

053106T4ACH
ANALYTICAL CHEMISTRY LEVEL 6
ASC/OS/ACHEM/CC/01/6A
APPLY PHYSICS PRINCIPLES
July/August 2024



**TVET CURRICULUM DEVELOPMENT, ASSESSMENT AND CERTIFICATION
COUNCIL (TVET CDACC)**

WRITTEN ASSESSMENT

3 HOURS

INSTRUCTIONS TO CANDIDATE

1. This paper consists of two sections; A and B.
2. Answer **ALL** the question as guided in each section.
3. Marks for each question are as indicated in the brackets.
4. You are provided with a separate answer booklet to answer the questions.
5. Do not write in this question paper.

This paper consists of SIX (6) printed pages

**Candidates should check the question paper to ascertain that all pages are printed as
indicated and that no questions are missing**

SECTION A: (40 MARKS)*Answer ALL questions in this section.*

1. Basic quantities are physical quantities that cannot be defined in terms of other quantities.

Name any FIVE basic quantities used in measurement of objects. 5 Marks

2. Basic and derived quantities are identified based on SI units. Give the meaning of the term SI units. 2Marks

3. The drawing below shows a snow-buggy being pulled by a sail. The buggy rests on three skis on the snow.

- a. The drawing shows four forces that act when the snow-buggy is moving.

Draw a line from each force in the list below to the correct letter from the diagram.

Draw only three lines. 3 Marks

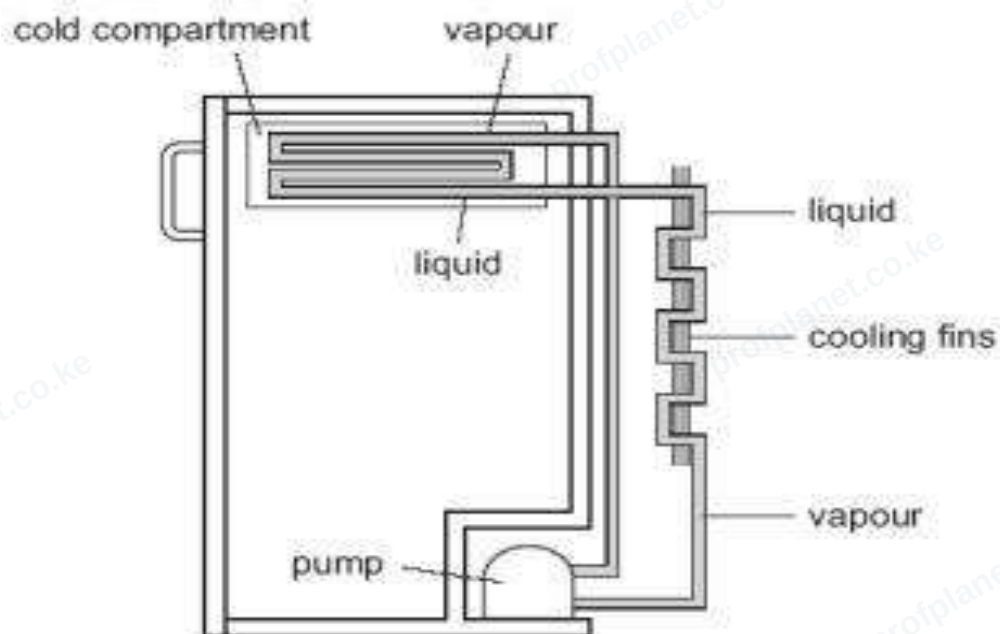
the weight of the buggy	A
the force pulling the buggy along	B
the friction between the skis and the snow	C
	D

- b) A physicist travelled 80 kilometers(km) each day in the buggy. How many kilometers had he travelled in 10 days? 1 Mark

4. The diagram below shows a picture of a man moving a wheelbarrow full of bricks. Name THREE forces acting on the wheelbarrow. 3 Marks



5. A car tyre is pumped using a piston with an area of 7 cm^2 and at a force of 175 N .
- Calculate the pressure exerted on the air in the pump. 3 Marks
 - Convert 760 mmHg into pascals. 3 Marks
6. The figure below shows a refrigerator in which a liquid absorbs thermal energy from the cold compartment and evaporates. As the vapour is compressed by the pump, work is done on it. The vapor condenses, giving out thermal energy to the surroundings through the cooling fins on the back of the refrigerator.



a. Explain the difference between boiling and evaporation 2 Marks

b. Explain why the pump compresses the vapor much more than it could compress a liquid.

2 Marks

7. Newton is known to have coined the three laws of motion.

a. State Newton's second law of motion.

2 Marks

b. Derive the equation associated with Newton's third Law of motion.

3 Marks

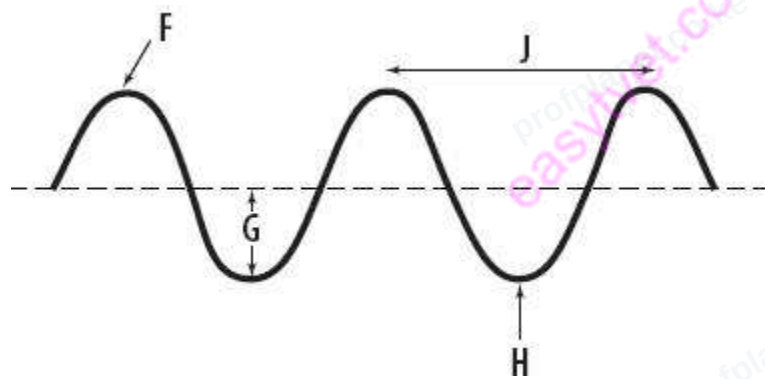
8. Light is a particle as well as a wave.

a. State the meaning of the term wave.

2 Marks

b. Label the parts of the transverse wave below.

4 Marks



9. Define the term work.

2 Marks.

10. A student measured the length of a table to be 20 inches. Express this length in SI units. 2 Marks

SECTION B: (60 MARKS)

Answer any **THREE** questions from this section

11. A U-tube- manometer was used to measure the pressure of a gas. It contained oil of density 897kg/m^3 . The oil level in the open tube was found to be 25.0 cm higher than that in the limb connected to the gas.

a. Calculate;

- The gauge pressure of the manometer.
- The absolute pressure of the gas.

6 Marks

5 Marks

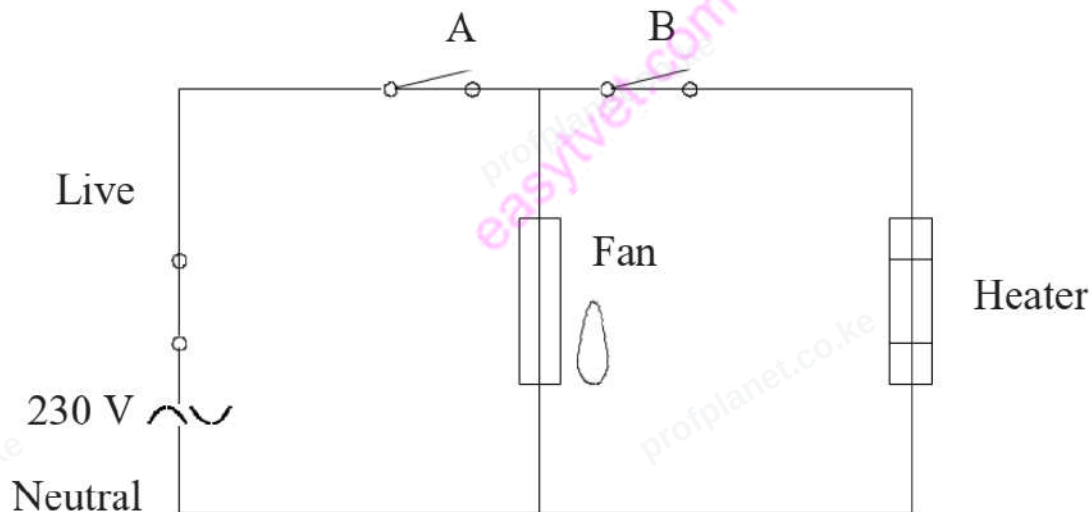
Given: Atmospheric pressure = $9.98 \times 10^4 \text{ N/m}^2$

- b. Heat transfer is movement of thermal energy between physical systems. Briefly describe the **THREE** modes of heat transfer giving relevant examples.

9 Marks

12. a) Sally made an electrical circuit consisting of two lamps, a variable resistor and a battery connected in series. Draw the circuit diagram. (6 Marks)

- b) An electric fan can blow out hot or cold air. Study the circuit diagram shown below



b. State what happens when:

- i. Switch A is closed and switch B is open 3 Marks
- i. Switch A is open and switch B is closed 2 Marks
- ii. Switch A and B are both closed 3 Marks
- c. Matter is anything that has mass and occupies space.
- (i) State the THREE states of matter 3 Marks
- (ii) State the differences between solids and liquids. 3 Marks

13. Density is a function of mass and volume.

- a. Describe an experiment to determine the volume of a cork using a sinker, a thread, measuring cylinder and water only. 10 Marks
- b. A man uses an inclined plane to lift a 50 kg load through a vertical height of 4.0 m. the inclined plane makes an angle of 30° with the horizontal. If the efficiency of the inclined plane is 72%, calculate;
 - i. The effort needed to move the load up the inclined plane at a constant velocity. 3 Marks
 - ii. The work done against friction in raising the load through the height of 4.0 m. (take $g = 10 \text{ N/kg}$) 3 Marks
- c. Describe any TWO properties of light. 4 Marks

14. A minibus of mass 1,500 kg travelling at a constant velocity of 72 km/h collides head-on with a stationary car of mass 900 kg. The impact takes 2 seconds before the two move together at a constant velocity for 20 seconds.

- a. Calculate;
 - i. The common velocity 4 Marks
 - ii. The distance moved after the impact 2 Marks
 - iii. The impulsive force 2 Marks
 - iv. The change in kinetic energy 3 Marks
- b. Differentiate between elastic and inelastic collision 4 Marks
- c. Outline any TWO applications of the laws of conservation of momentum 2 Marks
- d. Mention any FOUR ways of reducing friction between surfaces 4 Marks

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