



**higher education
& training**

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE DIGITAL ELECTRONICS N4

16 April 2020

This marking guideline consists of 6 pages.

QUESTION 1

1.1	1.1.1	D	(5 × 1)	(5)
	1.1.2	C		
	1.1.3	D		
	1.1.4	B		
	1.1.5	C		
1.2	1.2.1	positive	(5 × 1)	(5)
	1.2.2	carry out		
	1.2.3	simultaneously		
	1.2.4	toggle		
	1.2.5	5		
1.3	1.3.1	E	(5 × 1)	(5)
	1.3.2	C		
	1.3.3	A		
	1.3.4	B		
	1.3.5	D		
1.4	1.4.1	True	(5 × 1)	(5)
	1.4.2	True		
	1.4.3	False		
	1.4.4	False		
	1.4.5	True		
1.5	1.5.1	bit	(5 × 1)	(5)
	1.5.2	multi-vibrator		
	1.5.3	latch		
	1.5.4	fan-out		
	1.5.5	nonweighted		
1.6	1.6.1	full	(5 × 1)	(5)
	1.6.2	decoder		
	1.6.3	minimum		
	1.6.4	NOR		
	1.6.5	excess-3		

[30]

2.2.2 $6D, A_{16} = 01101101, 1010 \checkmark$
 $55, 5_8 = 101101, 101 \checkmark$

$$\begin{array}{r}
 11011011010 \\
 101101101 \\
 \hline
 11011011010 \checkmark \\
 00000000000 \\
 11011011010 \\
 11011011010 \\
 00000000000 \\
 11011011010 \\
 11011011010 \\
 00000000000 \\
 11011011010 \checkmark \\
 \hline
 1001110001001, 1010010 \checkmark \\
 = 5001,640625_{10} \checkmark
 \end{array}$$

(6)

2.3 2.3.1 110110_2

2.3.2 $\begin{array}{ccc} 2 & 8 & 4 \\ \pm 3 & \pm 3 & \pm 3 \\ 5 & 11 & 7 \end{array}$
 $5B, 7 \checkmark$
 $1011011, 0111 \checkmark$

2.3.3 $8421 \ 8421 \ 8421 \ 8421$
 $0010 \ 1010 \ 1111 \ 1000 \checkmark$
 $101010, 1111000 \checkmark$

(3 × 2) (6)
[30]**QUESTION 3**

3.1 3.1.1 $XX + XY (\bar{X} + \bar{Y} + Z) \checkmark$

$$X + XY (\bar{X} + \bar{Y} + Z) \checkmark$$

$$X (1 + Y) (\bar{X} + \bar{Y} + Z) \checkmark$$

$$X (\bar{X} + \bar{Y} + Z) \checkmark$$

$$X\bar{X} + X\bar{Y} + XZ \checkmark$$

$$X\bar{Y} + XZ \checkmark$$

(6)

3.1.2 $(\bar{A} + \bar{A} + \bar{B}) (\bar{B} + \bar{A} + \bar{B}) \checkmark$

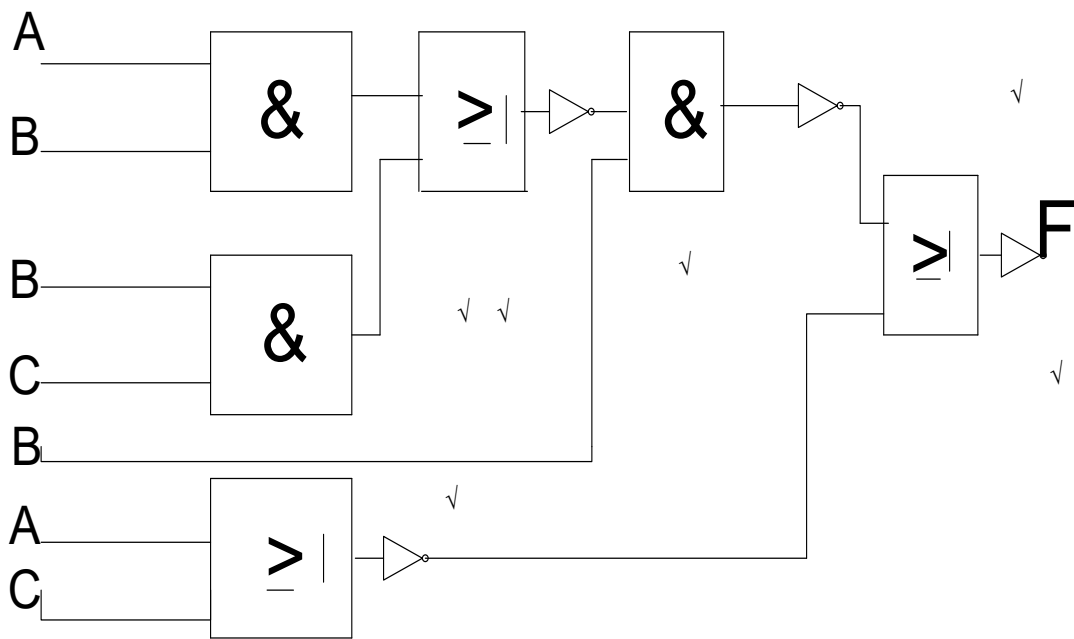
$$(\bar{A} + A + B) (\bar{B} + A + B) \checkmark$$

$$(1 + B) (1 + A) \checkmark$$

$$= 1 \checkmark$$

(4)

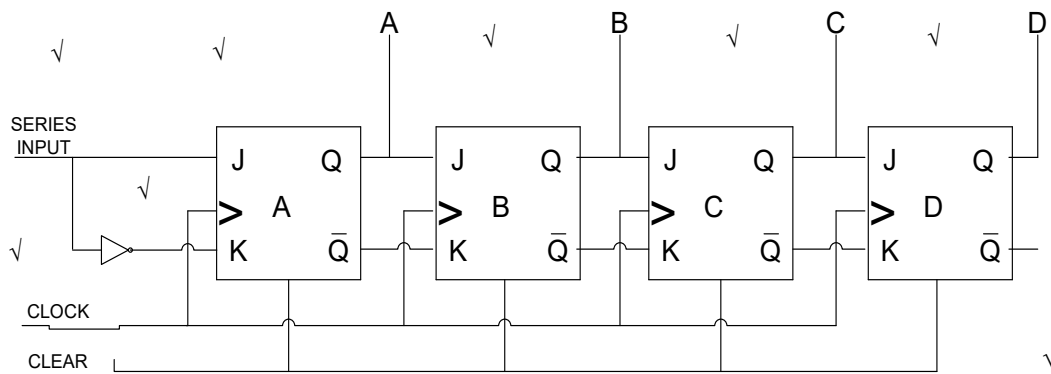
3.2



(6)
[16]

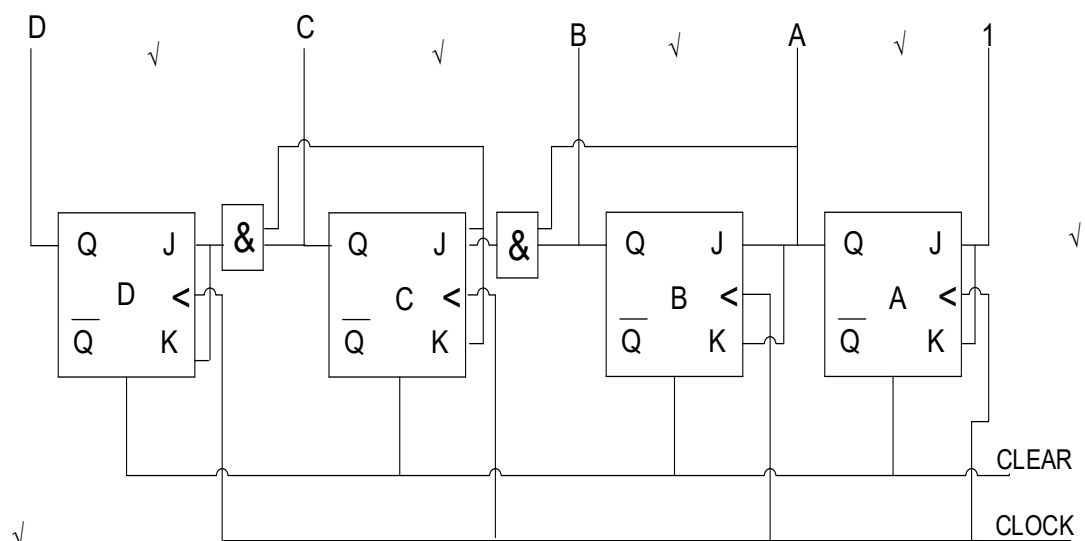
QUESTION 4

4.1



(8)

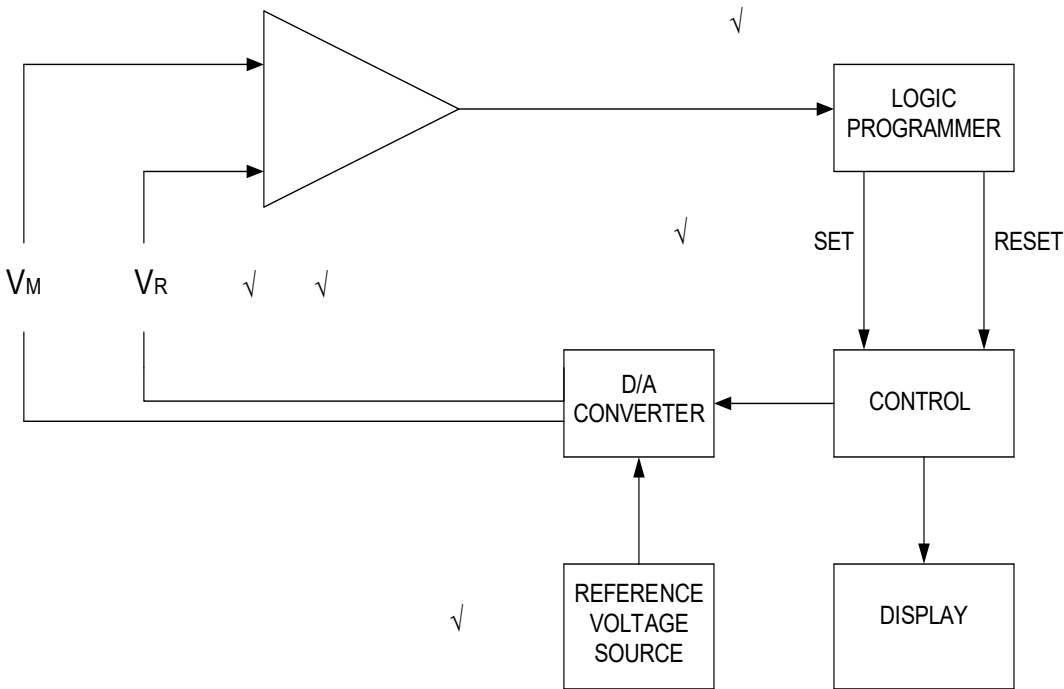
4.2



(6)
[14]

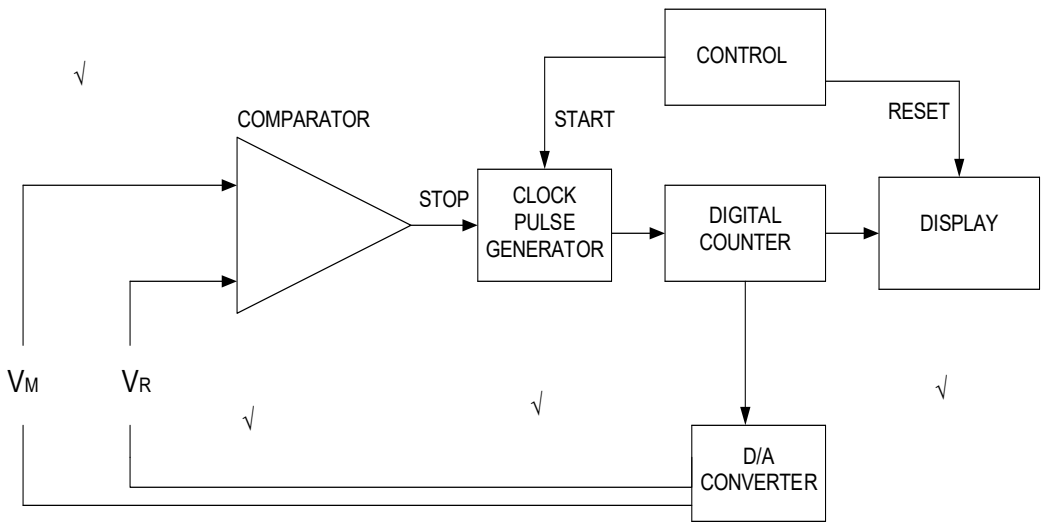
QUESTION 5

5.1



(5)

5.2



V_M = ANALOG VOLTAGE TO BE MEASURED

V_R = REFERENCE VOLTAGE

(5)
[10]

TOTAL: 100