



higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

NATIONAL CERTIFICATE DIGITAL ELECTRONICS N5

6 AUGUST 2019

This marking guideline consists of 9 pages.

QUESTION 1

1.1 $237,7_8 \div A,7_{16}$

$237,7_8 = 10011111,111_2$ ✓ {Each octal decimal is represented by 3 binary bits}

$A,7_{16} = 1010,0111_2$

$$\begin{array}{r}
 \sqrt{100111111110,000} \\
 \underline{-10100111} \\
 100110001 \quad \checkmark \\
 \underline{-10100111} \\
 100010101 \\
 \underline{-10100111} \quad \checkmark \\
 011011100 \\
 \underline{-10100111} \\
 0011010100 \\
 \underline{-10100111} \\
 001011,010 \quad \checkmark
 \end{array}$$

$\therefore 10011111,111_2 \div 1010,0111_2 = 1111,010_2 = 17,2_8$ ✓

1.2 $37,6_8 \times 10,01_2$

$37,6_8 = 011111,110_2 = 11111,11_2$ ✓ {Each octal decimal is represented by 3 binary bits}

$$\begin{array}{r}
 1111111 \\
 \times \quad 1001 \\
 \hline
 1111111 \quad \checkmark \\
 +1111111000 \quad \checkmark \\
 \hline
 1000111,0111 \quad \checkmark \checkmark
 \end{array}$$

Shift back the comma into three places

$\therefore 37,6_8 \times 10,01_2 = 10010,001_2 = 47,7_{16}$ ✓

1.3 $29,5_{10} - 21,7_8$

$29,5_{10}$

2^4	2^3	2^2	2^1	2^0	2^{-1}
1	1	1	0	1	1

$29,5_{10} = 11101,1_2 \checkmark$

$21,7_8 = 010\ 001, 111 = 10001,111_2 \checkmark$ {each octal is represented by 3 binary bits}

$11101,100$	→	$1\ 1\ 1\ 0\ 1,1\ 0\ 0$
$-10001,111$	→	$+ 0\ 1\ 1\ 1\ 0,0\ 0\ 1 \checkmark$
There is carry		$1\ 0\ 1\ 0\ 1\ 1,1\ 0\ 0 \checkmark$
Answer will be positive		$0\ 1\ 0\ 1\ 1,1\ 0\ 0$
Add carry to the L.S.B		$\underline{\hspace{10em} +1}$
		$1\ 0\ 1\ 1,1\ 0\ 1 \checkmark$

Therefore $11101,1_2 - 10001,111_2 = 1011,101_2 = 11,625_2 \checkmark$

(3 × 6) [18]

QUESTION 2

2.1

A	B	C	D	J _A	K _A	J _B	K _B	J _C	K _C	J _D	K _D	
0	0	0	0	0	X	0	X	0	X	1	1	✓
0	0	0	1	0	X	0	X	1	X	X	X	✓
0	0	1	0	0	X	0	X	X	0	1	1	✓
0	0	1	1	0	X	1	X	X	1	X	X	✓
0	1	0	0	0	X	X	0	0	X	1	1	✓
0	1	0	1	0	X	X	0	1	X	X	X	✓
0	1	1	0	0	X	X	0	X	0	1	1	✓
0	1	1	1	1	X	X	1	X	1	X	X	✓
0	0	0	0	X	0	0	X	0	X	1	1	✓
1	0	0	1	X	1	0	X	0	X	X	X	✓

1010	}	Don't cares (X's) ✓
1011		
1100		
1101		
1110		
1111		

(11)