CT-4

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1. b

stages = 6

time = 20 ns, 20 ns, 30 ns, 25 ns,
20 ns, 20 ns

For non-pipeline machine:

Instruction latency = 20 + 20 + 30 + 25
20 + 20

= 135 ns

For 80 instruction time need

= 135 × 80 ns

= 10800 ns

pipeline machine

Instruction latency = max instruction time

= 30 ns

For 80 instruction = (30×6)+(30×79)

= 180 + 2370

= 2550 ns

$$\therefore \text{speed up} = \frac{\text{non-pipline time}}{\text{pipeline time}}$$

$$= \frac{10800}{2550} \text{ times}$$

= 4.235

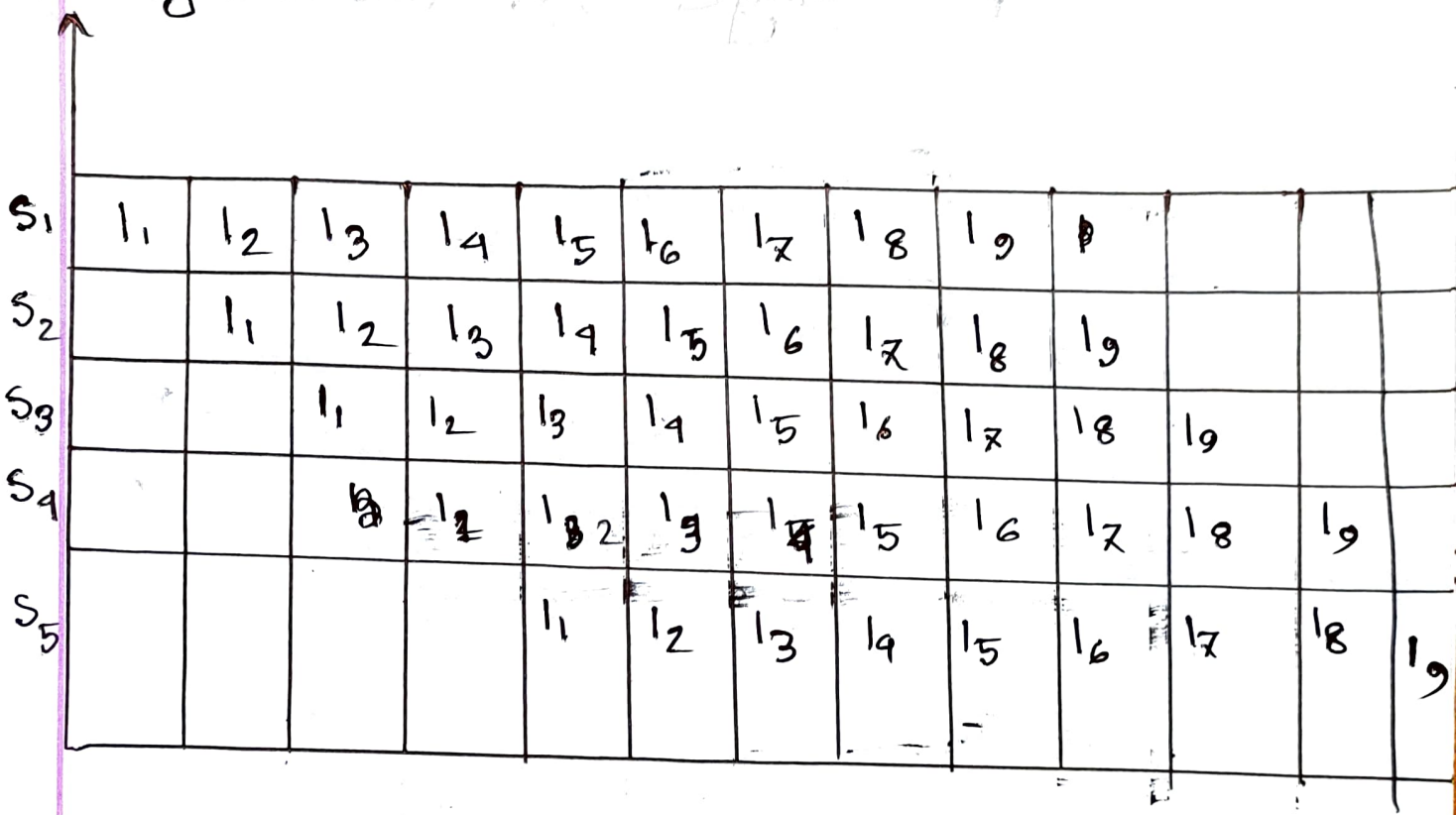
Ans

1. a) My ID = 18101094 $1+5 \Rightarrow 1+5$

$\Rightarrow 9$

I_1 to I_9

Stages



Total time for pipeline.

$$P = \text{Stage} \times 1 + (\text{Instruction} - 1)$$

$$= K \times 1 + (n-1)$$

$$= 5 + (9-1)$$

$$= 5 + 8$$

$$= 13 \text{ cc}$$

NP = stage x instruction

$$= K \times n$$

$$= 5 \times 9$$

$$= 45 \text{ cc}$$

$$\text{Speedup} = \frac{45}{13} \left(\frac{NP}{P}\right) = 3.46$$

$$\text{Efficency} = \frac{\text{stage x instruction}}{\text{block x stage}}$$

$$= \frac{5 \times 9}{13 \times 5}$$

$$= 0.69$$

Ans