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

731/1 **PHYSICS 1**

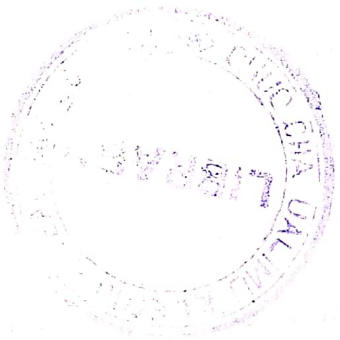
Time: 3 Hours **Tuesday, 14th May 2019 a.m.**

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. Section A carries **forty (40)** marks and sections B and C carry **thirty (30)** marks each.
4. Mathematical tables and non-programmable calculators may be used.
5. Cellular phones and any unauthorized materials are **not** allowed in the examination room.
6. Write your **Examination Number** on every page of your answer booklet(s).

The following information may be useful:

Moment of inertia of a disc, $I = \frac{1}{2}MR^2$



SECTION A (40 Marks)

Answer **all** questions in this section.

1. (a) What is meant by the term fractional error?

   (b) The expression of the period of oscillation in simple pendulum is given by $T = 2\pi\sqrt{\frac{\ell}{g}}$, where T is the period of oscillation, ℓ is length of storing and g is the acceleration due to gravity. Deduce the fractional error of each quantity in a given formula.

2. (a) What will happen to the moment of inertia of a man standing in a rotating turn table when

   (i) suddenly stretches his hands horizontally?

   (ii) raises his hands upwards?

   (b) A disc of mass 2 kg and radius 20 cm is free to rotate about an axis through its centre and perpendicular to the disc. If a force of 50 N is applied tangentially to the disc, calculate the angular acceleration.

3. (a) Define the following terms as used in strength of materials:

   (i) Inter atomic force

   (ii) Perfectly elastic body

   (iii) A brittle material

   (b) Why spring balances show wrong readings after been used for a long time?

4. (a) What is meant by the term internal energy of a system?

   (b) Write down the equation relating to the change in internal energy of a system ΔU, the heat supplied to the system ΔQ and the work done on the system ΔW.

   (c) A quantity of heat Q is supplied to a sample of an ideal monatomic gas under reversible condition. Explain how the first law of thermodynamics can be used to describe the changes that occur if the gas is maintained at

   (i) constant volume.

   (ii) constant pressure.

5. (a) Define the following terms as applied to earthquakes:

   (i) Primary waves

   (ii) Secondary waves

   (iii) Surface waves

   (b) Mention two types of surface waves.

6. Why sound is easily diffracted through windows but light cannot?

7. Why laboratory cupboards have locks and labeled?

8. Write four possible causes of fire in a Physics laboratory.

9. Explain four considerations when preparing a scheme of work.

10. Mention four assessment tools used in the teaching and learning Physics.

SECTION B (30 Marks)

Answer **two (2)** questions from this section.

11. (a) Why roads are banked round a curved pathway? Briefly explain.

(b) Give two necessary and sufficient conditions for an oscillatory motion to be considered simple harmonic.

(c) The displacement - time equation for a particle with simple harmonic motion is given by $x = r\cos(\omega t + \varphi)$.

(i) What does each symbol in the equation represent?

(ii) Write down the velocity-time and acceleration–time equations.

(iii) Use the equations in (ii) to sketch the corresponding graphs showing how velocity and acceleration varies with time (t).

12. Two wires of 10 Ω and 5 Ω are parallel and arranged in series with 20 Ω wire. If the current in 5 Ω wire is 2 A. Find the

(a) current in 10 Ω wire.

(b) potential difference across the whole circuit.

13. (a) State six necessary conditions for interference of light to occur.

(b) Plano–convex lens is used to produce Newton's rings with a flat glass plate. If the diameter of the tens dark ring viewed by normally reflected light of wavelength 5.00×10^{-7} m is 4.48 mm. Calculate;

(i) The radius of curvature of a Plano–convex lens.

(ii) The diameter of the twentieth bright ring.

(c) Why do explosions on other planets not heard on earth?

SECTION C (30 Marks)

Answer **two (2)** questions from this section.

14. (a) Briefly explain six characteristics of a good Physics test.

    (b) Explain three domains of educational objectives.

15. Explain how experiments/practicals make the students participate in learning?

16. With reference to "Ohm's law" which is taught in Form Three, explain how you would measure the resistance of a coil of wire by voltmeter-ammeter method.