



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II**

SESSION 2012/2013

COURSE NAME : REAL TIME SYSTEM
COURSE CODE : BIT 33303
PROGRAMME : 3 BIT
EXAMINATION DATE : JUNE 2013
DURATION : 3 HOURS
INSTRUCTION : ANSWER ALL QUESTIONS

THIS QUESTION PAPER CONSISTS OF FIVE (5) PAGES

- Q1** Consider a payroll system for an elevator company. Describe **THREE** (3) different scenarios in which the system can be justified as hard, firm or soft real-time. Please be specific in your description. (12 marks)
- Q2** Reliability is one of the most important criteria for a good system.
- (a) Explain **TWO** (2) approaches for fault prevention. (7 marks)
- (b) Explain **TWO** (2) approaches for fault tolerance. (7 marks)
- Q3** Discuss **TWO** (2) important criteria to develop network design for real time system applications. (4 marks)
- Q4** (a) Justify deadlock occurrence using **ONE** (1) example from the real world. (4 marks)
- (b) Suggest **ONE** (1) solution for **Q4** (a). (2 marks)
- Q5** (a) Given the incidence matrix in **Table 1** for a Petri net diagram without self loops.

Table 1 : Incidence Matrix

	P1	P2	P3	P4
T1	-1	+1	0	0
T2	-1	+1	+1	0
T3	-1	0	+1	0
T4	0	-1	+1	0
T5	0	0	-1	+1
T6	+1	0	0	-1

- (i) Based on **Table 1**, draw the Petri net diagram for the initial marking (1,0,0,0). (10 marks)

(b) Based on **FIGURE Q5 (b)**, answer the following questions :

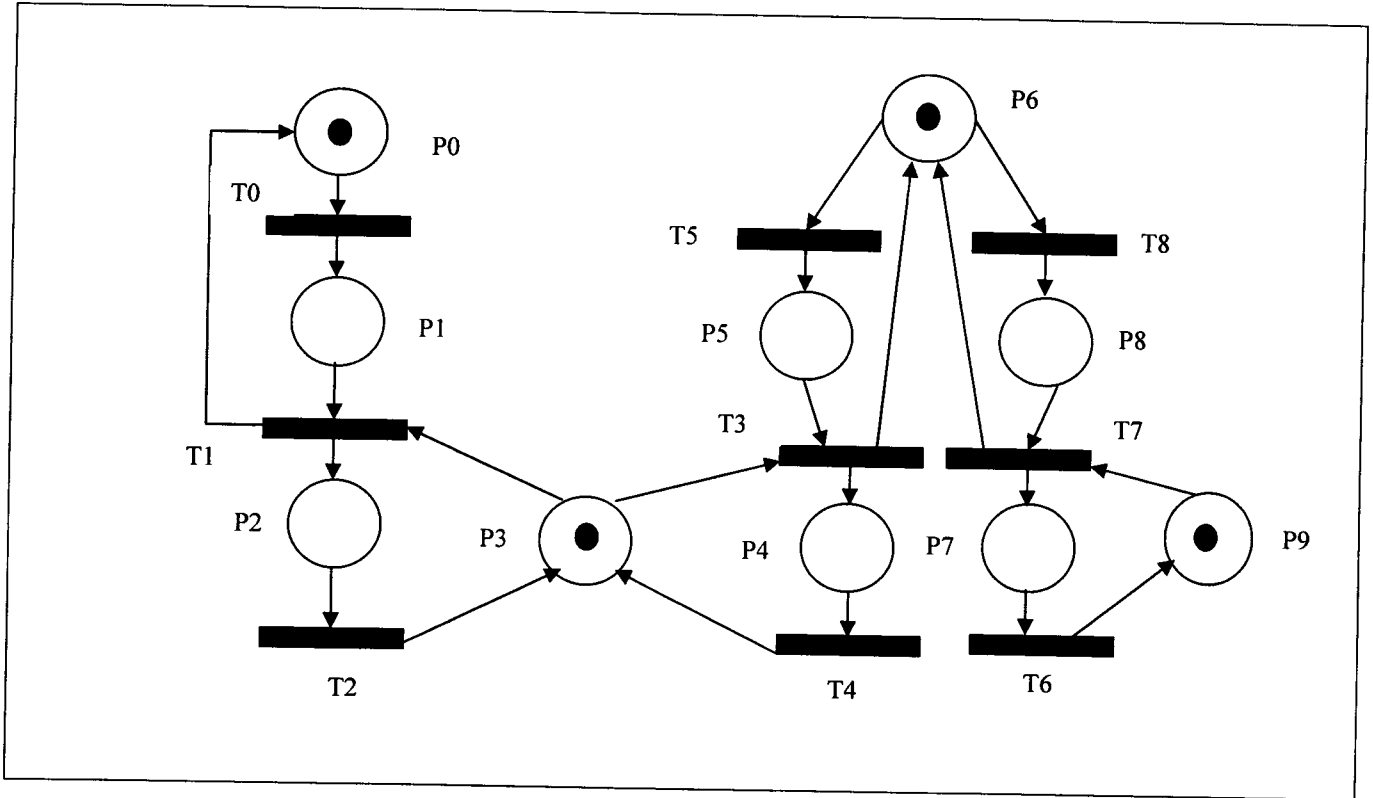


FIGURE Q5 (b)

- (i) Calculate the incidence matrix if transition T0, T5 and T8 fire simultaneously. (10 marks)
- (ii) Outline the firing process in transition T5, T3 and T4. (6 marks)

Q6 Five processes called P1, P2, P3, P4 and P5 run simultaneously with recovery point (Rn) are shown in **FIGURE Q6**.

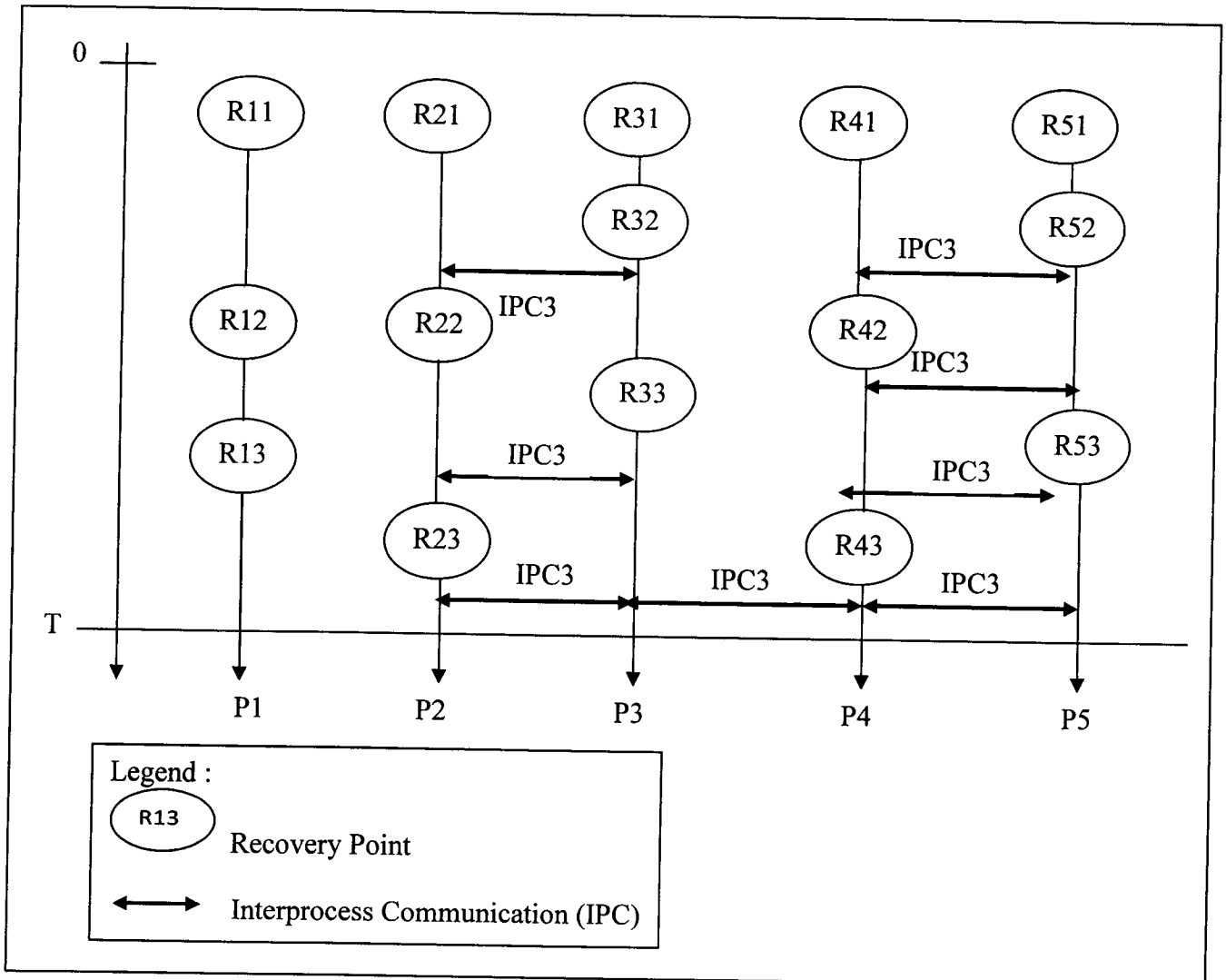


FIGURE Q6

Based on **FIGURE Q6**, outline what happen if error occurs at T time by using Backward Error Recovery concept for processes below :

(a) P2

(3 marks)

(b) P3

(6 marks)

(c) P4

(5 marks)

- Q7** The following **Table 2** has a set of processes having their Burst Time mentioned in millisecond and arrived almost at the same time for Round Robin Scheduling. Given $\text{Time Slice} = 2$.

Table 2 : Process versus Burst Time

Process	Burst Time
P1	10
P2	5
P3	2

- (a) Draw a Gantt chart for the overall processes; P1, P2 and P3. (4 marks)
- (b) Calculate the Waiting Time for P1, P2 and P3. (8 marks)
- (c) Calculate the Average Waiting Time for the overall processes; P1, P2 and P3. (4 marks)

- Q8** Consider three processes X, Y and Z as depicted in **Table 3**.

Table 3 : Summary of process execution

Process	Period	Execution Time
X	3	1
Y	6	2
Z	18	5

Show how these three logical processes X, Y and Z can be scheduled using :

- (a) Rate monotonic scheduling algorithm (4 marks)
- (b) Cyclic scheduling (4 marks)

-END OF QUESTION -