

THE OPEN UNIVERSITY OF SRI LANKA
 FACULTY OF MANAGEMENT STUDIES
 ADVANCED CERTIFICATE IN ENTREPRENEURSHIP AND SMALL
 BUSINESS MANAGEMENT (ESBM) PROGRAMME
 OSC 2303 - BASIC MATHEMATICS AND STATISTICS
 FINAL EXAMINATION – 2025/26
 DURATION: TWO (02) HOURS



DATE: 9TH MAY 2026

TIME: 9.30 AM – 11.30 AM

Instructions:

- Answer FOUR (4) questions ONLY.
- All workings pertaining to answers should be clearly submitted.
- All questions carry equal marks.
- Use of a non-programmable calculator is allowed.
- This question paper carries 5 questions in 4 pages.

Question 1

a) Solve the following equations for X:

(i) $5(2x - 1) = 4(3x + 2)$ (3 marks)

(ii) $\frac{2x}{3} - \frac{1}{4} = 5x + \frac{1}{2}$ (3 marks)

(iii) $2x^2 - 7 = 3x + 5$ (4 marks)

b) One day, a student went to a small cafe after school. He bought 2 burgers and 1 drink, and the total cost was Rs. 250. The next day, he visited the same cafe and bought 1 burger and 3 drinks, and this time he paid Rs. 300. The student became curious about the individual prices of a burger and a drink. Using this information, form simultaneous equations to find the cost of one burger and one drink. (6 marks)

c) If $a = -1$, $b = 4$, find:

$$\frac{2a^3 + 3b^2 - ab}{(a - b)^2 + 2ab}$$

(4 marks)

d) A fruit seller has a total of 100 fruits consisting of apples, oranges, and mangoes. The number of oranges is twice the number of apples, and the number of mangoes is 10 more than the number of oranges. Find how many fruits each he has.

(5 marks)
(Total 25 marks)

Question 2

A toy rocket is launched, and its height H (in meters) after t seconds is given by the equation:

$$H = t^2 - 6t + 8$$

- a) Find the time(s) when the rocket is at ground level. (3 marks)
- b) How long does it take to reach a height of 24 meters? (4 marks)
- c) Plot the graph of the rocket's height for t values from -1 to 7. (8 marks)
- d) A drone is flying at a constant height following the equation:

$$H = 2t - 4$$

Plot the drone's height on the same graph for t values from -1 to 7. (8 marks)

- e) Using the graphs, determine the time(s) when the rocket and the drone are at the same height. (2 marks)

(Total 25 marks)

Question 3

A researcher wants to assess the study habits of university students. The student population is divided into male and female groups. From each group, the researcher selects students proportionally, resulting in a total sample of 150 students. Data are collected on daily study hours, Grade Point Average (GPA), gender, and preferred study method (online or physical books). The researcher then calculates the average study hours of the selected students.

- a) Identify:
 - i) Population
 - ii) Sample
 - iii) Type of data collecting method (3 marks)
- b) Type of variables (Discrete, Continuous or Categorical)
 - i) Daily study hours
 - ii) GPA
 - iii) Gender
 - iv) Preferred study method (4 marks)
- c) Scales of measurement of variables (Nominal, Ordinal, Interval or Ratio) (4 marks)
- d) Is this study census or sample survey? (1 mark)
- e) What is the sampling method applied? Justify your answer. (3 marks)
- f) Identify the answer given in part(e) as probabilistic or non-probabilistic sampling. (1 mark)
- g) Explain how we can select a sample if the gender is not considered for grouping. (4 marks)
- h) Explain how systematic sampling can be applied in the above scenario. (5 marks)

(Total 25 marks)

Question 4

A local electronics store recorded monthly sales data for smart phones across different price ranges.

Price Range (Rs.)	Smartphones
0 - 20,000	20
20,000 - 40,000	40
40,000 - 60,000	30
60,000 - 80,000	20
80,000 - 100,000	10

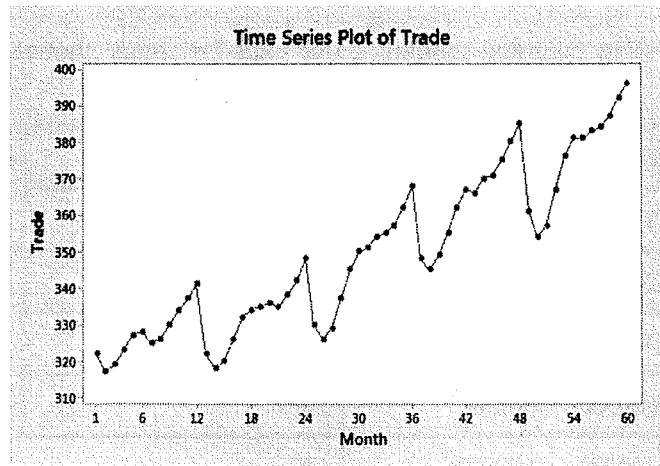
- Construct a Pie chart and a Histogram for the above data. Show the modal class in the histogram. (12 marks)
- Find the measures mean, median, and mode for the above data. (10 marks)
- Using the above answers, explain the properties of the prices of smart phones. (3 marks)

(Total 25 marks)

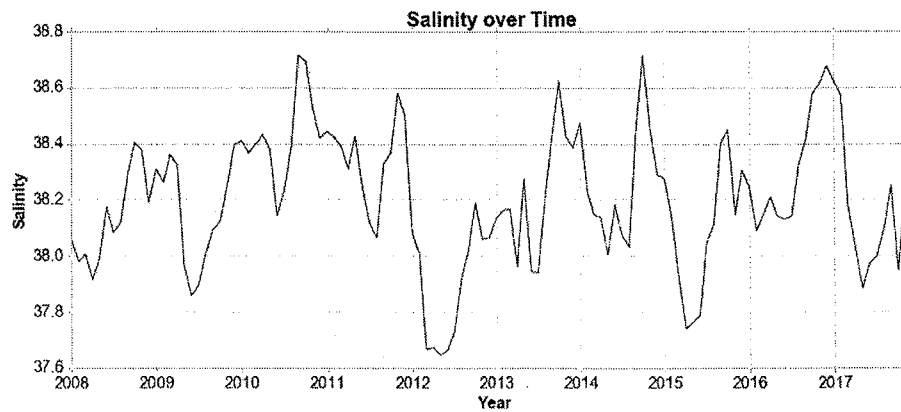
Question 5

- Ravi invests Rs. 5,000 at 4% per annum for 2 years. Calculate the simple interest and the compound interest (compounded annually). State which interest is higher and by how much. (6 marks)
- In a university, students can choose to study Management (M) and/or Entrepreneurship (E). Out of 200 students: 160 study Management, 100 study Entrepreneurship, 60 study both Management and Entrepreneurship.
 - Draw a Venn diagram to illustrate the above scenario. (3 marks)
 - Find the number of students who study only Management. (1 marks)
 - Find the number of students who study neither subject. (1 marks)
 - Find the probability that a student will study at least one subject. (2 marks)
- Interpret the following graphs with your knowledge on the components of time series.

i)



ii)



(6 x 2 = 12 marks)

(Total 25 Marks)

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Appendix

$$\text{mean} = \bar{x} = \frac{\sum fx}{\sum f}$$

$$\text{Median} = L + \frac{\frac{n}{2} - F}{f} * c$$

$$\text{Mode} = L + \frac{d_1}{d_1 + d_2} * c$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$