BRAC UNIVERSITY
Department of Computer Science and Engineering
CSE 260: Digital Logic Design

Examination: **Quiz 1** | Semester: Spring 2025
Duration: 25 Minutes | Full Marks: 15

Answer the following questions. You **MUST** show your workings/calculations where applicable.
Figures in the right margin indicate marks.

Name: Solution	Section: 02	ID:

1. Perform the following conversion: $(1010111100001100)_{\text{Excess-5}} = (?)_7$
   Note: You **must** show all the necessary conversions. [4]

2. Subtract $(-36)_{10}$ from 50_{10} using **7-bit 2's complement** system (show the conversion first). Justify whether there is an **overflow or not**. [5]

3. **Divide $(32112)_4$ by $(33)_4$. Find the quotient and remainder.**
   Note: You **must** show the necessary calculations. [6]

1) $(1010111100001100)_{Ex-5}$

0101 0111 1000 1100
5 7 8 12
-5 -5 -5 -5
0 2 3 7

$= (0237)_{10}$

$= (237)_{10} = (?)$

7 | 237
7 | 33 - 6 - L
7 | 4 - 5
0 - 4 - M

$(237)_{10} = (456)_7$

$\Rightarrow (1010111100001100)_{Ex-5} = (456)_7$ (Ans)

2) $50 - (-36) = 50 + 36$

2 | 50
2 | 25 - 0
2 | 12 - 1
2 | 6 - 0
2 | 3 - 0
2 | 1 - 1
0 - 1

$\Rightarrow (50)_{10} = (110010)_2$

$+50 = 011\ 0010$

2 | 36
2 | 18 - 0 → L
2 | 9 - 0
2 | 4 - 1
2 | 2 - 0
2 | 1 - 0
0 - 1 → M

$(36)_{10} = (100100)_2$

$+36 = 010\ 0100$

$011\ 0010$ (+)
$+\ 010\ 0100$ (+)
$101\ 0110$ (−)

Here, we added two positive numbers but the answer has negative sign.

So, according to this rule, Adding two same signed numbers if answer has different sign, then overflow.

Yes, we have overflow here.

3)

$$33 \overline{)32112} \quad 00331$$

0

32

-0

321

-231

301

-231

126

-33

03

$33 \times 0 = 0$

$33 \times 1 = 33$

$33 \times 2 = 132$

$33 \times 3 = 231$

$33 \times 2 = 132$

$33 \times 3 = 231$

$4 \overline{)6} \; 1$ remainder 2

$4 \overline{)7} \; 1$ remainder 3

$4 \overline{)9} \; 2$ remainder 1

$4 \overline{)11} \; 2$ remainder 3

Quotient $= (331)_4$

Remainder $= (3)_4$