



Jahangirnagar University

Institute of Information Technology

2nd Year 1st Semester B.Sc. (Honors) Final Examination-2020

Course No. # ICT - 2107

Course Title# Probability and Statistics for Engineers

Examination Roll No. #

19 23 40

Registration No. #

20 19 36 50 283

Academic Session #

2018 - 2019

Total no of written pages in the script #

Exam Date: 25, Aug , 2021

Instructions:

1. Examinee must write his/her exam roll no. and page no. at the top of every page of the script.
2. Do not write your name or any identification mark anywhere of the script.
3. Total time for exam is 45 minutes. You will get 15 additional minutes for submission.
4. Delay in submission is not acceptable.
5. You have to submit your exam script in PDF format.
6. The examinee must submit the examination script **through online (Google classroom/email/google form etc.)** as prescribed by the examiner.
7. You must use **your EXAM ID** only for naming your submitted file.
8. After completing the exam, you must write the total number of pages used for the exam in the top sheet.

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Answer to the question no - 1

a. classical definition of Probability: If a trial results in n exhaustive mutually exclusive and equally likely outcomes and m of these outcomes are favorable to a Particular event A , then the Probability P of happening the event A is given by:

$$\begin{aligned} P &= P(A) \\ &= \frac{\text{favorable number of Outcomes}}{\text{total number of Possible Outcomes}} \\ &= \frac{m}{n} \end{aligned}$$

Limitation:

1. The classical Probability fails to define Probability when the total numbers of Possible Outcomes are infinite.

b.

$$\Sigma f = 50$$

$$\Sigma n = 175$$

$$\Sigma fn = 1610$$

$$\Sigma fn^2 = 7125$$

$$\Sigma fn^3 = 58050$$

$$\begin{aligned} A.M &= \frac{\Sigma fn}{n} \\ &= \frac{1610}{50} \\ &= 32.2 \end{aligned}$$

$$\begin{aligned} S.D &= \sqrt{\frac{1}{n-1} \left(\Sigma fn^2 - \frac{(\Sigma fn)^2}{n} \right)} \\ &= \sqrt{\quad} \\ &= 34.11 \end{aligned}$$

$$\begin{aligned} \text{Variance} &= \frac{SD}{\text{Mean}} \times 100 \\ &= \frac{34.11}{32.2} \times 100 \\ &= 105.93\% \end{aligned}$$

2. It is not always possible to enumerate all the equally likely outcomes.

3. It is not possible to say the probability that a newly born baby will be a boy.

4. It is not possible to say the probability that a person will survive up to the age of 85 years.

Simple experiment:

Simple space: if we throw a die then the sample space $S = \{1, 2, 3, 4, 5, 6\}$. Now the event of 2 appearing on the die is simple is given by

$$E = \{2\}$$

Equally likely event: when an unbiased coin is tossed the chances of getting a head or a tail are the same.

Answer to the question no-2

a. Regression is a mathematical measure of expressing the average of relationship between two or more variable in terms of the original units of the data.

$$Y = A + Bx$$

Distinguish between correlation and regression

Correlation

1. Simple Correlation measures the direction and strength of linear relationship between two variables.

2. Correlation coefficient is Symmetric

$$r_{xy} = r_{yx}$$

3. The value of the correlation coefficient lies between -1 to +1

Regression

1. Regression measures the effect of independent variable on dependent variable.

2. Regression Co-efficients are not symmetric in x and y $b_{xy} \neq b_{yx}$.

3. Regression coefficient can take any real value between $-\infty$ to $+\infty$.

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Use of regression analysis.

1. The relation can be used for Predictive Purpose.

2. Regression analysis is widely used in statistical estimation of demand curves, supply curves, Production function.

b.