STATISTICS APPLIED TO BUSINESS ADMINISTRATION
ACADEMIC YEAR 2016-2017
PRACTICAL EXERCISES 6 AND 7 (30 MINUTES)

Date: _____

Complete name:_____ ID number:_____

EXERCISE 1 (10 POINTS) The following table includes information on the probability mass function a discrete r.v. X has under the null hypothesis ($P_0(x)$) and under the alternative hypothesis ($P_1(x)$).

X	1	2	3	4	5	6
$P_0(x)$	0	0.10	0.10	0.30	0.40	0.10
$P_1(x)$	0.30	0	0.25	0.05	0.10	0.30

A random sample of size $n = 1$ will be used to test the null hypothesis $H_0 : P(x) = P_0(x)$ against the alternative hypothesis $H_1 : P(x) = P_1(x)$.

1. **(3 points)** Would you include the point $X = \{2\}$ in the critical region? Explain why or why not.
2. **(3 points)** Would you include the point $X = \{1\}$ in the critical region? Explain why or why not.
3. **(4 points)** At the 20% significance level and providing all relevant details used to obtain the required response, find the most powerful critical region for this test, and compute its probability of type II error. **Remark**: Before providing an answer to this item, take into account your responses to the previous items in this exercise.

EXERCISE 2 (10 POINTS)

We wish to test the null hypothesis that the distribution of the clients, stratified by age, five large phone firms have is the same. In order to do so, five r.s. of 500, 600, 350, 800 and 700 clients from those phone firms were taken. These clients were accordingly classified as a function of their age in four classes: younger than 30, between 30 and 44, between 45 and 60, and older than 60.

1. **(5 points)** Providing all relevant details to justify your answer, what would be the most appropriate test for it?
2. **(5 points)** Providing all relevant details to justify your answer, under H_0, what would be the distribution of the test statistic to be used for this test?