

1.  $(23.5)_{10} = (\rule{10cm}{0.4pt})$  BCD (0.5 mark)

$= (\rule{10cm}{0.4pt})$  Excess-3 (0.5 mark)

$= (\rule{10cm}{0.4pt})$  84-2-1 (0.5 mark)

$= (\rule{10cm}{0.4pt})$  3-bit gray code (1.5 marks)

- $$F(A,B,C,D)=\Pi_M(0,1,2,3,5,11,15) \quad (6.75 \text{ marks})$$

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

3. Using k-map to simplify the following Boolean function as a Sum of Product (SoP). (4 marks)

$$F(A,B,C,D,E)=\sum m(1,2,3,4,7,10,16,17,20,23,31) + d(0,9,15,18,19,25)$$

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4. Subtract the following two BCD codes: 0110 1000.0001 and 0010 0101.0111 (5 marks)

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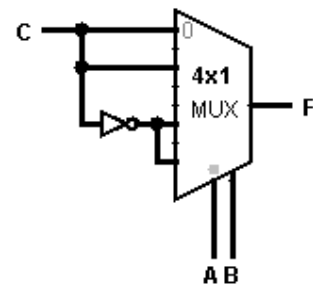
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5. Use only two 4-bit adders and an inverter, design a circuit that add two 4-bit numbers A & B represented in a special code, known that a correction is needed after adding the two numbers with a 4-bit binary adder as follows: The complement of the output carry from the first binary adder is the input to the second adder. Also, if this output carry = 1, then add 0011, and if it is = 0, then add 1101. (3.25 marks)

[illegible]

6. Derive a function  $F(A,B,C)$  using a single gate. (3.5 marks)

[illegible]

- (4.5 marks)

[illegible]

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