BINDURA UNIVERSITY OF SCIENCE EDUCATION

FACULTY OF COMMERCE

DEPARTMENT OF HUMAN RESOURCES MANAGEMENT
Course: HCM102/BS102 Quantitative Analysis for Business I (3)
Duration: 3 HOURS

INSTRUCTIONS FOR CANDIDATES

JUN 2023

1. Answer any **two** questions from section A and any **two** questions from section B.

INFORMATION FOR CANDIDATES

1. All questions carry equal marks.
2. No unauthorised items must be brought into the examination room.

MATERIALS ALLOWED

1. Scientific Calculator
2. Statistical Booklet
3. Graph Paper

SECTION A: Answer any **two** Questions

QUESTION 1

Given the following data set

1	12	8	16	6	9	4	7	20	10
3	11	18	12	8	10	2	9	13	22
3	7	9	17	17	23	6	9	11	2
15	5	7	4	14	28	8	19	25	10

Required:

a) Group the data into classes 0-<5 , 5- <10 , 10- <15 , 15- < 20 , 20 - <25 , 25- <30 (5)

b) Construct
i) a histogram (5)
ii) a frequency polygon (5)
iii) a more than ogive curve (5)
iv) a stem and leaf plot (5)

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QUESTION 2

Class Interval	Frequency
0-< 5	3
5-<10	5
10-<15	7
15-<20	6
20-<25	2

Calculate:

i) Mean age (5)
ii) Median age (5)
iii) Standard Deviation (5)
iv) the co-efficient of variation (5)
v) Pearson's Coefficient of Skewness ad comment (5)

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QUESTION 3

a) The lifetime of an experimental energy –savings device has an exponential distribution with a mean of 2 years and its cumulative distribution function given by $P(X=x) = 1 - e^{-\frac{x}{\theta}}$

i) what is the probability that the device will last more than 3 years. (5)

ii) what is the probability that the device will last less than 2 years. (5)

b) A luxury passenger liner has 500 passengers on whose ages are normally distributed around a mean of a mean of 60 years with a standard deviation of 12 years. How many passengers are

i) between 45 and 78 years old. (5)

ii) older than 78 years. (5)

iii) younger than 45 years. (5)

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Section B: Answer any two Questions

QUESTION 4

a) Solve the system of equations

$2x_1 + 4x_2 = 16$

$3x_1 - 5x_2 = -9$

using Cramer's Rule to find x_1 and x_2 (10)

b) Solve the system of equations

$4X_1 - 3X_2 + 3X_3 = 8$

$-2X_1 + 5X_2 + X_3 = 4$

$3X_1 + 2X_2 + 4X_3 = 2$

using Cramer's rule to find X_1 X_2 and X_3 (15)

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QUESTION 5

a) Given the supply and demand functions

$P = 2Q^2_S + 10Q_S + 10$

$P = -Q^2_D - 5Q_D + 52$

Calculate the equilibrium price and quantity. (10)

b) If fixed costs are 25, variable costs per unit are 2 and the demand function is

$P = 20 - Q$

obtain an expression for π in terms of Q and hence sketch its graph.

(a) Find the levels of output which give a profit of 31.

(b) Find the maximum profit and the value of Q at which it is achieved. (15)

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QUESTION 6

a) A principal sum of $5000 is invested at annual interest rate of 6%. Find the future value of this sum after 5 years if the interest rate is:

ii) compounded monthly (5)

iii) compounded continuously (5)

b) You are invited to invest $5000 in a project that is guaranteed to yield $5 800 after 4 years. The market rate of interest is 5% and is compounded continuously. Evaluate whether the investment should be undertaken using :

i) the net present value (NPV) approach. (5)

ii) the internal rate of return (IRR) approach. (5)

c) Share prices rise by 32% during the first half of the year and rise by a further 10% during the second half. What is the overall percentage change. (5)

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End of Paper