UNITED INTERNATIONAL UNIVERSITY

Class Test 1

CSE 4325 (B) - Microprocessors and Microcontrollers

Marks: 20

Time: 30 minutes

1. Transfer of bus control from processor to device takes **100 ns**. Transfer of bus control from device to processor takes **200 ns**.

    I.   If one of the input/output devices employs **DMA** in **Cycle Stealing** Mode and takes **7,850,900 ns** to transfer some data at a transfer rate of **384 KB/s** with **24 bytes** of data being transferred at once, find out the total size of the data to be transferred.

    II.   Suppose, you will be transferring the total data (*found from (a)*) now in both Burst Mode and Cycle Stealing Mode. For the **first one-third** of the bytes, you use Burst Mode and for the **rest**, you use Cycle Stealing Mode. Assuming that both modes use **384 KB/s** transfer rate, how long will it take to transfer the whole data?

[12]

2. Suppose, execution of a signed addition instruction **(7A34H + 4DC2H)** occurred. What would be the values of the sign flag (SF), parity flag (PF), carry flag (CF), and overflow flag (OF)?

[8]

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Section B

Invigilator's Signature with date

Course Code CSE 4325   Trimester / Semester: Spring / Summer / Fall, 20.25..   Date: 16-3-2025

Name of Exam: Class Test / Mid-term / Mid-term (Makeup/Improvement) / Final / Final (Makeup/Improvement)

Answers to the question No. 1

1/I

Here,

Bus transfer time (P to D) = 100 ns

Bus " " (D to P) = 200 ns

For Data transfer time,

Block size = ?

transfer rate = 384 KB/s

Chunk size = 24 B

$$\left[1 KB = \frac{1}{1024} B\right]$$

$$[1 s = 10^9 ns]$$

$$\therefore \text{Total time} = \left(BT \text{ time} + BT \text{ time} + \text{Chunk transfer time}\right) \times \text{no. of chunks}$$

$$\Rightarrow 7850900 \text{ ns} = \left(300 ns + \frac{24 B}{384 KB/s}\right) \times \frac{\text{Block size}}{\text{Chunk size}}$$

$$\Rightarrow 7850900 \text{ ns} = \frac{x}{24 B} \times \left(300 ns + \frac{24/1024 KB}{384 KB/10^9 ns}\right) \quad [\text{Block size} = x$$

$$\Rightarrow 7850900 \text{ ns} = \left(\frac{300 x}{24} + \frac{24/1024 KB \times x}{384 KB/10^9 \times 24 \text{ ns}}\right)$$

$$\Rightarrow 7850900 \text{ ns} = \frac{300 x}{24} + \frac{61035.15 \times x}{24}$$

$$\Rightarrow 7850900 \, ns = \frac{300x}{24} + \frac{\cancel{643} \, 61035.15 \times x}{24}$$

$$61035.15 \approx 61035$$

$$\Rightarrow 7850900 = \frac{300x + 61035x}{24}$$

$$\Rightarrow 7850900 \times 24 = 61835x$$

$$\Rightarrow x = \frac{7850900 \times 24}{61335}$$

$$\Rightarrow x = 3072$$

$$\therefore \text{Block size } 3072 \, B$$

(Ans).

1/ II

For First ~~Burst~~ one-third data will be transferred $= 3072 \times \frac{1}{3} \, B$
$$= 1024 \, B$$

For next data will be transferred $= 3072 \times \frac{2}{3} \, B$
$$= 2048 \, B$$

For Burst mode,

$$\text{Total time} = \left(BT + BT + \frac{1024/1024 \, KB}{384 \, KB / 10^9 \, ns} \right)$$

$$= 2604466.667$$

$$= 2604466.67 \, ns$$

For C·S mode,

$$\text{Total time} = \text{no. of chunks} \times \left(BT + BT + \frac{24/1024 \, KB}{384 \, KB / 10^9 \, ns} \right)$$

$$= \frac{2048/1024 \, KB}{24 \times 1024 \, KB}$$

$$= \frac{2048 B}{24 B} \times \left(300 ns + \frac{24/1024 KB}{384 KB/10^9 ns} \right)$$

$$= 5233933.33 \; ns$$

$\therefore$ So, it will take $= (B + C \cdot s)$ time

$$= (2604466.67 + 5233933.33) \; ns$$

$$= 7838400 \; ns$$

$\therefore$ to transfer the whole data it will take $7838400 \; ns$

(Ans).

Answer to the question NO: 2

Given,

    7A34 H
  + 4DC2 H
  _____

```
         1 1 1 1
      0111   1010   0011   0100
   +  0100   1101   1100   0010
   _____
    [1]1 0 0   0 1 1 1   1 1 1 1   0 1 1 0
```

SF → 1   (as 1 represents negative sign)

PF → 1   (as there are even no of 1's in the last 8 bit)

CF → 0   (as there is no carry)

OF → 1   (as we know ++ → - means it
            will give 1)

(Ans).

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