

INSTRUCTIONS

1. The quiz contains multiple choice questions that must be answered in the orange code sheet we have provided you with.
2. To select an answer, all you need to do is mark in the orange code sheet, **filling the rectangle over which the selected answer is located appropriately**. Please make sure you know the answer you wish to mark before doing it. Even though you can always erase your mark if you have used a pencil (number 2 or similar), any mark that has not been completely erased could be read by the machine. Therefore, we advice you to first mark your selected answers in the exam and to use only the last ten minutes or so from the time assigned to the multiple choice questions part of the exam to copy them into the code sheet.
3. In the multiple choice questions part of the exam there is always **only one correct answer** for every question. Every question correctly answered is worth 1 point, while each question incorrectly answered will not penalize your grade at all. Questions that have not been answered do not penalize your grade in any form.
4. The quiz has three numbered sheets, going from 0.1 to 0.3. Please make sure that you have all sheets and contact your professor if this is not the case. There are different exam types. This exam is of type 0. Mark a 0 in the column labelled with I in your code sheet, just as it is illustrated in the example.
5. The maximum final grade is 11 points. **You will need to obtain 8 points to pass this quiz.**
7. Please fill in your personal information in the appropriate places in the code sheet.

Example:

12545

PEREZ, Ernesto

Exam type 0

Resit

MULTIPLE CHOICE QUESTIONS (Time: 30 minutes)

1. FREE-QUESTION. The capital of Spain is:

- (A) Paris (B) Sebastopol (C) Madrid (D) Londres (E) Pekin

Questions 2 and 3 refer to the following exercise:

The probability that a professor makes a mistake when writing the grade a student has on the official transcripts is 0.01.

2. If in one of his classes the professor has 20 students, the probability that he makes exactly one mistake when writing the grades for this class on the official transcript is:

- (A) 0.1652 (B) 0.9831 (C) 0.5437 (D) 0.0169 (E) 0.8348

3. If in another one of his classes the professor has 100 students, the probability that he makes at most 4 mistakes when writing the grades for this class on the official transcript is:

- (A) 0.921 (B) 0.996 (C) 0.004 (D) 0.079 (E) 0.325

Questions 4 to 6 refer to the following exercise:

The number of cars arriving each minute at a given gas station follows a Poisson distribution with mean equal to 1.2. It is assumed that car arrivals in different minutes are independent.

4. The probability that in a given minute exactly two cars arrive to this gas station is:

- (A) 0.3142 (B) 0.6626 (C) 0.2169 (D) 0.8795 (E) 0.9467

5. The probability that in 5 minutes more than 8 cars arrive to the gas station is:

- (A) 0.1528 (B) 0.7160 (C) 0.8472 (D) 0.2840 (E) 0.4735

6. The approximate probability that in 30 minutes at most 41 cars arrive to the gas station is:

- (A) 0.29 (B) 0.18 (C) 0.37 (D) 0.82 (E) 0.71

7. Let $\{X_n\}_{n \in \mathcal{N}}$ be a sequence of random variables having probability mass function given by:

$$P_n(x) = \begin{cases} \frac{1}{2} & \text{if } x = 2 - \frac{1}{n} \\ \frac{1}{2} & \text{if } x = 2 + \frac{1}{n} \end{cases}$$

The sequence of random variables will converge:

- (A) In distribution, probability and quadratic mean to $X = 2$
(B) Only in distribution and probability to $X = 2$
(C) Only in distribution to $X = 2$
(D) Only in probability to $X = 0$
(E) In distribution, probability and quadratic mean to $X = 0$

8. Let X be a random variable such that $X \in \gamma(2, 2)$. The random variable $Y = 4X$ is distributed as:

- (A) $\gamma(8, 2)$ (B) $\gamma(\frac{1}{2}, 2)$ (C) $\gamma(2, 8)$ (D) $\gamma(\frac{1}{4}, 2)$ (E) $\gamma(4, 2)$

Questions 9 to 11 refer to the following exercise:

Let X and Y be two independent random variables such that $X \in \chi_1^2$ and $Y \in \chi_{10}^2$.

9. The probability that the random variable $Z = X + Y$ takes on values greater than 17.3 is:

- (A) 0.90 (B) 0.01 (C) 0.95 (D) 0.10 (E) 0.05

10. If we define the random variable $V = \frac{Y}{10X}$. The value of k such that $P(V > k) = 0.90$ holds is:

- (A) 3.280 (B) 0.017 (C) 2.320 (D) 60.20 (E) 0.305

11. The probability that the random variable $W = \frac{\sqrt{10X}}{\sqrt{Y}}$ takes on values smaller than or equal to 1.81 is:

- (A) 0.90 (B) 0.45 (C) 0.95 (D) 0.10 (E) 0.05