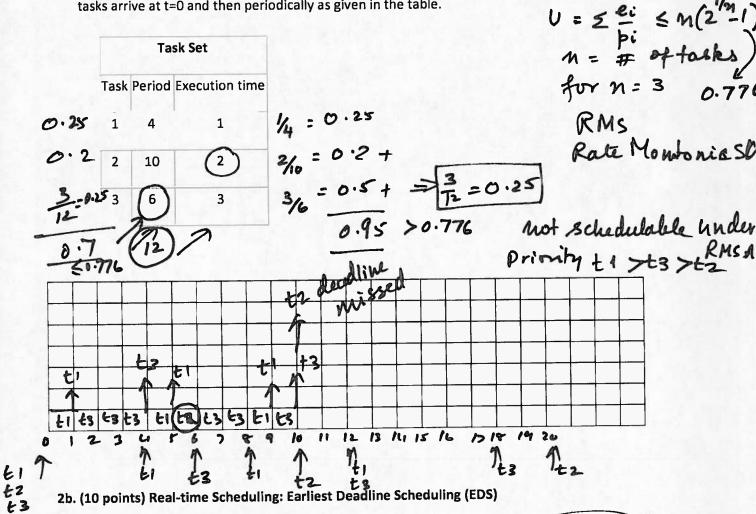**2a. (15 points) Real-time Scheduling: Rate Monotonic Scheduling (RMS)**

$$U \leq \frac{e_i}{p_i} \leq 1$$

Use the RMS schedulability analysis to check if the task set given is schedulable with RMS. If it is not schedulable under RMS, draw a timing chart to show where the first deadline miss occurs. Assume **pre-emptive** scheduling. Assume utility value for three tasks is 0.776 according to RMS. Assume all tasks arrive at t=0 and then periodically as given in the table.

$$U = \sum \frac{e_i}{p_i} \leq n(2^{1/n} - 1)$$

$n = \#$ of tasks

for $n = 3$ 0.776

RMS
Rate Monotonic SC

Task Set		
Task	Period	Execution time
1	4	1
2	10	2
3	6	3

0.25 $\frac{1}{4} = 0.25$

0.2 $\frac{2}{10} = 0.2 +$

$\frac{3}{12} = 0.25$ $\frac{3}{6} = 0.5 + \Rightarrow \boxed{\frac{3}{T_2} = 0.25}$

$\frac{0.7}{\leq 0.776}$ (12)

$0.95 > 0.776$

not schedulable under RMSA

Priority $t_1 > t_3 > t_2$

t2 deadline missed

t1 t3 t3 t3 t1 (t2) t3 t3 t1 t3
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

t1↑
t2
t3

t1   t3   t1   t2   t1   t3   t2
      t1   t3   t1   t2   t3   t3 t2
                             t3

2b. (10 points) Real-time Scheduling: Earliest Deadline Scheduling (EDS)

For the same task set given in Question 2a use the EDS schedulability analysis to check schedulability. Draw the timing chart for at **least two cycles of all tasks.** Assume **non-preemptive** since we are looking at only the earliest deadline.

t1 t3 t3 t3 t1 t2 t2 t3 t3 t3 t1 (t2 t2)
 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

t1
t2
t3

t1   t3   t1   t2   t3
      t1   t1   t1
            t3   t2 t3   t3 t2