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

731/1 **PHYSICS 1**

Time: 3:00 Hours **Wednesday, 16th May 2018 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 40 marks and sections B and C carry 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).
7. Use the following:

   $\pi = 3.14$

   Acceleration due to gravity, g, = 10 ms^{-2}

   Moment inertia of a ring, $I_{ring}, = MR^2$

   Density of air = 1.2 kgm^{-3}

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SECTION A (40 Marks)

Answer **all** questions in this section.

1. (a) Define the following terms:
   (i) Accurate
   (ii) Error

   (b) The force acting on an object of mass m, travelling at velocity V in a circle of radius r is given by $F = \frac{mv^2}{r}$. If the measurements recorded were as $m = 3.5\ kg \pm 0.1\ kg$, $V = 20\ ms^{-1} \pm 1\ ms^{-1}$ and $r = 12.5\ m \pm 0.5\ m$. Find
   (i) the maximum possible fractional error.
   (ii) percentage error in the measurement of force.

2. Mention four agents that can ionize gases.

3. State two advantages of solid dielectric.

4. Briefly explain how the use of safety belts reduces the shock of car accidents.

5. A circular ring of diameter 40 cm and mass 1 kg is rotating about an axis normal to its plane and passing through the centre with a frequency of 10 rotations per second. Calculate the angular momentum about axis of rotation.

6. The specific heat capacities of air are 1040 $Jkg^{-1}K^{-1}$ measured at constant pressure and 740 $Jkg^{-1}K^{-1}$ measured at constant volume. Why the values are different? Briefly explain.

7. Mention four safety measures in the Physics laboratory.

8. Write four information required in writing practical report after the experiment.

9. What are the four important things a Physics teacher should consider when constructing a table of specification.

10. State four advantages of tutorial software in teaching and learning of Physics.

SECTION B (30 Marks)

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

11. (a) Explain the following terms:
    (i) Parking orbit
    (ii) Velocity of escape
    (iii) Weightlessness.

    (b) A satellite of mass 1000 kg moves in a circular orbit of radius 7000 km round the earth which is assumed to be a sphere of radius 6400 km. Calculate the total energy needed to place the satellite in orbit from the earth.

    (c) Deduce Newton's law of universal gravitation from Kepler's third law.

12. (a) Write the expression for dynamic pressure and show that it is dimensionally correct.

    (b) The aeroplane wings cuts as aerofoil. If the velocity of air below the surface of the wings is $120 ms^{-1}$ and that above them is $500 ms^{-1}$; Find the payload the earoplane can carry if the total area of the wings is 50 m^2 and the mass of aeroplane is 200 tons.

13. Explain three negative effects and three positive effects of volcanoes.

SECTION C (30 Marks)

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

14. Explain five activities to be carried out before teaching a new topic.

15. (a) State ten main components of a Physics logbook.

    (b) Explain five important headings when writing a Physics practical report.

16. Giving an example from each point, explain how teaching and learning of Physics helps in the following areas in daily life:
    (a) To acquire knowledge of Physics concepts and laws.
    (b) To apply scientific procedures in performing experiments.
    (c) To use relevant scientific skills in investigating physical phenomenon.
    (d) To apply fundamental concept, principles, laws and theories in solving problems in daily life.
    (e) To use knowledge and manipulative skills to construct various technological appliances.