**THE UNITED REPUBLIC OF TANZANIA**

**MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY**

 **LINDI MUNICIPAL COUNCIL**

**FORM FOUR MOCK I**

**031/1 PHYSICS 1**

**TIME: 3 HOURS 2019**

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**INSTRUCTIONS**

1. This paper consists of section A, B and C with a total of **eleven (11)** questions.
2. Answer **all** questions in sections A and B and **one (1)** question from section C.
3. Calculators and cellular phones are **not** allowed in the examination room.
4. Write your **Examination Number** on every page of your answer sheet.
5. Where necessary the following constants may be used:
6. Acceleration due to gravity, g=10 m/s2
7. Density of water = 1.0g/cm3
8. Velocity of sound in air = 340m/s
9. 1g of water is equivalent to 1 cm3
10. Pie, π = 3.14

**SECTION A (30 marks)**

1. For each of the items (i)-(x) choose the correct answer from among the given alternatives and write its letter beside the item number.
2. Relative humidity is defined as.
3. the percentage saturated vapour pressure of water at a dew point
4. the percentage of the volume of water in air required to saturate it at the same temperature
5. the percentage of moisture in air
6. the percentage of the mass of water vapour actually present in a unit volume of air required to saturate it at the same temperature
7. A rod is brought close to the cap of a charged electroscope causing the leaves of the electroscope to collapse. This indicates that.
8. the rod and the electroscope must be oppositely charged
9. the rod and the electroscope must have the same charge
10. the rod must be uncharged
11. the rod must be charged
12. The electromotive force of a dry cell is derived from chemical reaction of
13. ammonium chloride jelly.
14. the powdered carbon.
15. carbon rod and zinc can.
16. manganese dioxide powder
17. Ocean tides are caused by
18. rotation of the earth about the sun.
19. rotation of the moon about the earth.
20. gravitational force of the earth on the moon.
21. gravitational force of the moon on sea water
22. In electromagnetic induction
23. induced e.m.f. is produced wherever a conductor carrying an electric current has its magnetic flux changed.
24. speed of motion determines direction of the Induced current .
25. Lenz's Law gives direction of induced e.m.f
26. induced e.m.f. opposes its production methods
27. one advantage of the lead-acid accumulator is that
28. It can be recharged.
29. its internal resistance is high.
30. it supplies only a small current .
31. its p.d is less than 2V
32. Lenz's Law can be applied to predict the
33. magnitude of back e.m.f in a circuit.
34. magnitude of induced current in a circuit.
35. direction of induced e.m.f in a circuit
36. direction of applied e.m.f. across the circuit
37. The mass of an atom depends on the number of
38. Protons only.
39. neutrons, electrons and protons.
40. electrons and protons .
41. neutrons and protons.
42. The shaving mirror is a typical application of
43. concave mirror.
44. convex mirror.
45. plane mirror.
46. Rotating mirror.
47. Small groups of bright stars that form patterns in the sky which are linked to more familiar objects on the earth are known as.
48. Galaxies.
49. meteors.
50. milky way.
51. Constellations
52. Match the items in **LIST A** with the responses in **LIST B** by writing the letter of the correct responses beside the item number

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| **LIST A** | **LIST B** |
| 1. Neutral point
2. P-type semiconductor.
3. Longitudinal wave.
4. Doping.
5. Work function of a metal.
6. Capacitor.
7. Equal and opposite reaction.
8. Reverberation.
9. Epicentre.
10. Eddy current
 | 1. The majority charge carriers are electrons.
2. The majority charge carriers are holes.
3. The process of adding impurity atoms to an intrinsic crystal.
4. A point in magnetic field where resultant field is zero.
5. Resultant field is maximum in a magnetic field at that point.
6. Newton's third law of motion.
7. Newton's second law of motion.
8. Causes the particles of medium to oscillate orthogonally to the direction of travel.
9. Imparts energy to the particles of the medium such that they oscillate in the same direction as the direction of travel.
10. A device which stores charges.
11. Internal circulating current when a thick conductor is subjected to magnetic flux linkage change.
12. Current passing through a thick conductor.
13. Multiple reflections of sound.
14. The site of an earthquake.
15. The point on the earth's surface.
16. Minimum energy for an electron just to escape from the metal surface.
 |

1. For each of the items (i)-(x), fill the blanks by writing the correct answer in the answer sheet
2. The presence of electric charge in a body can be detected by means of \_\_\_\_\_\_\_\_\_\_
3. A collision during which the kinetic energy changes is known as\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. The quantity of electricity when the current of 1 ampere is flowing in 1 second is known as\_\_\_\_\_\_\_\_\_\_\_
5. The corresponding note of a sound wave produced at fundamental frequency is called \_\_
6. The particles in the nucleus of an atom which carry no charge are called\_\_\_\_\_\_\_\_\_\_\_\_\_
7. An electric current can pass through an electric component due to the existence of \_\_\_\_
8. The ratio of distance moved by effort to the distance moved by load is referred to as \_\_
9. The parallel forces which are equal in magnitude but acting in opposite direction to each other are called\_\_\_\_\_\_\_\_\_\_
10. A physical property of a materials to resists or oppose the movement of electric charges through it is called \_\_\_\_\_\_\_\_\_\_
11. \_\_\_\_\_\_\_\_\_\_ is the center of the sphere of which a mirror is a part.

**SECTION B (60 Marks)**

**Answer ALL questions in this section**.

1. (a) Define the terms:
2. Force.
3. Pressure

(b) A car of mass 1200kg is brought to rest by a uniform force of 300N,in 80 seconds. What was the speed of the car?

 (c) A rectangular log of wood of density 200kg/m³has dimensions:

 0.3m X 0.5m X 6.0m.

1. Calculate the maximum pressure it can exert on the ground. How is it experienced?
2. Calculate the minimum pressure it can exert on the ground.
3. (a) (i) Differentiate between resistance and resistivity of a given conductor.
4. Is it possible for two cells in parallel arrangement to drive more current through a resistor than one cell? Give reason.

(b) (i) What is '1 KILOWATT-HOUR' as applied to current electricity.

(ii) If you find a domestic electric bulb rated 60W, 240V what does this mean?

(c) ) Find the cost of running five 60W lamps and four 100W lamps for 8 hours if electric energy costs Tshs. 27 /=per unit.

1. (a) Define the following terms as used in sound waves:
2. Audibility range
3. Ultrasonic sound

 (b) Why notes of the same pitch played in a violin and flute has different quality?

 (c) A string of length 75cm has a mass of 8.2g. If the tension in the string is 18N, Calculate

 the frequency of the first and third harmonics.

1. (a) (i) What is meant by a transformer?
2. Why does a transformer work with alternating current (a.c) only?

(b) State two (2) ways in which power is lost in a transformer.

(c) A 240V main transformer has 1000 turns in primary and N turns in the secondary. It is used to supply energy to a 12V, 24W lamp.

(i) How many turns are there in the secondary?

(ii) What is the efficiency of the transformer if the current drawn from 240V supply is

 12.5A ?

1. (a) (i) Define the term astronomy.

(ii)Enumerate three importance of astronomy to mankind.

 (b) (i) Specify the difference that exists between galaxy and a planet.

 (ii) Outline three defining characters of a planet.

 (c) Briefly explain the importance of stratosphere to living things on the earth’s surface.

1. (a) What is meant by the following terms:

(i) Global warming.

 (ii) Greenhouse effect.

1. Earthquake.

(b) Mention three effects of global warming.

(c) (i) What is the major cause of global warming?

 (ii) Briefly explain three measures that can be taken to control global warming.

**SECTION C (10 Marks)**

**Answer one (1) question from this section.**

1. (a) (i) What is a transistor?
2. Mention two applications of transistors.

(b) (i) List down two types of diodes.

 (ii) Briefly explain the mode of action of a forward bias in a p-n junction.

(c) The Figure below shows a common-emitter amplifier circuit.

 C2

 +

 Ϲ1 IB R

 +

 VC

 R VC

 VBB VBE IE

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1. Why the circuit is named so?
2. Explain the function of capacitors C1 and C2.
3. (a) (i) binding energy

 (ii) Nuclear fusion

(b) (i) What is half-life of a radioactive element?

(ii) How does the rate of escape of electrons from a metal relate to its temperature?

(iii) A sample containing 400g of iodine-131 has a half-life of 8 days. How much of the sample will remain undecayed after 40 days?

(c) A radioactive material is denoted by the symbol 88226X. Write down the composition of the nucleus during the end of the following stages of disintegration.

(i) The emission of an alpha-particle.

(ii) The further emission of a beta-particle.

 (iii)The further emission of a gamma-radiation.