**CS2100 Assignment 3 Answer Book**

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Save this file as AxxxxxxxY.pdf and submit on Canvas. You do NOT need to create a zip file.

You will forfeit up to 3 marks if you do not fill your particulars above, or do not follow the submission instructions.

**Submission information: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ / 3**

**Question 1.** (6 MARKS)

(a) (2 marks) *F(A,B,C,D)* = **(6, 15)**

(b) (2 marks) *G(A,B,C,D)* = **(8, 10, 12)**

(c) (2 marks) *H(D,C,B,A)* = **(10, 11, 15)**

**Q1 Total: \_\_\_\_\_\_\_\_\_ / 6**

**Question 2.** (6 MARKS)

(a) (2 marks) *X(A,B,C)* = **(0, 3, 6, 7)**

(b) (2 marks) *Y(A,B,C,D)* = **(0, 1, 2, 3, 6, 7, 8, 10, 11, 13, 14, 15 )**

(c) (2 marks) *Z(C,B,A)* = **(1, 2, 4, 6)**

**Q2 Total: \_\_\_\_\_\_\_\_\_ / 6**

**Question 3.** (7 MARKS)

(a) (3 marks)

*F* = A’ + (B’⋅ C’)

*G* = (A’⋅ B) + (B⋅ C’) + (A⋅ B’⋅ C)

*H* = C

(b) (2 marks)

“The circuit converts a 3-bit sign-and-magnitude number to 3-bit excess 4 code.”

(c) (2 marks)

X3

X2

X1

X0

Y3

Y2

Y1

Y0

**4-bit**

**COMP**

X<Y

X=Y

X>Y

0

A

B

F

C

0

1

0

**Q3 Total: \_\_\_\_\_\_\_\_\_ / 7**

1

**Question 4.** (7 MARKS)

(a) (2 marks) *F*(*A,B,C,D*) = (A ⋅ C’) + (A ⋅ B ⋅ D’) + (B ⋅ C’ ⋅ D’)

(b) (2 marks)

0

X3

X2

X1

X0

Y3

Y2

Y1

Y0

**4-bit**

**COMP**

X<Y

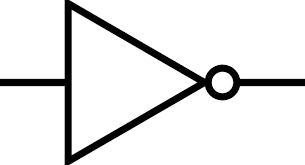
X=Y

X>Y

B

C

D



G(A,B,C,D)

0

1

0

1

(c) (3 marks)

X3

X2

X1

X0

Y3

Y2

Y1

Y0

**4-bit**

**COMP**

X<Y

X=Y

X>Y

B’

A

C

D

1

0

H(A,B,C,D)

0

0

**Q4 Total: \_\_\_\_\_\_\_\_\_ / 7**

**Question 5.** (5 MARKS)

*F*2 = A7 + A6 + A5 + A4

*F*1 = A7 + A6 + (A5’⋅A4’⋅A3) + (A5’⋅A4’⋅A2)

*F*0 = A7 + (A6’⋅A5) + (A6’⋅A4’⋅A3) + (A6’⋅A4’⋅A2’⋅A1)

**Q5 Total: \_\_\_\_\_\_\_\_\_ / 5**

**Question 6.** (6 MARKS)

(a) (2 marks) State 7

(b) (2 marks) State 2

(c) (2 marks) States 0 and 2

**Q6 Total: \_\_\_\_\_\_\_\_\_ / 6**

**Total Marks: \_\_\_\_\_\_\_\_\_\_\_\_\_ / 40** (To be filled by TA only)

=== END OF PAPER ===