

**NSSB**  
**PRINCIPAL MATHEMATICS**  
**S.5 END OF TERM EXAMINATION 2026**  
**TIME: 3 HOURS.**

**INSTRUCTIONS.**

This paper consists of two section A and B.

Attempt all questions in section A and B.

**SECTION A: (COMPUTATIONS)**

1. Solve for  $y$ :  $y - 2\sqrt{y} = 3$ .
2. Solve the equation:  $6\sin^2x - 5\sinx + 1 = 0$  for  $0^\circ \leq x \leq 360$
3. The quadratic equation  $x^2 - 5x + 4 = 0$  has roots  $\alpha$  and  $\beta$ . Find the quadratic equation with integral coefficients whose roots are  $\alpha$  and  $-\beta$ .
4. Solve the inequality:  $\frac{3}{x+1} > 2$
5. Solve the equation.  $\sqrt{x+1} + \sqrt{x-2} = \sqrt{x+6}$ .
6. The second term of an AP is 7 and the sixth term is 23. Find the 4th term of the AP and the sum of the first 5 terms.
7. Express the  $\frac{4x+5}{(x-2)(2x-1)}$  into partial fraction.
8. Solve the equation:  $\log_2 x + 6 \log_x 2 = 5$

**SECTION B (APPLICATIONS)**

**ITEM 1.**

A school canteen in Jinja prepared 3 items for a Saturday revision programme: cups of porridge(P), samosas(A), and boiled eggs(B).

During the first break, 2 cups of porridge, 1 samosa, and 2 eggs were sold for UGX 9,100. During the second break, 1 cup of porridge, 3 samosas, and 3 eggs were sold for UGX 11,900.

During the third break, 3 cups of porridge, 2 samosas, and 5 eggs were sold for UGX 18,000. The bursar wants to know the cost of each item so that a new breakfast pack can be introduced.

The pack will be approved only if the total cost of 2 cups of porridge, 5 samosas, and 4 eggs does not exceed UGX 20,000; otherwise, the prices will be reviewed.

**Task:**

- (a) Form 3 equations for the information given.
- (b) Find the cost of 1 cup of porridge, 1 samosa, and 1 boiled egg.
- (c) State whether the breakfast pack should be approved.

**ITEM 2.**

A poultry farmer in Masaka is monitoring the growth of bacteria in a warm brooder unit. At the beginning of observation, there were 500 bacteria in the unit. The farmer notices that the number of bacteria doubles every hour under the existing conditions.

He wants to know how many bacteria will be present after 4 hours, how long it will take for the number to reach 20,000, and how much extra time will be needed for the number to increase from 20,000 to 160,000.

The farmer will keep the current disinfecting plan only if the time taken to rise from 20,000 to 160,000 is at least 3 hours; otherwise, the brooder will be cleaned earlier.

**Task:**

- (a) Form an expression for the number of bacteria after  $t$  hours. Hence find the number of bacteria after 4 hours.
- (b) Find the time taken for the number of bacteria to reach 20,000.
- (c) State whether the farmer should keep the current disinfecting plan or clean the brooder earlier.

**ITEM 3.**

A poultry farmer in Luweero is planning a rectangular wire enclosure for young birds on uneven ground. He has 100 m of fencing wire, but one of the longer sides of the enclosure will lie along an existing wall, so that side does not need wire.

Because the ground is still soft and some parts have already been occupied by pegs, feeders, and trays, the farmer cannot measure the full layout directly. He therefore lets the width of the enclosure be  $x$  metres and wants

the area worked out from the fencing arrangement so that he can know the greatest possible space and the dimensions that produce it.

The farmer will keep the current design only if the enclosure can provide at least  $1,248 \text{ m}^2$  for some values of  $x$ ; otherwise, the design will be changed.

**Task:**

- (a) Form an expression for the area  $A$  in terms of  $x$ . Hence find the maximum possible area of the enclosure.
- (b) Find the dimensions of the enclosure when this maximum area occurs.
- (c) Find the range of values of  $x$  for which the area is at least  $1,248 \text{ m}^2$ .
- (d) State whether the farmer should keep the design or change it.

**ITEM 4.**

A shopkeeper in Mityana is tracking the value of stock taken on credit by a school canteen at the end of each week. In the first week, the canteen takes goods worth UGX 40,000, and each following week the value taken is  $\frac{3}{2}$  times the value of the previous week because the number of learners attending weekend revision keeps increasing.

Since the stock is taken and used before the books are balanced, the shopkeeper cannot tell directly how the weekly amounts will grow and needs a mathematical model to estimate the pattern. She wants to know the weekly starting amount, the multiplying pattern, the value taken in the 7th week, the total value taken in the first 8 weeks, and the first week in which the weekly stock taken will reach UGX 455,625.

The arrangement will continue only if the total value taken in the first 8 weeks does not exceed UGX 2,000,000; otherwise, the credit terms will be reviewed.

**Task:**

- (a) Find the weekly starting amount and the multiplying factor.
- (b) Find the value of stock taken in the 7th week.
- (c) Find the total value of stock taken in the first 8 weeks.
- (d) Find the first week in which the value of stock taken will be at least UGX 455,625.
- (e) State whether the arrangement should continue or the credit terms should be reviewed.