



higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

MARKING GUIDELINE

**NATIONAL CERTIFICATE
DIGITAL ELECTRONICS N5**

8 APRIL 2019

This marking guideline consists of 8 pages.

QUESTION 1

$A = 33,25_{10} = 100001,01_2$

$B = 70,2_8 = 111000,01_2$ {each octal is represented by 3 binary bits}

$C = B4,C_{16} = 10110100,11_2$ {each hexadecimal is represented by 4 binary bits}

1.1 $A \times C = 100001,01_2 \times 10110100,1100_2$

$A \times C = 100001,01_2 \times 10110100,1100_2$

$$\begin{array}{r}
 101101001100 \\
 \times 10000101 \\
 \hline
 101101001100 \quad \checkmark \\
 10110100110000 \quad \checkmark \\
 101101001100000000 \quad \checkmark \\
 \hline
 1011101111001,1111 \quad \checkmark
 \end{array}$$

Therefore $101110111100,1111_2 = 13571,74_8$ ✓✓

(6)

1.2 $B - 10,01_2$

$B = 70,2_8 = 111000,01_2$

$$\begin{array}{r}
 111000,01_2 \xrightarrow{\hspace{10em}} 111000,01_2 \quad \checkmark \\
 000010,01_2 \xrightarrow{1sc} 111101,10 \xrightarrow{2sc} 111101,10+1 \xrightarrow{\hspace{1em}} 111101,11_2 \quad \checkmark \\
 \hspace{10em} \checkmark \hspace{1em} \checkmark \\
 \hspace{10em} \text{Ignore the carry} \quad 1 \ 110110,11 \quad \checkmark \\
 \hspace{10em} \underline{110110,00} \quad \checkmark
 \end{array}$$

Therefore $B - 10,01 = 111000,01_2 - 10,01_2 = 110110,00 = 54_{10}$ ✓

(6)

1.3 $C \div 11,1_2 = 101010100,1100_2 \div 11,1_2$
 $= 10101010011,000_2 \div 1110_2$

```

      0110011,110 ✓
    -----
1110 1011010011,000
      1110
      ---
      10001
        1110 ✓
        ---
        0011001
          1110
          ---
          10111 ✓
            1110
            ---
            10010 ✓
              1110
              ---
              10000 ✓
                1110
                ---
                00100
    
```

Therefore $101010100,1100_2 \div 11,1_2 = 110011,101 = 63, A_{16}$ ✓

(6)
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QUESTION 2

A	B	C	D	F1	F2	F3	F4
0	0	0	0	0	0	0	0
0	0	0	1	0	0	0	1
0	0	1	0	0	0	1	1
0	0	1	1	1	0	1	0
0	1	0	0	0	1	1	0
0	1	0	1	0	1	1	1
0	1	1	0	0	1	0	1
0	1	1	1	0	1	0	0
1	0	0	0	1	1	0	0
1	0	0	1	1	1	0	1

```

1010
1011
1100
1101
1110
1111
    } Don't cares ✓✓✓
    
```