

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

**740**

**MATHEMATICS**

**Time: 3 Hours**

**Tuesday, 15<sup>th</sup> 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).



**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;

$$p \wedge (p \vee \sim q) = p \wedge (p \vee \sim q) \rightarrow \text{given}$$

$$= (p \vee f) \wedge (p \vee \sim q) \rightarrow \underline{\hspace{2cm}}$$

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$$p \wedge (p \vee \sim q) = p \rightarrow \underline{\hspace{2cm}}$$

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)

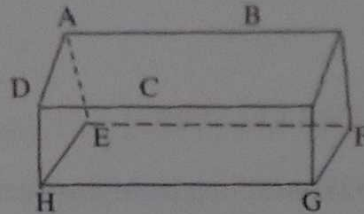
Answer two (02) questions from this section.

11. (a) Solve the following equation for the value of  $x$  where,  $0^\circ \leq x < 180^\circ$ :
  - (i)  $\cos(x + 30^\circ) - \cos(x + 90^\circ) = \frac{1}{2}$
  - (ii)  $\cos(x + 30^\circ) \cos(x - 30^\circ) = \frac{1}{2}$
- (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.