



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE DIGITAL ELECTRONICS N4

7 AUGUST 2019

This marking guideline consists of 9 pages.

QUESTION 1

1.1	1.1.1	A		
	1.1.2	B		
	1.1.3	C		
	1.1.4	B		
	1.1.5	A		
			(5 × 1)	(5)
1.2	1.2.1	B		
	1.2.2	F		
	1.2.3	E		
	1.2.4	C		
	1.2.5	A		
			(5 × 1)	(5)
1.3	1.3.1	True		
	1.3.2	False		
	1.3.3	False		
	1.3.4	False		
	1.3.5	False		
			(5 × 1)	(5)
1.4	1.4.1	$\begin{array}{r} 1010,1011 \\ +111,1\checkmark \\ \hline 10010,0011\checkmark \end{array}$		
	1.4.2	$11101_2\checkmark\checkmark$		
	1.4.3	$\begin{array}{r} 1100 \\ -1011\checkmark \\ \hline 0001\checkmark \end{array}$		
			(3 × 2)	(6)
				[21]

QUESTION 2

2.1 F, $A_{16} = 1111, 1010$ ✓

$$5, 7_8 = 0101, 1110 = 1010, 0001$$

$$\begin{array}{r} + 1 \checkmark \\ \hline 1010, 0010 \checkmark \end{array}$$

$$\begin{array}{r} 1111, 1010 \checkmark \\ 1010, 0010 \\ \hline 1001, 1100 \checkmark \\ = 9,75_{10} \checkmark \end{array}$$

(6)

2.2 $8,5_{10} = 1000, 100$ ✓

$6, 2_8 = 0110, 010 = 1001, 101$ ✓

$$\begin{array}{r} 1000, 100 \\ 1001, 101 \checkmark \\ \hline 0010, 001 \\ + 1 \checkmark \\ \hline 0010, 010 = 2,25_{10} \checkmark \end{array}$$

(5)

2.3 $1,111$ ✓

$$\begin{array}{r} 1111010 \text{ } \sqrt{11101011000} \\ -1111010 \\ \hline 11100010 \checkmark \\ -1111010 \\ \hline 11010000 \\ -1111010 \checkmark \\ \hline 10101100 \\ -1111010 \checkmark \\ \hline 00110010 \checkmark \\ = 1,7_8 \checkmark \end{array}$$

(6)

2.4

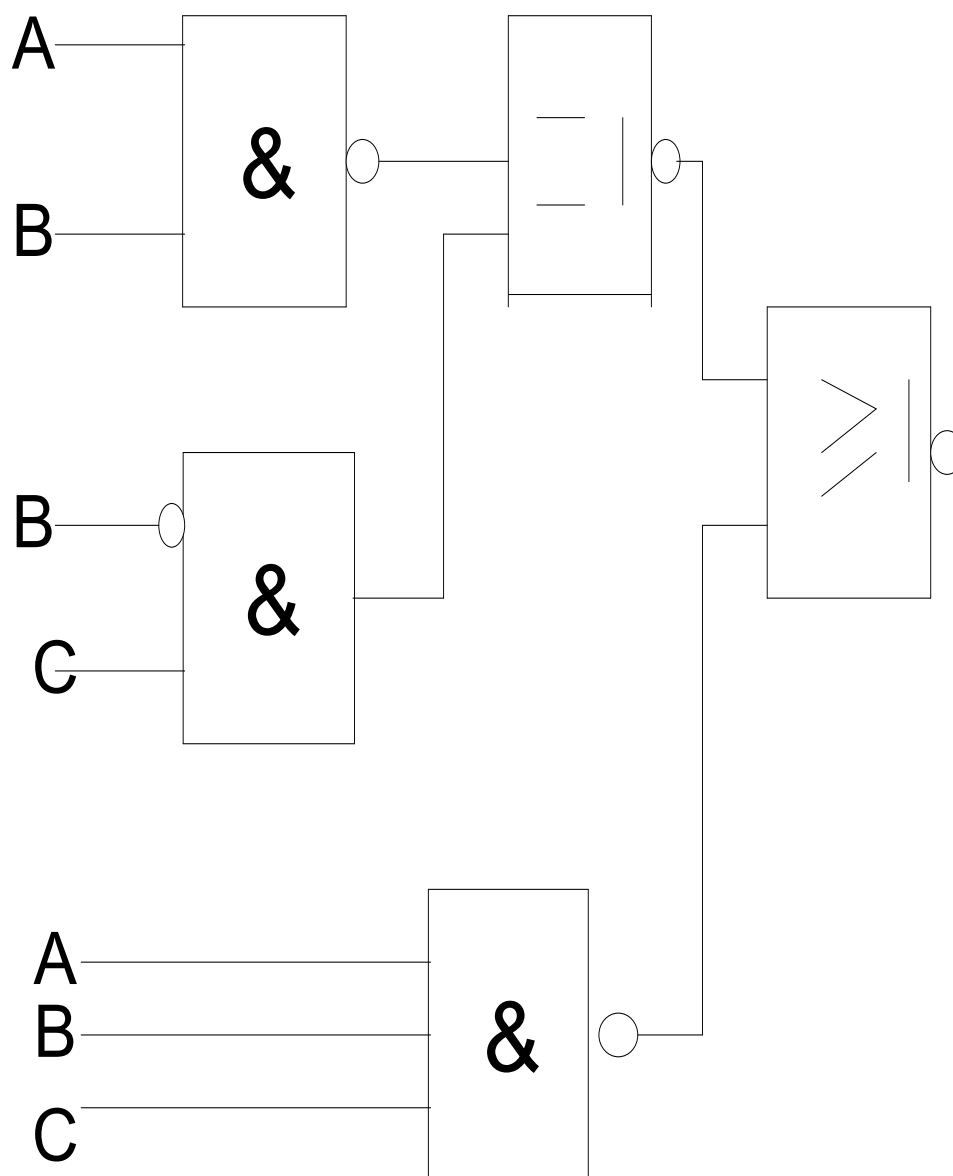
$$\begin{array}{r} 110000011010 \\ 110101 \checkmark \\ \hline 110000011010 \\ 000000000000 \checkmark \\ 110000011010 \\ 000000000000 \checkmark \\ 110000011010 \\ 110000011010 \checkmark \\ \hline 1010000, 00101100010 \checkmark \\ = 50,2C_{16} \checkmark \end{array}$$

(6)
[23]

QUESTION 3

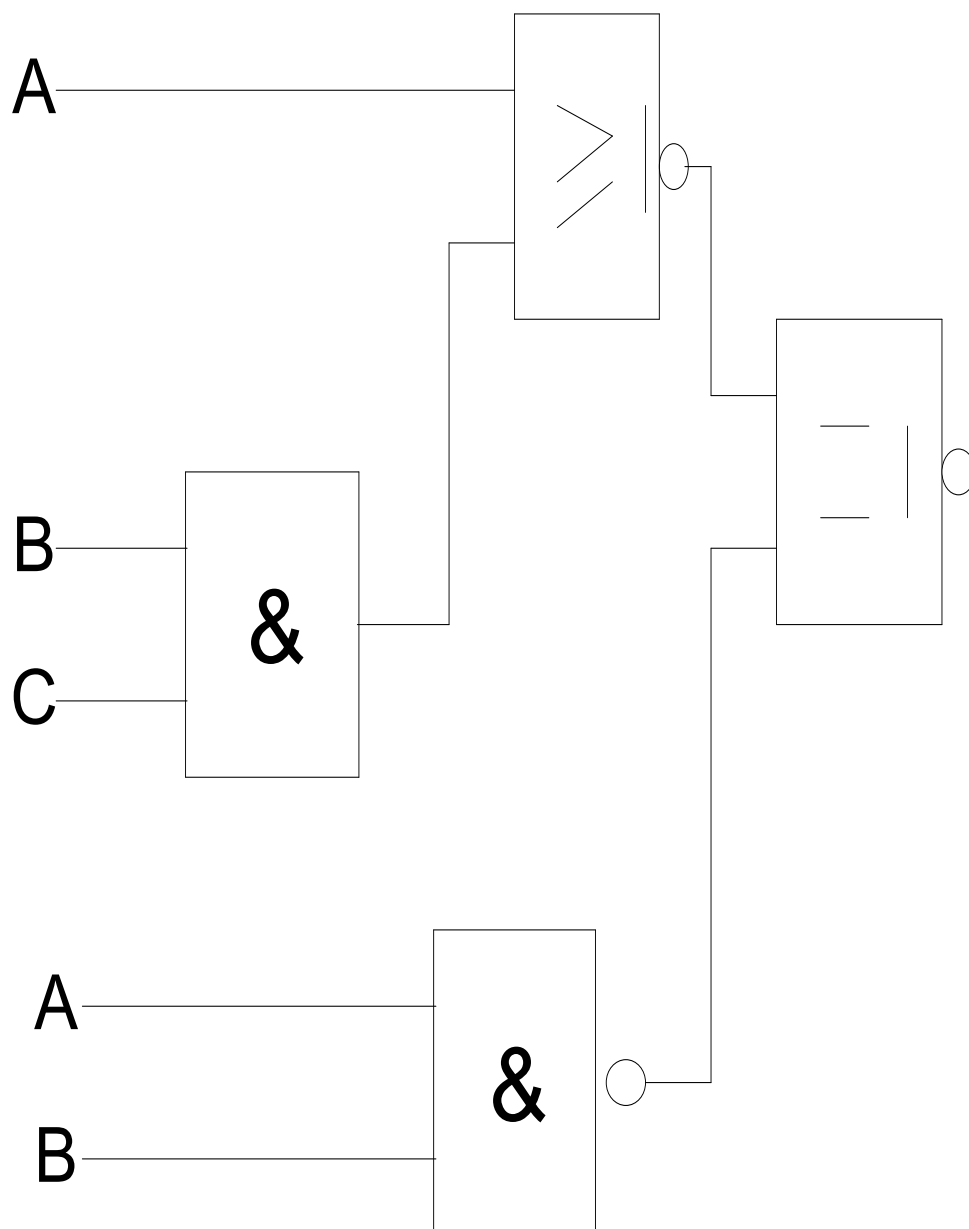
- 3.1 3.1.1 $F = ABC + \bar{A}BC + \bar{A}\bar{B}C + \bar{A}\bar{B}\bar{C}$
 $A(B\bar{C} + \bar{B}C) + \bar{A}(B\bar{C} + \bar{B}C)✓$
 $A(B \oplus C) + \bar{A}(B \oplus C)✓$
 LET $B \oplus C = K✓$
 $AK + \bar{A}K✓$
 $K(A + \bar{A})✓$
 $= K = B \oplus C✓$ (6)
- 3.1.2 $X(X + Y)(\bar{X} + \bar{Y} + Z)$
 $XX + XY(\bar{X} + \bar{Y} + Z)✓$
 $X(1 + Y)(\bar{X} + \bar{Y} + Z)✓$
 $X(1)(\bar{X} + \bar{Y} + Z)✓$
 $X\bar{X} + X\bar{Y} + XZ✓$
 $X\bar{Y} + XZ✓$ (5)

3.2 3.2.1



(6)

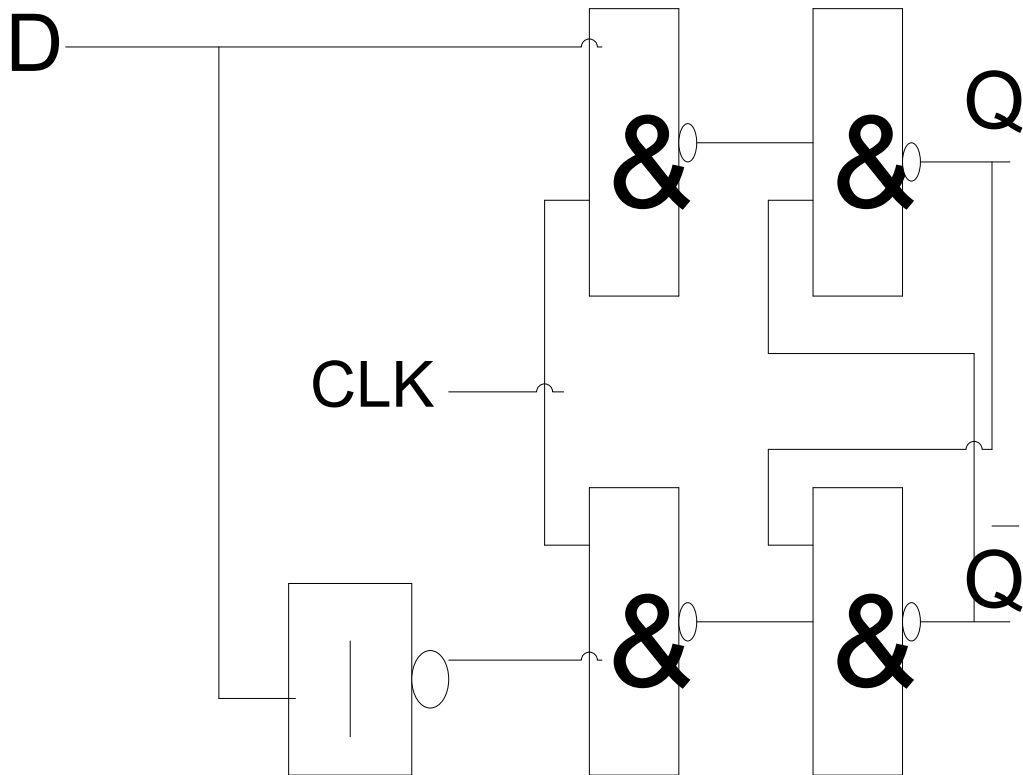
3.2.2



(5)
[22]

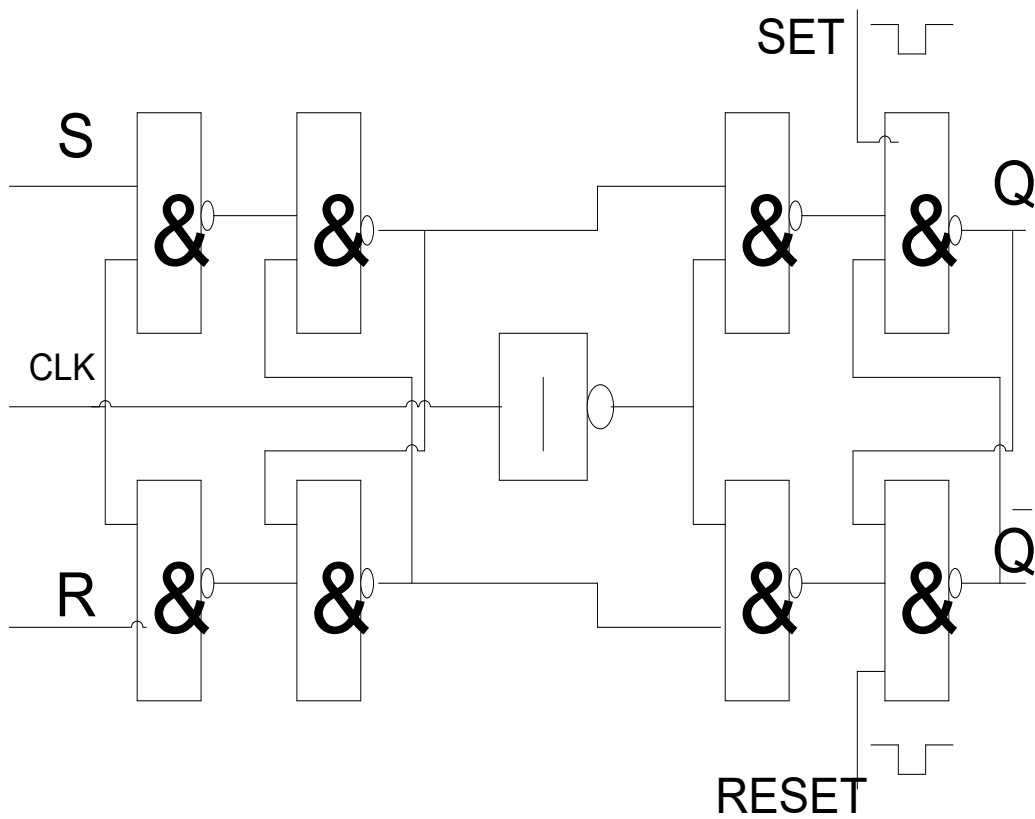
QUESTION 4

4.1



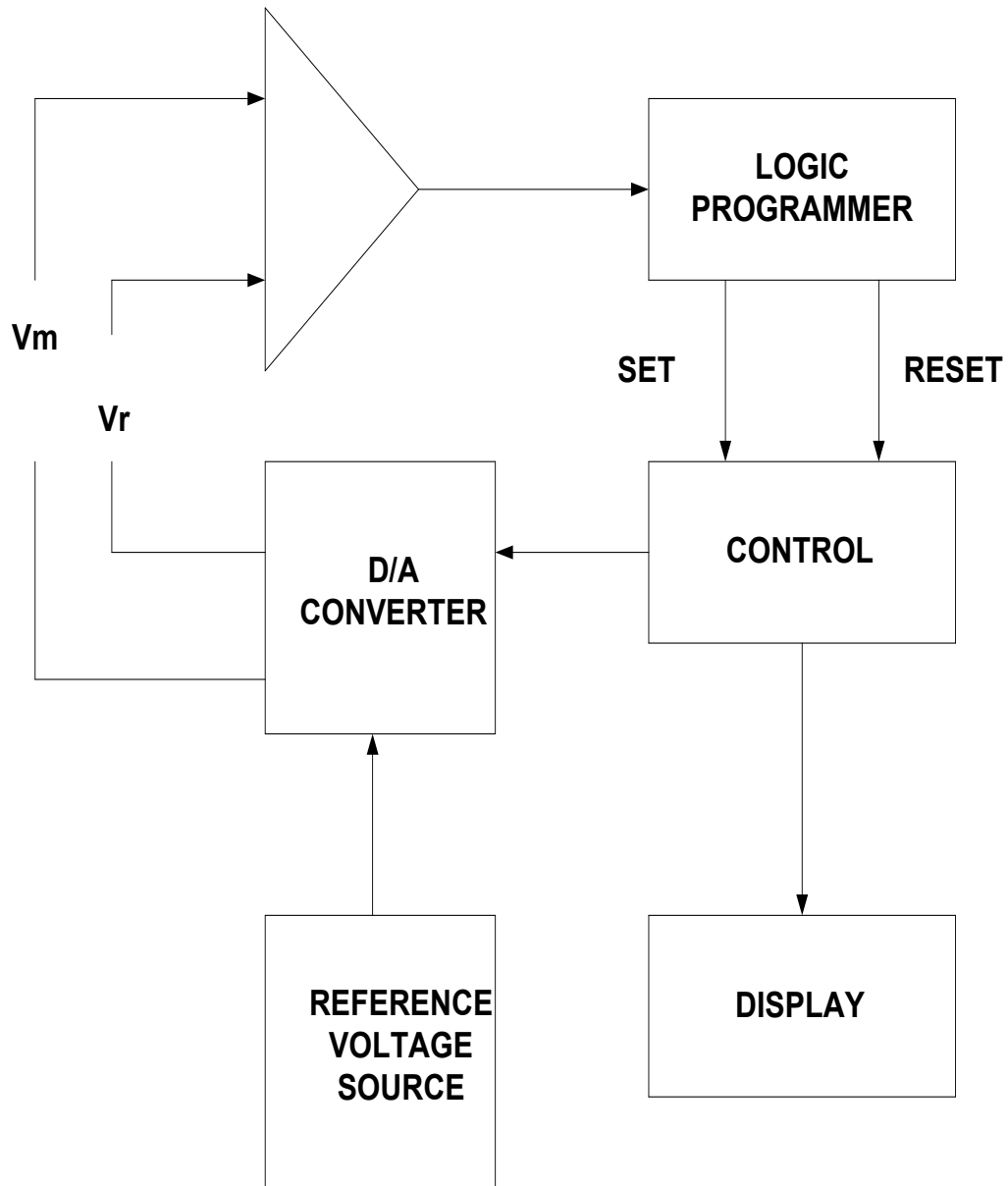
(8)

4.2

(10)
[18]

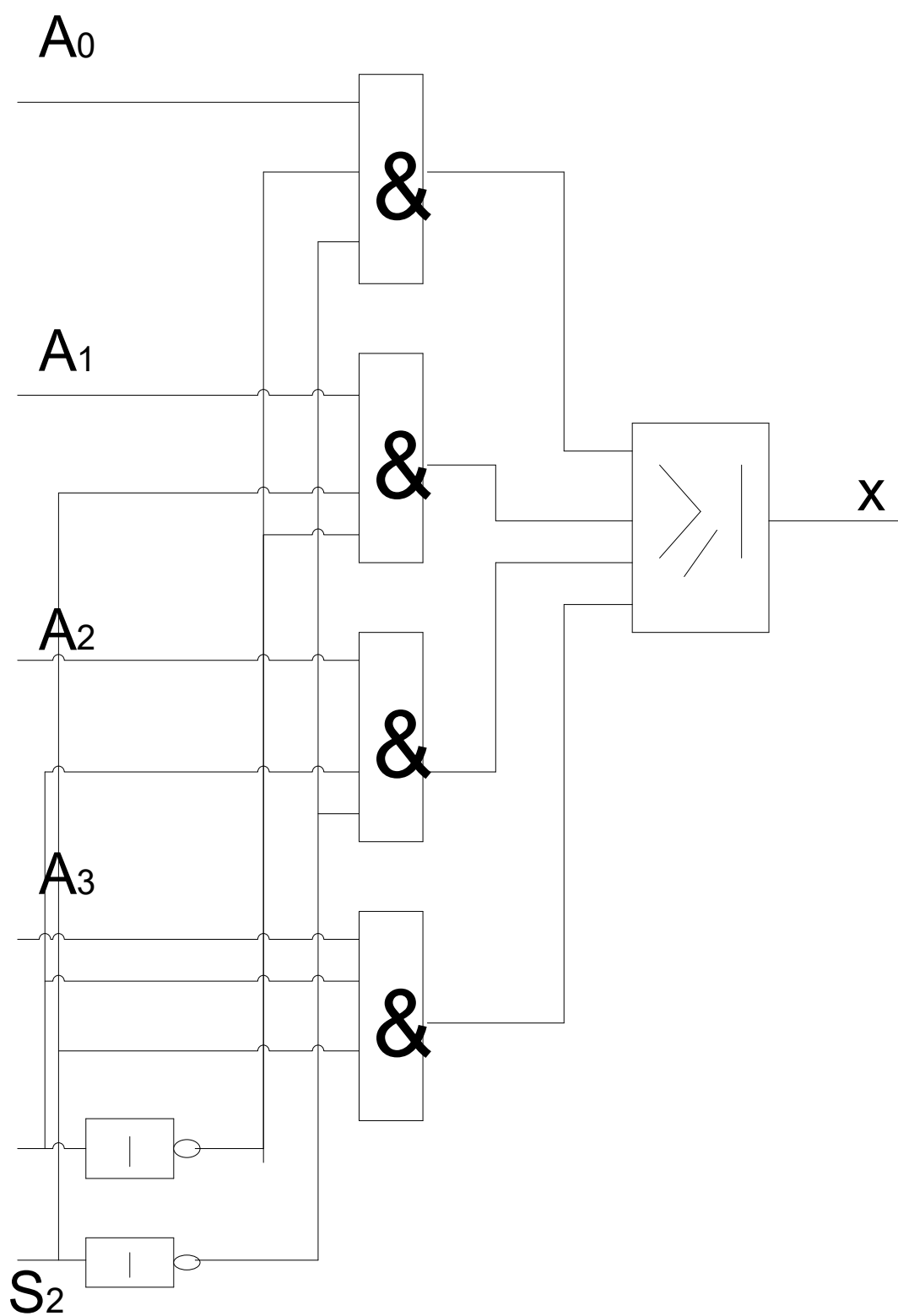
QUESTION 5

5.1



(8)

5.2

(8)
[16]

TOTAL: 100