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

Use silent non-programmable calculators where necessary

Show all working clearly

Section A (Compulsory)

Item 1

A company manufactures solar lamps and power banks. In one month, the company produced a total of 800 solar lamps and 600 power banks. The production cost per solar lamp is 24,500 shillings and 39,000 shillings per power bank. The company sells the solar lamps at a 15% profit and power banks at a 20% profit.

Task

A. Calculate the total production cost for solar lamps and power banks.
B. Find the selling price of one solar lamp and one power bank.
C. Calculate the total revenue if all products are sold at the selling price.
D. Determine the total profit made by the company.

Item 2

A water tank is in the shape of a cylinder with radius 1.5 meters and height 4 meters. Water is poured into the tank at a rate of 300 liters per minute.

Task

A. Calculate the capacity of the tank in liters.
B. Find the time taken to fill the tank completely.
C. If water is being drawn from the tank at 100 liters per minute while it is being filled, determine the net time taken to fill the tank.

Section B

Part I (Answer ONE item from this part)

Item 3

A school conducted a survey on students' preferred extracurricular activities. The data collected shows:

90 students like football
70 students like basketball
50 students like volleyball
30 students like both football and basketball
20 students like both basketball and volleyball
15 students like both football and volleyball
10 students like all three sports

40 students do not like any of these sports
A student is selected at random.

Task

A. Find the number of students who like only football.
B. Calculate the probability that the student likes basketball or volleyball.
C. Find the probability that the student likes basketball given they like volleyball.

Item 4

The marks of 60 students in a Mathematics test are grouped as follows:

Marks Range	Number of Students
0 – 9	3
10 – 19	7
20 – 29	10
30 – 39	20
40 – 49	15
50 – 59	5

Task

A. Calculate the mean mark.
B. Determine the modal class and explain its significance.
C. Estimate the percentage of students who scored below 30 marks.

Part II (Answer ONE item from this part)

Item 5

A triangular plot of land has vertices A, B, and C. Side AB measures 120 meters, side AC measures 90 meters, and angle BAC measures 45 degrees. A fence is to be constructed from A perpendicular to side BC, meeting BC at D.

Task

A. Calculate the length of side BC.
B. Find the area of the triangular plot ABC.
C. Determine the length of the fence AD.
D. Calculate the areas of triangles ABD and ADC.

Item 6

A point Q has coordinates (4, 5). Point Q is reflected about the line x = 3 to get point Q'. Then Q' is rotated 90 degrees clockwise about the origin to get point Q''. Finally, Q'' is translated by the vector (3, -2) to get point Q'''.

Task

A. Find the coordinates of point Q'.

B. Find the coordinates of point Q''.

C. Find the coordinates of point Q'''.

D. Describe the single transformation that maps Q directly to Q'''.

END OF PAPER 6

Would you like me to prepare the answer scheme as well?