KISII UNIVERSITY
FACULTY OF AGRICULTURE

AGBM 241   BUSINESS STATISTICS Exam   2022

SECTION A: ANSWER ONE QUESTIONS AND ANY OTHER THREE

1.
   A.
   i.   Define the term correlation analysis as used in Business statistics.   [2 Marks]
   ii. Outline the three main types of correlation.   [3 Marks]
   iii. State five methods of correlation   (5 Marks)
   B.   Given the data is table 1 below.

Table 1 : variables Y and X

Y	48	35	17	23	47
X	45	20	40	25	45

   a) Calculate Karl Pearson's coefficient of correlation and interpret its value
                                                                                  [3 Marks]
   b) Calculate correlation coefficient by direct method (i.e. without taking the deviations from actual mean or assumed mean).   [3 Marks]
   c) Calculate the probability error ($P.E_r$)   [3 Marks]
   d) Calculate the standard error of coefficient of correlation.   [3 Marks]
   e) If $r = 0.6$ and N=64, find out the probable error of the coefficient of correlation and determine the limits of population r [3Marks]

2.
   i.   Four playing cards are drawn without replacement. What is the probability that they are all Aces?   [5 Marks]
   ii. Using binomial distributions, find the probability of 4 heads in 10 flips.
                                                                                  [5 Marks]
   iii. A student in Kisii University receives an average of 8 calls per hour. Use Poisson distribution to determine the probability of receiving 3 calls randomly in a selected hour.   [5 Marks]
   iv. FACTORIAL
        Determine
        a)
        $$\frac{C_2^{10} \times C_2^8 \times C_4^{12}}{C_8^{12}}$$

                                                                                  [5 Marks]

        b) In shuffling a pack of cards, eight cards are accidentally dropped; find the chance that the missing cards should be two from each suit which is given as

        $$\frac{C_2^{13} \times C_2^{13} \times C_2^{13} \times C_2^{13}}{C_8^{52}}$$

                                                                                  [5 Marks]

3.
   a) Determine the average deviation, variance, coefficient of variation, standard deviation, mean, mode, and median of the given ungrouped data   (15 Marks)

Table 2: Ungrouped data

6	7	6	8	5	7	6	9	10	6

b) Define the following terms as used in statistics

    I.   Variable   [2Marks]

    II.   Random variable   [2 Marks]

    III.   Sample   [2 Marks]

    IV.   Discrete variables   [2 Marks]

    V.   Nominal level   [2 Marks]

4.

a) Define and explain the term ANOVA   [5 Marks]

b) A tea company in Kericho County appoints four Salesmen A, B, C, D and observes their sales in three seasons – 1, 2 and 3. The figures in thousands of Kenya shillings are given in the following table:

Seasons	Salesmen				Season's Totals
	A	B	C	D	
1	36	36	21	35	128
2	28	29	31	32	120
3	26	28	29	29	112
Salesmen's Totals	90	93	81	96	360

Code the above data by subtracting 30 from each figure (value) and answer the following questions:

a) Do salesmen significantly differ in performance   [10 marks]

b) Is there any significance difference between seasons   [10 marks]

For critical value (2,6) d.f $F_{0.05}$ = 5.14 AND For critical value (3,6) d.f $F_{0.05}$ = 4.76

5. Given the following two linear variable model, $Q_i = \beta_0 + \beta_1 P_i + \mu_i$

a) State five assumptions of the classical linear regression model (OLS) put forward for the error term.   [5 Marks]

b) Give the data below on quantity demanded (Q) and price (P) :-

Q	12	8	9	6	4	2	1
P	2	3	6	6	10	12	17

With 5 df, $t_{0.05} = 2.571$

    i.   Estimate the demand function.   [8 Marks]

ii. State whether β_0 and β_1 are statistically significant at 5 % level of significance.

[5 Marks]

iii. Determine the coefficient of correlation between Q and P. [2 Marks]

iv. Determine the coefficient of determination and adjusted R $(\overline{R})$. [2 Marks]

v. Find the coefficient of price elasticity of demand given $\overline{Q} = 6$ and $\overline{P} = 8$

[3 Marks]

6.
  i. Explain what is meant term chi-square (χ^2). [5 Marks]
  ii. In anti a malaria campaign at Kisii University , and its environs, Quinine was administered to 812 out of a total of 3,248 as in the table below.
  Discuss the usefulness of Quinine in checking Malaria. [20 Marks]

Treatment	Fever	No Fever	Total
Quinine	20	792	812
No Quinine	220	2,216	2,436
Total	240	3,008	3,248