BRAC UNIVERSITY

Inspiring Excellence

CSE260: Digital Logic Design
Spring 2025
Quiz - 01
Duration: 25 Minutes

A

Name: Solution	ID:	Section:

Instructions: **Answer on the space provided.**

Question 1 [CO1]: Add $(-25)_{10}$ with $(18)_{10}$ in **7-bit 1's complement** number system. Justify whether there is an overflow or not.   **[5] marks**

```
2 | 25
2 | 12   1
2 | 6    0
2 | 3    0
2 | 1    1
    0    1
```

```
2 | 18
2 | 9    0
2 | 4    1
2 | 2    0
2 | 1    0
    0    1
```

$(25)_{10} = (11001)_2$

$18 = (10010)_2$

$+25$ in
7-bits $= (0011001)_{1s}$

$+18$
in 7-bits $= (0010010)_{1s}$

$-25 = (1100110)_{1s}$

```
      1 1
  1 1 0 0 1 1 0
+ 0 0 1 0 0 1 0
  _____
 (1 1 1 1 0 0 0)_1s
```

Since we are adding two different signed numbers, there will be no overflow.

Question 2 [CO1]: Bangladesh is facing up against Australia in a cricket match. They have scored $(154)_{16}$ runs in total. Australia has currently played $(24)_8$ overs with a run rate of $(110.1)_2$. Calculate how many more runs they need to score to win the game. **Show your answer in decimal.** [10] marks

$$(154)_{16} = 1 \times 16^2 + 5 \times 16^1 + 4 \times 16^0$$

$$= (340)_{10}$$

$$(24)_8 = 2 \times 8^1 + 4 \times 8^0$$

$$= (20)_{10}$$

$$(110.1)_2 = 1 \times 2^2 + 1 \times 2^1 + 0 \times 2^0 + 1 \times 2^{-1}$$

$$= (6.5)_{10}$$

Current runs = Over $\times$ Run rate

$$= (20)_{10} \times (6.5)_{10}$$

$$= (130)_{10}$$

Runs needed to win $= (340 - 130) + 1$

$$= (211)_{10}$$