



MSc DEGREE (CSS) EXAMINATION, DECEMBER 2025

First Semester

MSc Statistics with Data Science

Core Courses - ST040104 - STATISTICAL COMPUTING 1 USING PYTHON

2020 Admission Onwards

512115D3

Time: 3 Hours

Weightage: 30

(Answer any **THREE** questions. Each question carries a weight of **10**)

1. (a) Write a program to check whether a string is Palindrome
- (b) Write a program to convert the given number into a binary system.
- (c) Write a program to print the multiplication table of three numbers viz. a,b,c till n in the following format
(Justify using format function)

$$\begin{array}{llll} a \times 1 & = & a & \quad b \times 1 & = & b & \quad c \times 1 & = & c \\ a \times 2 & = & 2a & \quad b \times 2 & = & 2b & \quad c \times 2 & = & 2c \end{array}$$

$$a \times n = na \quad b \times n = nb \quad c \times n = nc$$

2. (a) Briefly explain the following function
 - (i) Function with default values
 - (ii) Function by parameter name
- (b) Write a script that inputs a line of plaintext and a distance value and outputs an encrypted text using a Caesar cipher and replace space with !. (In Caesar cipher a letter is substituted by a letter certain fixed number position it's later or before the alphabet. For example - Alphabet B is replaced by two positions down D. D would become F and so on)
3. a) The following nine observations were drawn from a normal population:
27, 21, 20, 24, 23, 29, 21, 18, 27
Test the null hypothesis $H_0 : \mu = 26$
against the alternative hypothesis, $H_1 : \mu \neq 26$
Write the python codes used for testing the hypothesis and give the output obtained.
- b). Data collected on the effect of four fixed types of television tube coating on the conductivity of the tubes is given as :
Coating I : 56, 55, 62, 59, 60





Coating II : 64, 61, 50, 55, 56

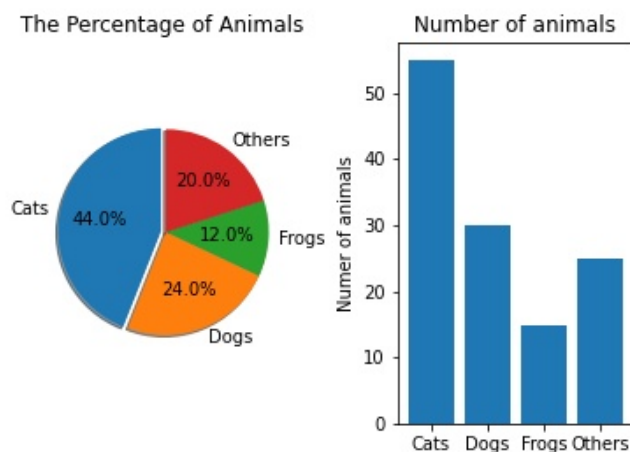
Coating III: 45, 46, 45, 39, 43

Coating IV: 42, 39, 45, 43, 41

Do an analysis of variance on these data and test the hypothesis that the four coatings yield the same average conductivity. Write the python program used for testing the hypothesis and give the output obtained.

4. Write a Python program to display the given data in a diagram of the following format

Type of Animals	Cat	Dog	Frog	Others
Number of Animals	55	30	15	25



5. Obtain a reflexive g-inverse of the following matrices.

$$A = \begin{bmatrix} 1.3 & 2.1 & 3.5 & 6.4 \\ 2.5 & 1.6 & 4.2 & 3.6 \\ 6.1 & 5.2 & 7.5 & 4.3 \end{bmatrix}, B = \begin{bmatrix} 2 & 3 & 1 \\ 1 & 5 & 2 \\ 2 & 1 & 3 \\ 0 & 2 & 4 \end{bmatrix}$$

Also, write the Python codes used

6. Generate random samples of size 12 each from the following distributions using the inversion method,

(1) Discrete uniform distribution with possible values 1,2...10

(2) Exponential distribution with rate, $\lambda = 0.15$

(3) Pareto distribution with scale parameter $k = 1.3$ and shape parameter $\alpha = 2.1$

Write the Python codes used and the random samples generated. Set seed using the code,

`np.random.seed(155)`

