THE UNITED REPUBLIC OF TANZANIA
NATIONAL EXAMINATIONS COUNCIL OF TANZANIA
DIPLOMA IN SECONDARY EDUCATION EXAMINATION

740 **MATHEMATICS**

Time: 3 Hours **Tuesday, 15th May 2018 p.m.**

Instructions

1. This paper consists of sections A, B and C with a total of **sixteen (16)** questions.
2. Answer **all** questions in section A and **two (2)** questions from each of sections B and C.
3. In both sections, you are required to show clearly all the necessary steps.
4. Non-programmable calculator, mathematical and statistical tables may be used.
5. **All** communication devices and any unauthorized materials are **not** allowed in the examination room.
6. Write your **Examination Number** on every page of your answer booklet(s).

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SECTION A (40 Marks)

Answer all questions in this section.

1. Define the following terms as used in mathematics teaching methods:

   (a) Curriculum materials (b) Mathematics syllabus

   (c) Lesson plan (d) Assessment.

2. Differentiate between the following:

   (a) Mathematics text book and mathematics Reference book.

   (b) Mathematics syllabus and mathematics teacher's guide book.

3. (a) State the principle of permutation as used in probability.

   (b) Ten candidates are contesting for presidency. How many ways are there of predicting the first three positions?

4. During micro-teaching session, a mathematics teacher who was teaching about 3-Dimensional geometry in Form Four asked students to mention any three prism geometrical objects they know. The following were the responses of students A and B.

Student A	Student B
Rectangular	Triangular
Cylinder	Cone
Cube	Pyramid

The teacher accepted all responses from students A and B as correct responses. Assume you were an observer in the micro-teaching, what would have been your reaction to the teacher's comment?

5. Indicates the rules used to simplify the following proposition;

$p \wedge (p \vee \sim q) \equiv p \wedge (p \vee \sim q)$ $\rightarrow$ given

$\equiv (p \vee f) \wedge (p \vee \sim q)$ $\rightarrow$ _____

$\equiv p \vee (f \wedge \sim q)$ $\rightarrow$ _____

$\equiv p \vee f$ $\rightarrow$ _____

$p \wedge (p \vee \sim q) \equiv p$ $\rightarrow$ _____

6. Find two real numbers x and y such that $(2+i)x+(3-2i)y=-1-4i$.

7. Differentiate the function $f(x) = \cos(x^2 + 2x + 1)$.

8. Sketch a diagram of a square pyramid and mention the total number of:
   (a) the faces
   (b) the vertices
   (c) the edges.

9. List four characteristics of a learner centered teaching method.

10. Find the perpendicular distance from point (10, -11) to the line passing through points (2, -1) and (1,1).

SECTION B (30 Marks)

Answer **two (02)** questions from this section.

11. (a) Solve the following equation for the value of x where, $0^o \le x < 180^o$:

    (i) $\text{Cos}(x + 30^o) - Cos(x + 90^o) = \frac{1}{2}$

    (ii) $\text{Cos}(x + 30^o)\, Cos(x - 30^o) = \frac{1}{2}$

    (b) Use t – formula to solve the equation $\sin\theta + 2\cos\theta = 1$.

12. (a) If A and B are points (1, 1, 3) and (4, 5, 8) respectively, find the displacement vector $(\overrightarrow{AB})$ in terms of the unit vectors i, j and k and hence represent it in the xyz plane.

    (b) A moving particle describes a path defined by $\underline{s}(t) = 3t^2\underline{i} + 2t\ \underline{j} - e^t\underline{k}$ in meters. What is the velocity and acceleration of the particle after 3 seconds?

13. (a) Use Taylor's series to expand $\sin\left(\frac{\pi}{6} + k\right)$ in ascending powers of k as far as the term containing k^3. (Hint use Taylor's Series).

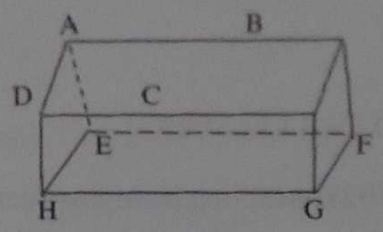
    (b) Find the turning points on the curve $x^3 - 2x^2 + x + 1$.
    Hence sketch the curve and show that $x^3 - 2x^2 + x + 1$ has only one root.

SECTION C (30 Marks)

Answer **two (02)** questions from this section.

14. Explain five factors which a teacher has to consider during construction of mathematics test.

15. (a) Using the following sketched cuboid, prepare a part of lesson development of a lesson plan for teaching "how to locate and name an angle between a line and plane of a cuboid".



(b) By giving a reason, identity two prerequisite concepts (knowledge) that learners need to have in order to understand the procedures for calculating an angle between a line and a plane of a three dimensional figures.

16. The use of lesson plan plays an important role in teaching and learning mathematics. Justify this statement by giving five points.