NATIONAL OPEN UNIVERSITY OF NIGERIA
FACULTY OF SOCIAL SCIENCES
DEPARTMENT OF ECONOMICS
2025_2 EXAMINATIONS

COURSE TITLE: APPLIED STATISTICS
COURSE CODE: ECO 452
UNITS: 2
TIME ALLOWED: 2 HOURS
INSTRUCTION: ANSWER QUESTION ONE (1) AND ANY OTHER TWO (2) QUESTIONS
QUESTION ONE CARRIES 30 MARKS WHILE OTHER QUESTIONS CARRY 20 MARKS EACH

1a. Describe the descriptive measures that can be used in assessing a sample or population **(5 marks)**
  b. Explain in details the standard deviation and sample variance of any given population **(5 marks)**
  c. Explain the assumptions of a normal distribution **(5 marks)**
  d. The information below relates to quantities of groundnut produced by Nigeria farm Nigeria Ltd. The production data are normally distributed with equal variance in the 3 sections for 6 months.

Months	Morning (x_1)	Afternoon (x_2)	Evening (x_3)
1	85	77	90
2	83	81	92
3	79	85	84
4	81	82	82
5	82	80	87

    (i)   What is explained variation
    (ii) What is unexplained variation
    (iii) What is total variation. **(15 marks)**

2a. A coin is tossed 120 times, find the probability that head will appear between 45% and 55%.
  b. Describe the following components of time series
        (i)   Secular trend or long-term movement
        (ii) Seasonal variation
        (iii) Irregular or residual variation
        (iv) Cyclical variation. **(20 marks)**

3a. State and explain the null hypothesis of analysis of variance (ANOVA)
  b. State and explain the divisions of the total variation in ANOVA **(20 marks)**

4a. State and explain the assumptions of multiple regression
  b. The quantity demanded for Apple denoted by Y is thought to be a linear function of price (X_1) and income (X_2). A sample of 6 pairs of price and income gave the value of quantity demanded shown in the table below:

Y	X_1	X_2
40	9	8
10	12	10
35	6	6
25	10	11
30	9	8

45	14	7

(a) Find the least square regression equation of Y on X_1 and X_2; if $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \mu$ and $E(\mu) = 0$

(20 marks)

5. A population consists of four members 3, 7, 11, 15. Consider all possible samples of size of two that can be drawn without replacement from this population. Find

               (i) Population mean

               (ii) The population standard deviation

               (iii) The mean of the sampling distribution of means

               (iv) The standard deviation of the sampling distribution of means. **(20 marks)**