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

731/1 **PHYSICS 1**

Time: 3 Hours **Thursday, 21st May 2009 a.m.**

Instructions

1. This paper consists of sections A, B, and C.
2. Answer **all** questions in section A, and **two (2)** questions from each of sections B and C.
3. Section A carries 40 marks, section B carries 40 marks and section C carries 20 marks.
4. Mathematical Tables and non-programmable calculators may be used.
5. Cellular phones are **not** allowed in the examination room.
6. Write your **Examination Number** on every page of your answer booklet(s).
7. The following constants may be useful
   - Acceleration due to gravity, $g=10ms^{-2}$
   - Density of water is $1000kgm^{-3}$
   - Stefan's constant, $\sigma = 5.7 \times 10^{-8} Wm^{-2}K^{-1}$
   - $\pi = 3.14$

This paper consists 4 printed pages

SECTION A (40 Marks)

Answer **all** questions in this section

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

   (b) Using two (2) relevant examples, explain the cause of random errors.

2. The resistance force F opposing a small sphere of radius r moving with uniform velocity V through a fluid of viscosity η is given by $F = 6\pi r\eta v$. Show that this equation is dimensionally correct.

3. (a) Explain the following terms as applied to fluid mechanics.

   (i) Viscous fluid (ii) Turbulent flow.

   (b) What is meant by the term incompressible fluid as applied to fluid flow?

4. (a) Define simple harmonic motion.

   (b) A particle is moving with simple harmonic motion. Write the relation between the:

   (i) force and displacement of the particle.
   (ii) velocity and time.

5. Assume that human body has the total surface area of $1.18m^2$ and the surface temperature of 30^0C. Find the total rate of radiation of energy from the body if emissive power of the body is 30%.

6. (a) Give the meaning of

   (i) atomic number
   (ii) mass number.

   (b) A radioactive element of mass 218 and atomic number 84 disintegrates with the emission of an α-particle. What might be the atomic number and mass number of the new element?

7. (a) What is meant by the term half life?

   (b) Show that the half life of a given substance is given by $T = \frac{0.693}{\lambda}$

8. (a) What are cathode rays?

   (b) Mention three (3) properties of cathode rays.

9. (a) State ohm's law.

   (b) Differentiate ohmic conductors from non-ohmic conductors.

10. It is believed that the interior part of the earth (the core) is in molten form. What seismic evidence support this belief?

SECTION B (40 Marks)

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

11. (a) Describe five (5) principles of teaching and learning Physics.

(b) Explain the significance of the principles in (a) above.

12. Any Physics teacher need to know Physics laboratory rules before conducting experiments in the laboratory.

(a) Explain four (4) laboratory rules that are supposed to be known by a Physics teacher.

(b) Mention five (5) sources of accidents in a Physics laboratory?

13. In test construction, moderation is crucial. Give four (4) reasons for the moderation in Physics tests.

14. (a) Explain briefly the importance of assessment in the teaching and learning of Physics.

(b) In setting standard questions in Physics we normally consider the Table of Specification by which levels of abilities and skills tested are indicated.

For example:

Skills to be tested	Topics/Subtopics
I: Knowledge II: Comprehension III: Application	1. Nature of light. 2. Reflection of light from curved mirrors. 3. Refraction of light through plane media. 4. Lenses and optical instrument. 5. Dispersion and colours. 6. Production and propagation of waves. 7. Musical sounds.

The above topics/subtopics have been extracted from O-Level Physics syllabus. Set O-Level examination questions based on the instructions given in (c) - (e).

(c) An essay question on the following
(i) III, 5
(ii) III, 4

(d) A multiple choice item with four suggested answers on each of the following
   (i) I, 1
   (ii) I, 4

(e) A structural (completion or fill-in-blanks) question on each of the following
   (i) I, 6
   (ii) II, 7
   (iii) III, 2

SECTION C (20 Marks)

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

15. Explain the procedures of helping a student who has suffered an electric shock.

16. Mr. Chapakazi has taught a topic called "work" to his form II students. Prepare five (5) questions from that topic he might use to assess the learning achievement of his students.

17. "On a rainy day during the school sports day, Rashid, the 100 metre runner took 10 seconds to run the 100 metre. Find his average speed".

   (a) Moderate the above question.

   (b) Why do you think moderation is very important in test construction?

18. Pressure depends on the area of contact. The larger the area, the lower the pressure for the same thrust. This is the conclusion of a lesson. Refer to your past experience of teaching the topic and answer the following questions.

   (a) How would you introduce the lesson to your students?

   (b) What ideas do you think the students would give from the activities of the lesson?