THE UNITED REPUBLIC OF TANZANIA

NATIONAL EXAMINATIONS COUNCIL OF TANZANIA

DIPLOMA IN SECONDARY EDUCATION EXAMINATION

731/1 **PHYSICS 1**

Time: 3 Hours **Year: 2023**

Instructions

1. This paper consists of sections **A** and **B** with a total of **fourteen (14)** questions**.**
2. Answer **all** questions.
3. Section **A** carries **forty (40)** marks , and section **B** carry **sixty (60)** marks.
4. 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).

SECTION A (40 Marks)

Answer **all** questions in this section

1. The Form One students were given a task to measure a mass of a bob using beam balance. Explain two physical quantities that would be expressed by the students in carrying out such task.
2. An experimenter complained to you about a problem of obtaining different readings when using the new and old spring balance. What would be a reason for this difference?
3. A passenger in the train noticed that the brake was applied when it was moving with a velocity of 72 km/hr. After passing over 200 m , its velocity reduces to 36 km/hr at the same rate of retardation. How much distance will it go before brought to rest?
4. The College Principal invited a clinical officer to present to the second-year student teachers about qualities of a good thermometric property. What are the four key points will the clinical officer present to students?
5. "If the distance between two objects is doubled, the gravitational force between them decreases to one fourth." Prove this statement by using Gravitation's equations.
6. The radio technician was given a 5 Ω resistor and asked to connect it in series with a parallel combination of other resistors each of 5 Ω . For the radio to work, it requires a total resistance of 6 Ω . How many resistors are required to be in parallel connection for the radio to work properly?
7. Scientists have discovered two hypothetical elements, A and B. If element A has energy gap of 3. 0 eV and element B has energy gap of 1.2 eV; which element will be suitable in the manufacturing of semiconductor devices? Justify your answer using energy band diagram.
8. You have been employed at Uhai Secondary School which has scarcity of

laboratory apparatus and equipment. Unfortunately, you wanted to conduct an experiment to determine acceleration due to gravity to Form Two students. How would you improvise the apparatuses so that you perform such an experiment effectively? Give four points.

9. Some of the Physics teachers argued that preparing a lesson plan is too demanding and time wastage activity. Comment on teacher arguments giving four points.

10. Form Three students were given a task of conducting an experiment to verify Ohm's law. You have decided to use observation schedule to record their participation during experiment. What four key points would you record for students' assessment?

SECTION B (60 Marks)

Answer all questions from this section

11. (a) Scientists at Tanzania Atomic Energy Agency bombarded the stable and naturally occurring nuclide of Cobalt-59 with neutrons. Explain this process basing on neutron-activation.

(b) An employee in the nuclear plant project has identified a radioactive element to have an initial count rate of 2400 counts per minute on a scale meter. After 30 hours the count was observed to fall to 300 counts per minute;

(i) Determine the half-life of the element.

(ii) If the initial number of atoms in another sample is 6×10^{20} , how many atoms will have decayed in 50 hours?

12. In determining the beat frequency of a guitar string and turning fork, two student teachers were assigned to strike a guitar string and sound a turning fork by hitting it on a rubber band. If the tension of the string was 129.6 N and the beat frequency obtained when the string and the turning fork sounded was 10 beats per second, calculate the frequency of turning fork if the tension on the string is raised to 160 N.

13. During the block teaching practice, the academic master appointed you to present a sample of a lesson notes on “global warming and greenhouse” for the period of 80 minutes to your fellow student teachers before actual teaching. Prepare a lesson notes for the topic given using five points.
14. Suppose you have been invited by the District Education Officer to orient the newly employed teachers on the application of principles of teaching and learning Physics, what would be your explanations on the following principles?
    (a) A learning environment should be supportive, productive and safe.
    (b) Students learn better from simple to complex.