CS & IT ENGINEERING

Operating System

CPU Scheduling

DPP 01 (Discussion Notes)

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01 Question

02 Discussion

Q.1

Process can complete its execution from ___

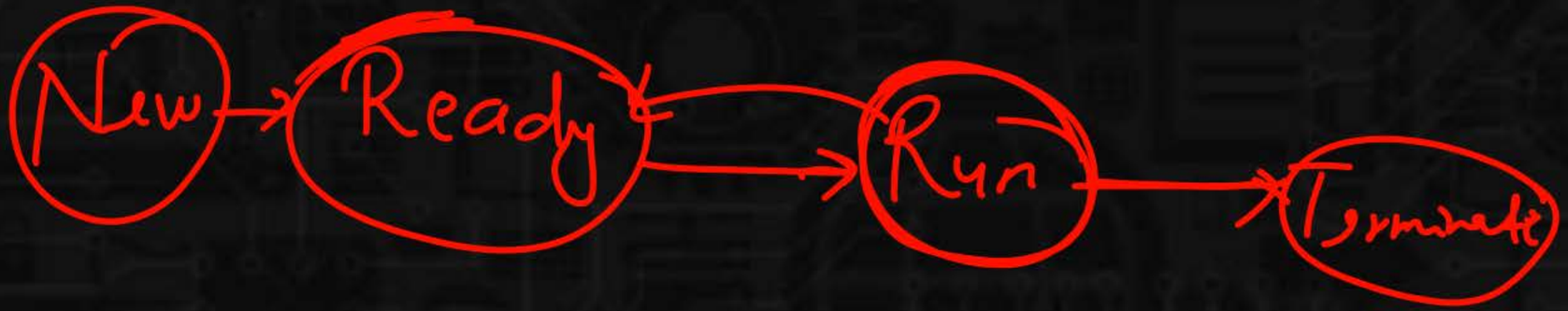
[MCQ]

A. Ready state

B. Running state

C. Block state

D. All of the above



Q.2

Consider a system with n number of processes, s is time when each process terminates, and t is the time each process arrives to the ready queue. What will be the average time for n processes to complete their execution? [MCQ]

A. $\sum_{i=1}^{n} \frac{(t_i - s_i)}{n}$

B. $\sum_{i=1}^{n} \frac{(n_i - t_i)}{s}$

C. $\sum_{i=1}^{n} \frac{(s_i - n_i)}{t}$

D. $\sum_{i=1}^{n} \frac{(s_i - t_i)}{n}$

[A]

$P_1 \quad \frac{0-2}{4} = -0.5$

$P_2 \quad \frac{2-6}{4} = -1$

B

$\frac{4-0}{2} = 2$

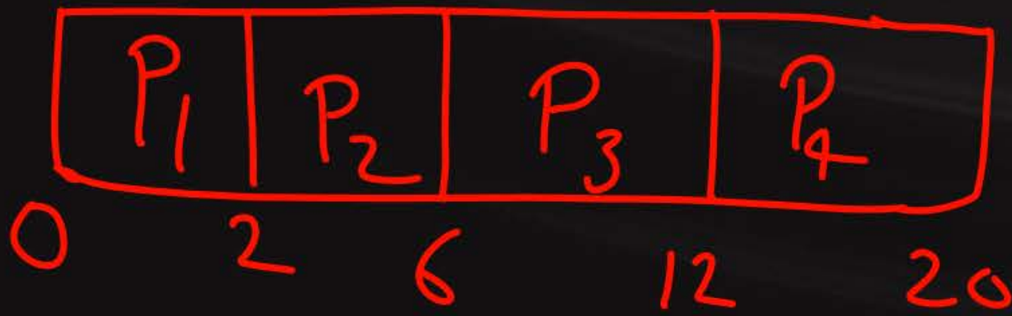
$\frac{4-2}{6} = \frac{2}{6} =$

n = 4

	AT	BT	S	t
P_1	0	2	2	0
P_2	0	4	6	2
P_3	0	6	12	6
P_4	0	8	20	12

→ arrive in the RQ

FCFS



$$\text{Avg ET} = \frac{2+4+6+8}{4} = 5$$

[C] $P_1 = \frac{2-4}{0} =$

$= 0.5 + 1 + 1.5 + P_2$

$= 5$

[D] $\sum_{i=1}^{n} \frac{S_i - t_i}{n}$ $\Rightarrow$ P_1 $\frac{2-0}{4} = 0.5$

P_2 $\frac{6-2}{4} = 1$

P_3 $\frac{12-6}{4} = 1.5$

P_4 $\frac{20-12}{4} = 2$

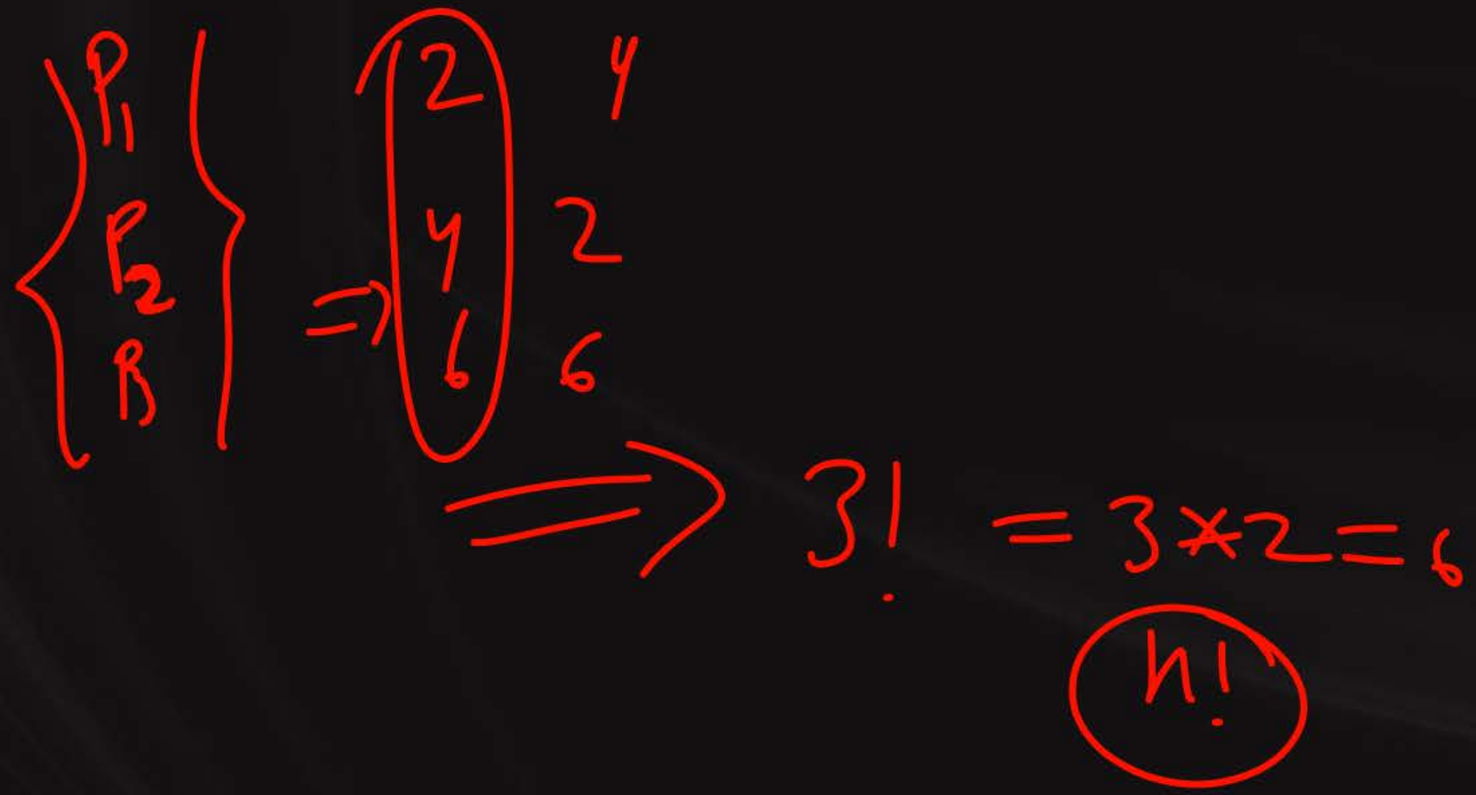
Q.3 Which of the following statement is/ are INCORRECT regarding total number of schedules if the system has n number of processes? [MSQ]

A. Total number of schedules possible in non-preemptive system are n. Incorrect.

B. Total number of schedules possible in non-preemptive system are n^2. Incorrect.

C. Total number of schedules possible in preemptive system are n^2. Incorrect.

D. Total number of schedules possible in non-preemptive system are n!. Correct.

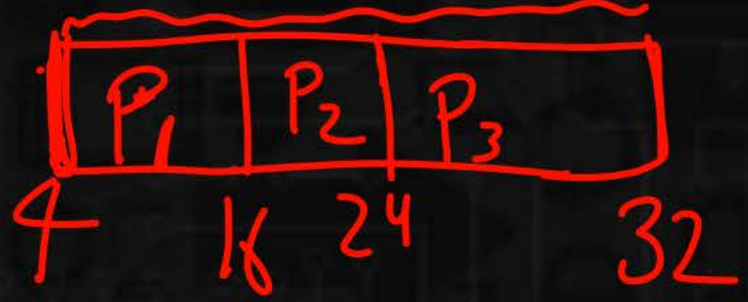

P1
P2
P3
2
4
6
2
6
3! = 3*2=6
n!

Q.4

Consider a system with three non-preemptive processes, first process arrives at time unit 4 and executes for 12 ms, while first process was executing second process arrives at time 6 with burst time 8 ms and third process arrives at time 19 with burst time 8 ms. Assume X is the schedule length of the above system and Y is the amount of time CPU is idle and waiting for processes, calculate X + Y?

Note: CPU time started at 0.

[NAT]



	AT	BT
P_1	4	12
P_2	6	8
P_3	19	8

Schedule length = Max(CT) − Min(AT)

= 32 − 4

(X) = 28

Idle (Y) = 4

X + Y = 28 + 4 = 32

Q.5 Which of the following statements are CORRECT regarding process state transition diagram?

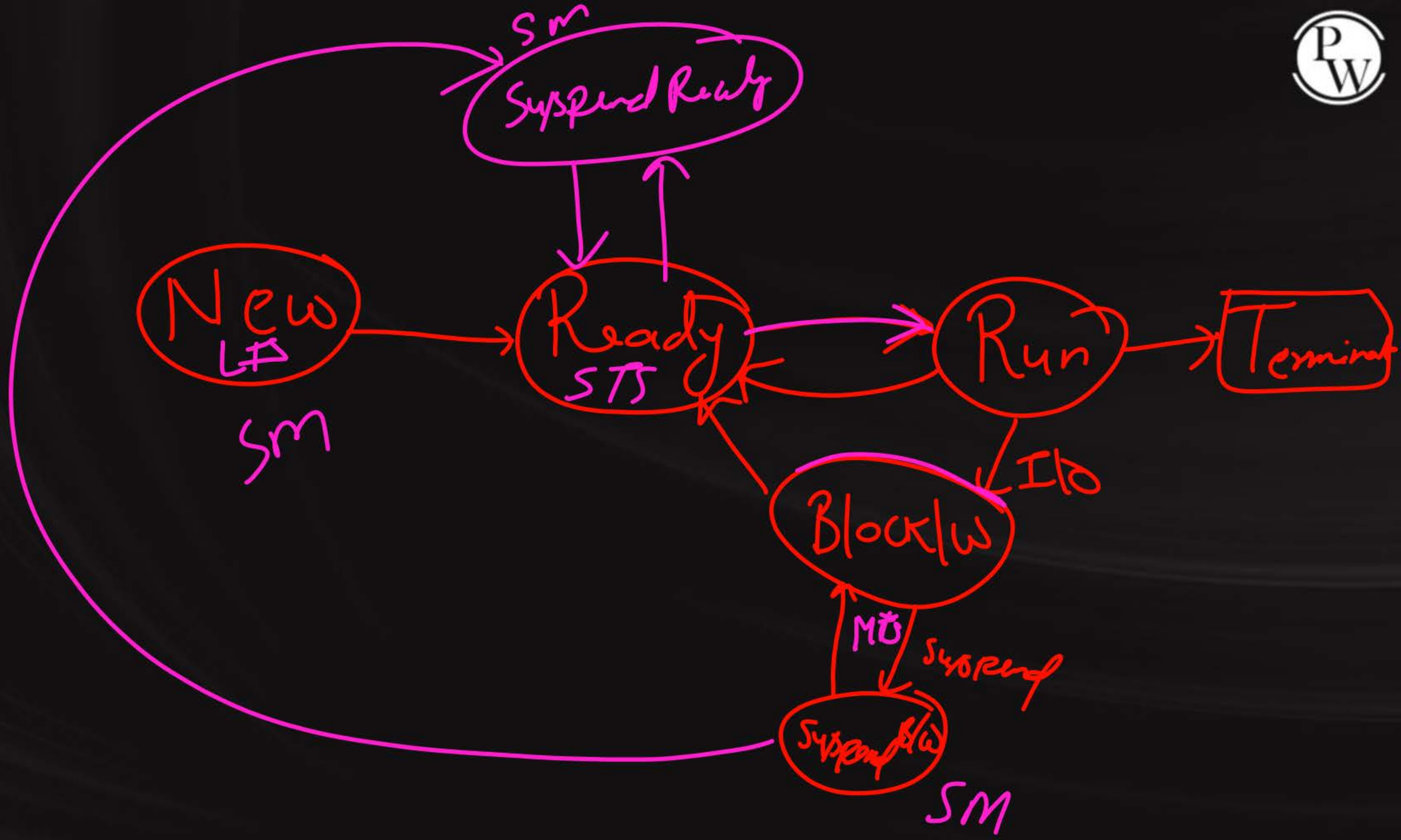
[MSQ]

A. A process can move from ready to suspend blocked state. Incorrect.

B. A blocked process can move to suspend ready state. Correct.

C. A blocked process can move to running state. Incorrect

D. A running process can move to blocked state. Correct.


SM
Suspend Ready
New
LTS
SM
Ready
STS
Run
Terminate
I/O
Block/W
MTS
Suspend
Suspend B/W
SM

Q.6

Consider the following processes, with their respective arrival time and burst times: [NAT]

Processes	Arrival Time	Burst Time
P1	3	4
P2	5	6
P3	2	5
P4	0	3

7.75

CT-AT

Calculate the average turnaround time of all the processes scheduled using First come first serve algorithm. [Upto two decimal places]

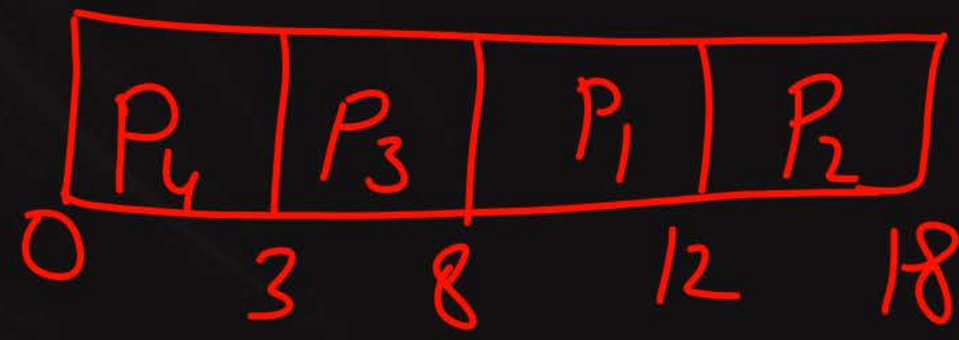
Note: Scheduling overhead is negligible

FCFS

	AT	BT	CT	TAT	WT
P_1	3	4	12	9	5
P_2	5	6	18	13	7
P_3	2	5	8	6	1
P_4	0	3	3	3	0

→ TAT − BT

→ Avg TAT



$$\text{Avg}_{TAT} = \frac{9+13+6+3}{4}$$

$$= \frac{31}{4} = 7.75$$

Q.7

Consider the following processes, with their respective arrival time and burst times:

[NAT]

Processes	Arrival Time	Burst Time
P1	2	5
P2	5	4
P3	4	6
P4	0	4

13.25

CT-AT

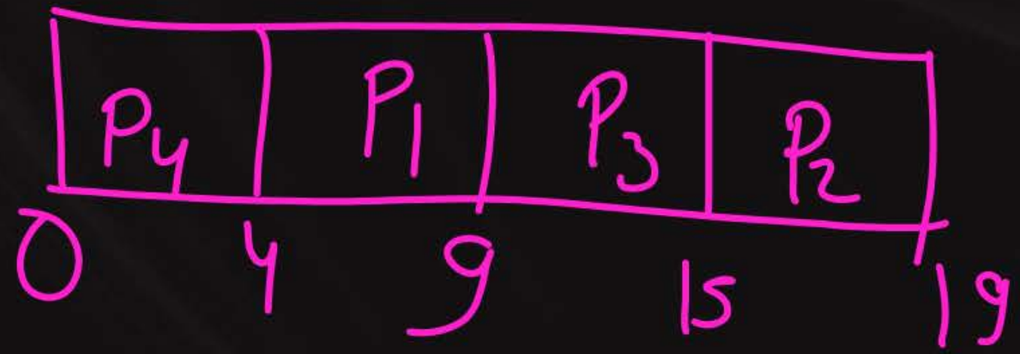
Calculate the sum of average waiting time and average turn around time of all the processes scheduled using First come first serve algorithm . [Upto two decimal places]

Note: Scheduling overhead is negligible.

TAT-BT

	AT	BT	CT	TAT	WT
P_1	2	5	9	7	2
P_2	5	4	19	14	10
P_3	4	6	15	11	5
P_4	0	4	4	4	0

FCFS



$$Avg_{TAT} = \frac{7+14+11+4}{4}$$

$$= \frac{36}{4} = 9$$

$$Avg_{WT} = \frac{2+10+5}{4}$$

$$= \frac{17}{4} = 4.25$$

$$Sum = 9 + 4.25$$

$$= 13.25$$

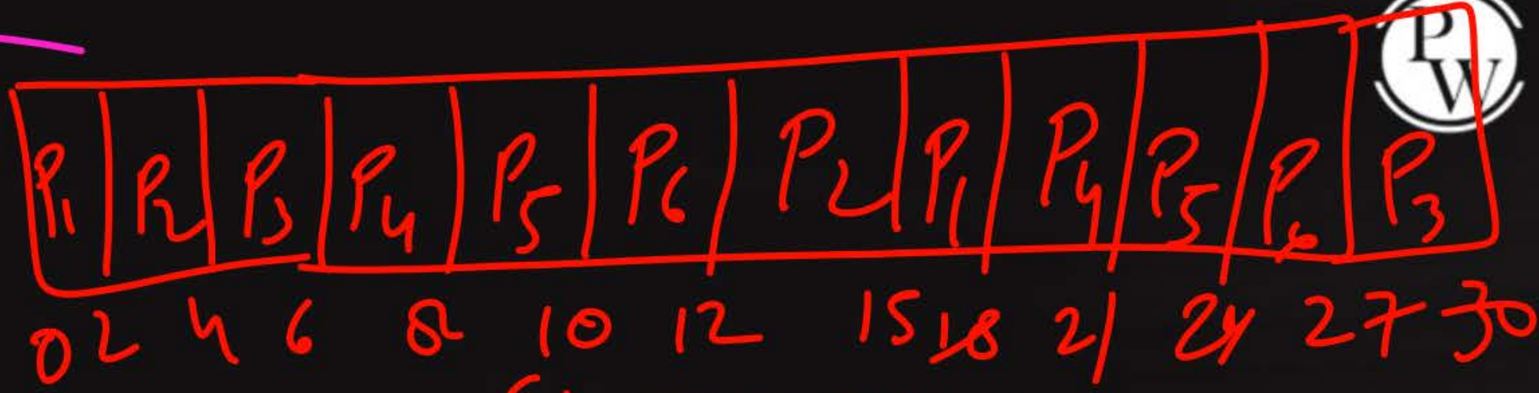
Q.8

Consider a pre-emptive system with 6 processes, each process executes for 2 ms and leaves the system, and again enters the system(in any order) after all other processes has executed its first 2 ms. Each process has a burst time of 5 ms. What will be the total schedule length. Assuming no process went in block state.

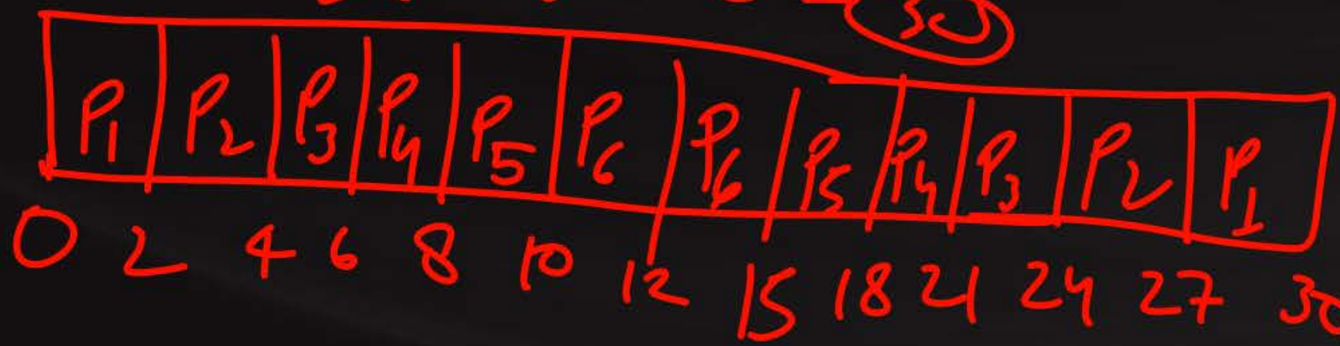
[NAT]

$P_1 = 2$
$P_2 = 2$
$P_3 = 2$
$P_4 = 2$
$P_5 = 2$
$P_6 = 2$

30



SL = 30 − 0 = 30



SL = 30 − 0 = 30


THANK YOU GW
SOLDIERS !