

SENIOR FOUR MATHEMATICS
Scenario-Based Examination Paper 6
Time: 2 Hours 30 Minutes

Instructions

Answer all items in Section A

Answer one item from Part I and one item from Part II in Section B

Answer four items in total

Show all working clearly

Use a silent non-programmable calculator where necessary

Section A (Compulsory)

Item 1

A company produces two types of electronic devices: tablets and smartphones. The cost to produce one tablet is 150,000 shillings, and one smartphone costs 120,000 shillings. Due to resource limits, the company can produce at most 200 tablets and 300 smartphones per month. The total production budget should not exceed 36,000,000 shillings. The profit per tablet is 25,000 shillings, and per smartphone is 20,000 shillings.

Task

- A. Define variables for the number of tablets and smartphones produced.
- B. Write inequalities to represent the production and budget constraints.
- C. Write an expression for the total profit.
- D. Find the maximum profit possible under the constraints.

Item 2

The height in meters of a ball thrown into the air after t seconds is given by the expression:
negative 5 times t squared plus 20 times t plus 3.

Task

- A. Find the time when the ball reaches its highest point.
- B. Calculate the maximum height of the ball.
- C. Determine the time when the ball hits the ground.
- D. Sketch the graph of height against time, labeling the highest point and intercepts.

Section B

Part I (Answer one item from this part)

Item 3

A school held a three-day fundraising event. On the first day, 60% of the total amount was collected. On the second day, 25% of the remaining amount was collected. On the third day, the rest, which was 45,000 shillings, was collected.

Task

- A. Calculate the total amount collected over the three days.
- B. Find the amount collected on each day.
- C. If 150 contributors shared the total equally, how much did each contribute?

Item 4

50 students took a mathematics exam. Their marks are grouped as follows: 0–9 marks, 4 students; 10–19 marks, 6 students; 20–29 marks, 10 students; 30–39 marks, 15 students; 40–49 marks, 10 students; 50–59 marks, 5 students.

Task

- A. Identify the modal class and explain its meaning.
- B. Calculate the mean mark using mid-point method.
- C. Find the percentage of students who scored 30 marks and above.

Part II (Answer one item from this part)

Item 5

A triangular plot has sides measuring 150 meters, 200 meters, and 180 meters. A farmer wants to fence the plot by drawing a line from one vertex perpendicular to the opposite side.

Task

- A. Calculate the area of the plot using Heron's formula.
- B. Find the length of the perpendicular fence.
- C. Calculate the areas of the two parts created by the fence.
- D. Determine which part has a larger area if one part is for planting crops and the other for building a barn.

Item 6

Point R has coordinates (2, -1). Point R is first reflected about the x-axis, then translated by the vector (5, 3), and finally rotated 90 degrees counterclockwise about the origin.

Task

- A. Find the coordinates of point R after each transformation.
- B. Describe a single transformation that maps R directly to its final position.
- C. Sketch point R and its final image on a coordinate plane.

END OF PAPER 6

Let me know if that's perfect now or if you want me to adjust anything else!