1. In a certain factory, the defective rate of product A is 0.01%. Recently, the factory bought an inspection machine, and it could show the result of either "qualified" or "unqualified". However, this machine makes some biases. If a product is qualified there is a probability of 99.99% that it will show the result of "qualified". If a product is unqualified, the probability that the machine shows "unqualified" result will be 99.99%. Among the products, (a) what is the probability that the machine shows a result of "unqualified"? (5%)　(b) what is the probability that the machine shows a result of "qualified"? (5%)

(c)If the machine shows a result of "unqualified", what is the probability that the product is unqualified? (5%)

(d) If the machine shows a result of "unqualified", what is the probability that the product is qualified? (5%)

2. Arrivals of customers at a restaurant follow a Poisson distribution. If three customers arrive per minute at the restaurant on average, (a) what is the probability that in a given minute exactly two customers will arrive?　(7%)

(b) what is the chance that more than two customers will arrive in a given minute? (7%)

(e= 2.71828, $e^2 = 7.38905$, $e^3 = 20.08550$, $e^4 = 54.59800$, $e^5 = 148.41270$)

3. A tire manufacturer wishes to determine whether, on the average, a brand of steel-belted radial tires provides more than 50,000 miles of wear. A random sample of 36 tires yielded a mean, $\overline{X}$, of 52,100 miles and a standard deviation, s, of 2,500 miles.

(a) Use　t　to test the null hypothesis at the .01 level of significance. (7%)

(b)If appropriate, also construct a 99 percent confidence interval, and interpret this interval. (7%)

4. An experimenter has prepared a drug dosage level that she claims will induce sleep for 80% of people suffering from insomnia.　After examining the dosage, we feel that her claims regarding the effectiveness of the dosage are inflated.　In an attempt to disprove her claim, we administer her prescribed dosage to 20 insomniacs, and we observe Y, the number for which the drug dose induces sleep.　We wish to test the hypothesis　$H_0 : p = .8$　versus the alternative, $H_a : p < .8$.　Assume that the rejection region　$\{y \leq 12\}$　is used.

a.　In terms of this problem, what is a type I error? (5%)

b.　Find　α. (5%)

c.　In terms of this problem, what is a type II error? (5%)

d.　Find　β　when p=.6. (5%)

（注意下頁尚有試題）

5. Fit a straight line to the five data points in the accompanying table.　Give the estimates of β_0 and β_1. (6%) Plot the points and sketch the fitted line as a check on the calculations. (6%)

y	x
3	-2
2	-1
1	0
1	1
.5	2

6. An experiment has been concluded for four treatments with three blocks. Complete the following analysis of variance table. (14%)

Source	Sum of Squares	Degree of Freedom	Mean Square
Treatments	42	(a)= ____	(e)= ____
Blocks	32	(b)= ____	(f)= ____
Error	12	(c)= ____	(g)= ____
Total	86	(d)= ____	

(h). Use α =.05 to test for any significant differences. (6%)