BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF COMMERECE

NOV 2023

DEPARTMENT OF ECONOMICS

PROGRAMME: BSc HONORS IN ECONOMICS

STATISTICS FOR ECONOMISTS 1 EC 103 (2)

DURATION: 3 HOURS TOTAL MARKS: 100

INSTRUCTIONS TO CANDIDATES

(i) Answer all questions.

(ii) Each question carries **25 marks.**

(iii) Start each answer on a new page.

(iv) No cell phones are allowed into the examination room.

QUESTION 1

a) List any four properties of a normal distribution curve. **[4 Marks]**

b) The following task completion times were recorded for a task presented to 25 teams of employees. The units in hours

3.1 4.3 5.6 2.3 4.9 4.2 3.3 6.1 4.4
2.8 4.8 3.8 4.4 3.4 4.0 6.4 5.2 4.2
5.3 2.7 3.6 3.5 2.0 4.7 3.9

i. Construct a frequency distribution by grouping data into classes 2.0 – 2.9; 3.0 – 3.9 etc until all the values have been accounted for. **[6 Marks]**

ii. From the frequency distribution above draw a less than ogive and hence determine the third decile. **[4 Marks]**

iii. Using the frequency distribution above find 3 main measures of central tendency and comment on the degree of skewness. **[6 Marks]**

c) Distinguish between the following

i. A histogram and a bar chart; **[1 Mark]**

ii. Discrete data and continuous data; **[1 Mark]**

iii. A parameter and a statistic; **[1 Mark]**

iv. Mean deviation and Quartile deviation and; **[1 Mark]**

v. Mutually exclusive and non-mutually exclusive events. **[1 Mark]**

QUESTION 2

a) A company offered each of its employees a choice of three performance bonus options: a cash bonus option, a profit-sharing option and a shares option. The number of employees who selected each bonus option together with their work function (administration or production) is shown in the following cross-tabulation (two-way pivot) table.

	Cash bonus	Profit Sharing	Shares Option
Admin	28	44	68

Production	56	75	29

i. Find the probability that an employee selected the cash bonus option. **[2 Marks]**

ii. If income tax must only be paid on the cash bonus or the profit-sharing option, find the probability that an employee selected a tax-free bonus option. **[2 Marks]**

iii. Find the likelihood that an employee works in production and chose the cash bonus option. If an employee is in administration, what is the likelihood that the employee chose the shares option. **[2 Marks]**

iv. If a cash bonus option was chosen, what is the probability that it was chosen by a production worker? **[2 Marks]**

v. If event A = shares option and event B = an administration employee, test whether the choice of performance bonus option is statistically independent of the work function of the employee. **[2 Marks]**

vi. State the probability type (marginal, joint or conditional) or probability rule that applied in each of (i) to (v). **[3 Marks]**

b) A company produces 1000 items every week from three different types of machines. Machines A, B and C. Machine A produces 600 items, and B produces 300 and C produces 100 items. The probability that an item produced by A is bad is 0,4, the probability that an item from B is bad = 0,2 and the probability that an item from C is bad = 0,05.

Required:

If an item is taken at random what is the probability that:

i. it is from Machine A **[4 Marks]**

ii. It is bad **[4Marks]**

iii. It is from machine A given that it is bad **[4 Marks]**

QUESTION 3

a) Customers arrive randomly at a department store at an average rate of 3.4 per minute. Assuming the arrivals form a Poisson's distribution, calculate the probability that:

i. No customers arrive in any particular minute. **[3 Marks]**

ii. Exactly one customer arrives in any particular minute. **[3 Marks]**

iii. Two or more customers arrive in any particular minute. **[3 Marks]**

iv. One or more customers arrive in any particular minute. **[3 Marks]**

b) From the past records, the probability that a machine will need correcting adjustment during a day's production run is 0.20

If there are six of these machines running on a particular day, find the probability that

i. No machine needs correction **[2 Marks]**

ii. Just one machine needs correction **[2 Marks]**

iii. Exactly two machines need correction **[2 Marks]**

iv. More than two machines need correction **[2 Marks]**

c) Distinguish between the principles of inclusion and of exclusion in the classification of data into a grouped frequency. **[3 Marks]**

d) Explain any Two (2) disadvantages of conducting a census **[2 Marks]**

QUESTION 4

The following table gives information on salaries (in dollars) for the 30 employees of Diggo Investments (Pvt) LTD.

Salary (in dollars)	Number of Employees

0 to less than 2000	4
2000 to less than 4000	7
4000 to less than 6000	9
6000 to less than 10 000	5
10 000 to less than 15 000	3
15 000 to less than 200 000	2

a) **Calculate the following:**

i. The mean salary for Diggo Investments **[3 Marks]**

ii. The median salary for Diggo Investments **[3 Marks]**

iii. The Modal salary for Diggo Investments **(3 Marks]**

iv. Estimate the median from an ogive **[9 Marks]**

b) State any five uses of statistics in a business **[5 Marks]**

c) Explain any One (1) advantage and One (1) disadvantage of primary sources of data. **[2 Marks]**

END OF PAPER