✓



4c.
[3]

Stuck-at-0 fault at ALUSrc

4d.
[4]

Adding bne instruction

Q4:

/12

5a.

[1]

5b. Array A:

--	--	--	--	--	--	--	--

[4]

5c.

[4]

5d.

[2]

5e.

[2]

5f.

[2]

Q5:

/15

6a.

Minimum =

 Maximum =

[2]

6b.

[6]

6c. cycles

[3]

6d. cycles

[3]

Q6:

/14

- 7a.
[2] Index: _____ bits; Offset: _____ bits
- 7b.
[4] $A[1023] \rightarrow$ Index _____; $B[1023] \rightarrow$ Index _____;
- 7c.
[2] Array A: _____ accesses; Array B: _____ accesses
- 7d.
[2] Array A: _____ %; Array B: _____ %
- 7e.
[4] Misses: _____; Hits: _____

Q7:

/14

=== END OF PAPER ===