THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATION COUNCIL

DIPLOMA IN SECONDARY EDUCATION EXAMINATION

722 **MATHEMATICS**

Time: 3 Hour. **Year: 2022**

Instructions

1. This paper has Section **A** and **B** and with total of **Fourteen (14)** questions.
2. Answer **all** questions from **Section A** and **two (2)** questions from Section **B**.
3. Section **A** carries **forty (40)** marks and **Section B** carries **sixty (60)** marks.
4. **Mobile phones** are not allowed inside the examination room.
5. Write your **Examination Number** on every page of your answer booklet.

SECTION A (40 Marks)

Answer all questions from this section.

1. Use symbols to test the validity of the argument "If I like logic, I will study arguments. I will study arguments if and only if I have a logical mind. I do not like logic; Therefore, I will not study arguments."

2. List the procedures for computing the determinant of a $\begin{pmatrix} 4 & 1 & 6 \\ 3 & -2 & 5 \\ 1 & 1 & 7 \end{pmatrix}$ matrix using a non-programmable calculator.

3. State five specific objectives for the sub-topic "Elimination Method" in teaching simultaneous equations.

4. Calculate the volume of a frustum given that the full cone has a radius of 18 cm and height 20 cm, while the upper radius of the frustum is 12 cm.

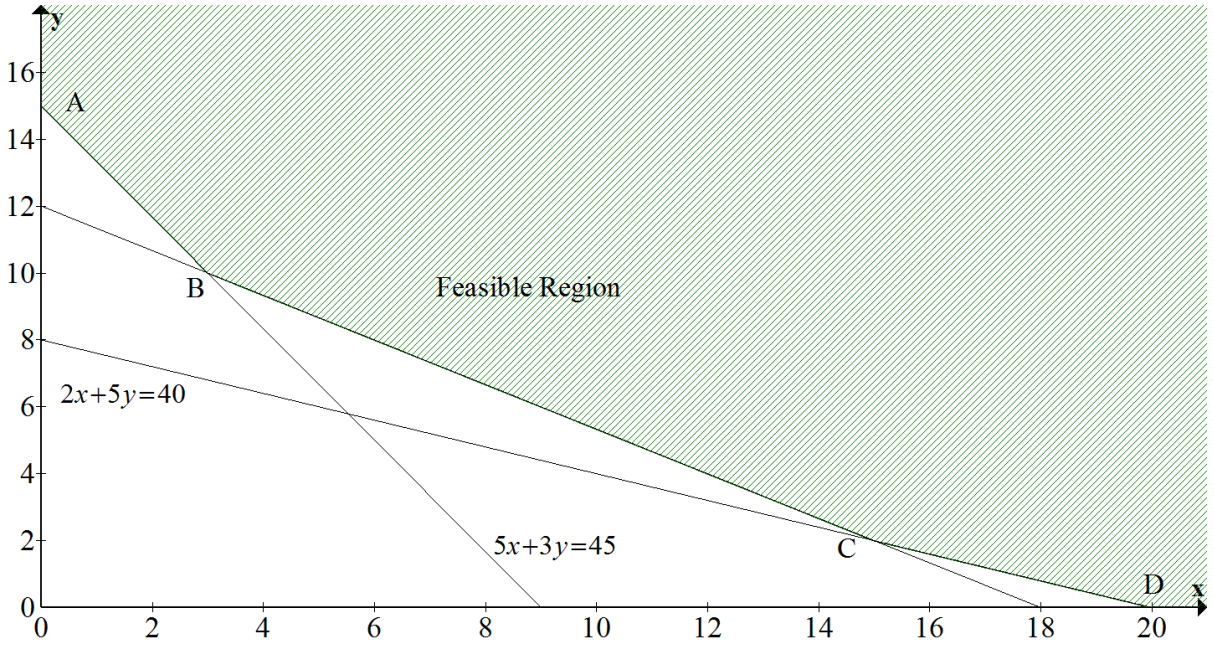
5. Use the standard results for $\sum r^2$ *and* $\sum \mathrm{r}^3$ to show that; $\sum_{r=1}^{n} r^2 (r+1) = \frac{n}{12}(n+1)(n+2)(3n+1)$ and then evaluate $\sum_{r=6}^{10} r^2 (r+1)$

6. Differentiate between assessment and evaluation.

7. Given vectors A = i – 2j + nk and B = 2i + j – 4k, find the value of n if the area of the parallelogram formed by A and B is $5\sqrt{6}$.

8. Given the motion equation x = 4t + ln(1–t):
   (a) Find the velocity and acceleration at t = 1.5 seconds.
   (b) Determine the time when the body is at rest.

9. You are given the graphical representation of a certain linear programming problem shown below;



(a) Identify corner points of a feasible region.
(b) Write the constraints.
(c) Find the maximum and minimum values of the objective function f(x, y) = 12000x + 15000y.

10. Mention four essential aspects in the preparation of a table of specifications.

SECTION B (60 Marks)

Answer **all** questions from this section.

11. Determine the condition such that the equation acosh(x) + b sinh(x) = c has equal roots.

12. "A curve passes through point P, where x = 0 and y = 1. If the gradient at any point is $\frac{3}{2} + x - \frac{1}{2}x^2$. Find

    (a) The equation of the curve.

    (b) The area enclosed by the curve, x-axis with the ordinates x = 1 and x = 3.

13. State five merits of improvising teaching and learning resources.

14. "In spite of having the relevant textbook for lesson preparation, a Mathematics teacher is still required to have a syllabus" Justify this by giving four points.