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

**731/1**

## PHYSICS 1

**Time: 3 Hours** **Wednesday, 16th May 2012 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. Sections A and B carry 30 marks each and section C carries 40 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 used.
   (i) Plank's constant = $6.6\times10^{-34}\,J$.
   (ii) Atomic mass of Lithium = 7.016 a.m.u.
   (iii) Atomic mass of Hydrogen is 1.008 a.m.u.
   (iv) Atomic mass of $\alpha$ particle is 4.004 a.m.u.
   (v) 1 a.m.u is equivalent to 931MeV.



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## SECTION A (30 Marks)

Answer **all** questions in this section.

1. Using equations of Newton's laws of motion, verify that dimensional analysis can be used to check the corrections of the formula.

2. A $2\Omega$, $3\Omega$ and $5\Omega$ resistors are connected in series across a 90V d.c. supply. Calculate:
   (a) The current flowing in the circuit.
   (b) The potential difference across each resistor.

3. Define the following terms:
   (a) Alpha particle.
   (b) Beta particle.
   (c) Gamma rays.

4. (a) Draw the symbol of $n-p-n$ transistor.
   (b) Distinguish between semi-conductor and conductor.

5. A steel wire of length $4.7m$ and cross sectional area $3\times10^{-5}m^2$ stretches by the same amount as a copper wire of length $3.5m$ and cross sectional area $4\times10^{-5}m^2$ under a given load. Find the ratio of Young's Modulus of steel to that of copper.

6. The equation ${}^{7}_{3}Li+{}^{1}_{1}H\rightarrow{}^{4}_{2}He+{}^{4}_{2}He+Q$ occured when Lithium nuclei bombed with proton. Using this equation perform the following:
   (a) State what is represented by $Q$.
   (b) Calculate the value of $Q$.

7. Mention five activities that a Physics teacher is required to do in planning for his/her teaching.

8. Outline six criteria for selecting variety methods of teaching and learning process.

9. List three important things to consider when a teacher purchases the Physics books for teaching.

10. Briefly explain why the Physics teacher needs to evaluate his or her students during teaching and learning process.



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## SECTION B (30 Marks)

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

11. Derive Bernoulli's equation and state any conditions and assumptions made.

12. (a) The side of a cube is $(30 \pm 0.2)$ cm. Calculate the percentage relative error in:
    (i) Surface area
    (ii) Volume.

    (b) The velocity of an object varies with time as $V=At^2+Bt + C$. Determine the units of constant A, B, and C.

13. (a) Outline three ways in which 'thermionic emission' differ from 'photoelectric emission.'

    (b) State the necessary condition for photoelectric emission to occur.

    (c) Einstein extended the idea of Max plank regarding the energy of the quantum. Write the Einstein's photoelectric equation and explain the meaning of each term used.

    (d) Sodium has a threshold frequency of $5.6 \times 10^{14}$ Hz. Calculate its work function in electron volt.

14. (a) Describe two limitations of projectile motion.

    (b) Distinguish between projectile and trajectory as used in the projectile motion of a body.

    (c) Show that the path taken by the projectile is a parabola.

## SECTION C (40 Marks)

Answer two (2) questions from this section.

15. With the help of illustrative diagram (warning signs) for laboratory rules and precautions, explain why the study of laboratory rule in Physics is of important to the students.

16. Describe five significance of microteaching practice to a student teacher.

17. Explain five advantages of Physics experiments in teaching and learning process.

18. Examine five problems faced by Physics teacher in classroom teaching and learning process in Tanzania.



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