PHYSICS FOR SENIOR ONE ALL, YEAR 2020.

EXERCISE A

1. What is science?
2. Differentiate between natural and social sciences.
3. State some aspects of the natural sciences which you have learnt at the primary school level.
4. Name any four branches of natural sciences.
5. Define the term Physics.
6. Name six different branches of physics.
7. Give instances where physics inter-depend with the following: chemistry, history and agriculture.
8. Mention four career opportunities of a physicist.

Describe five contributions of physics to the development of Rwanda as a nation. Mention four careers opportunities of physicists.
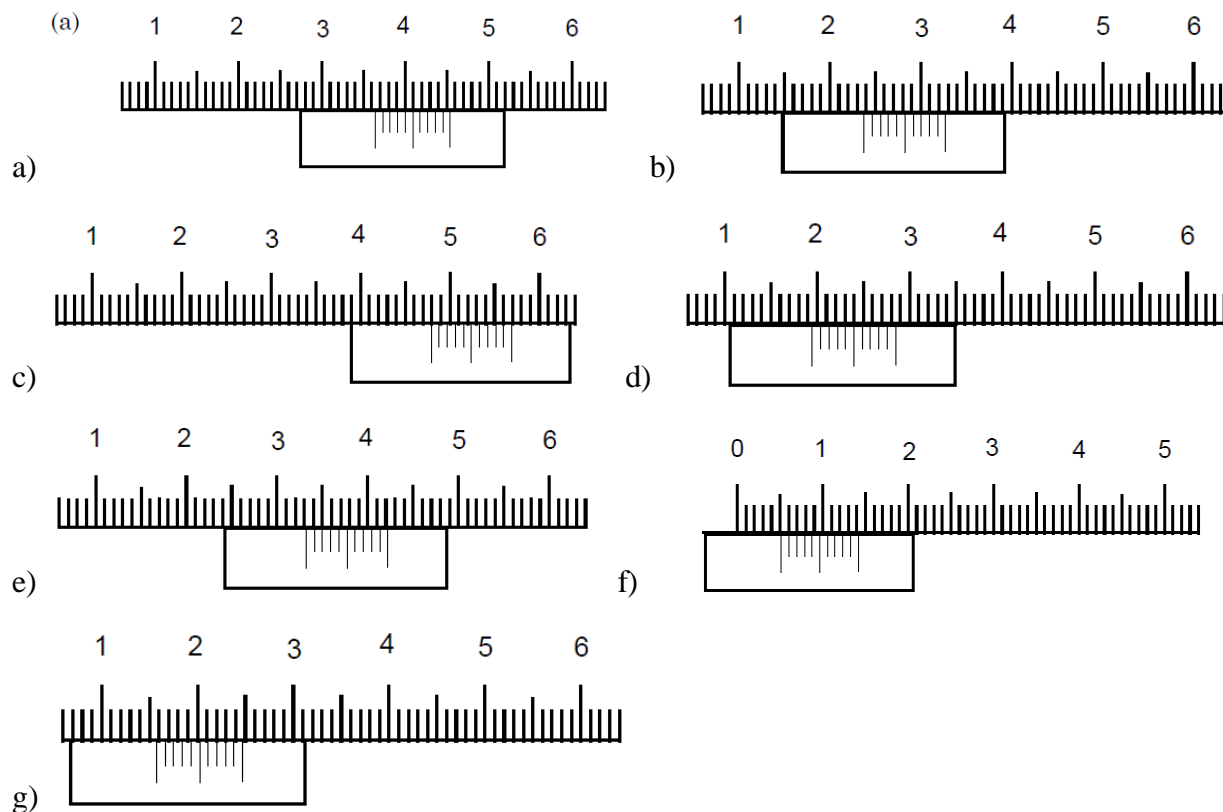
EXERCISES B

1) What is a scientific investigation?
2) Why is the step of making observation in the process of scientific investigation very important?
3) How is scientific investigation different from non-scientific investigation? Give examples.
4) Discuss the meanings of the following terms:

Prediction **(b)** Interpretation of result **(c)** Data analysis **(d)** Decision making
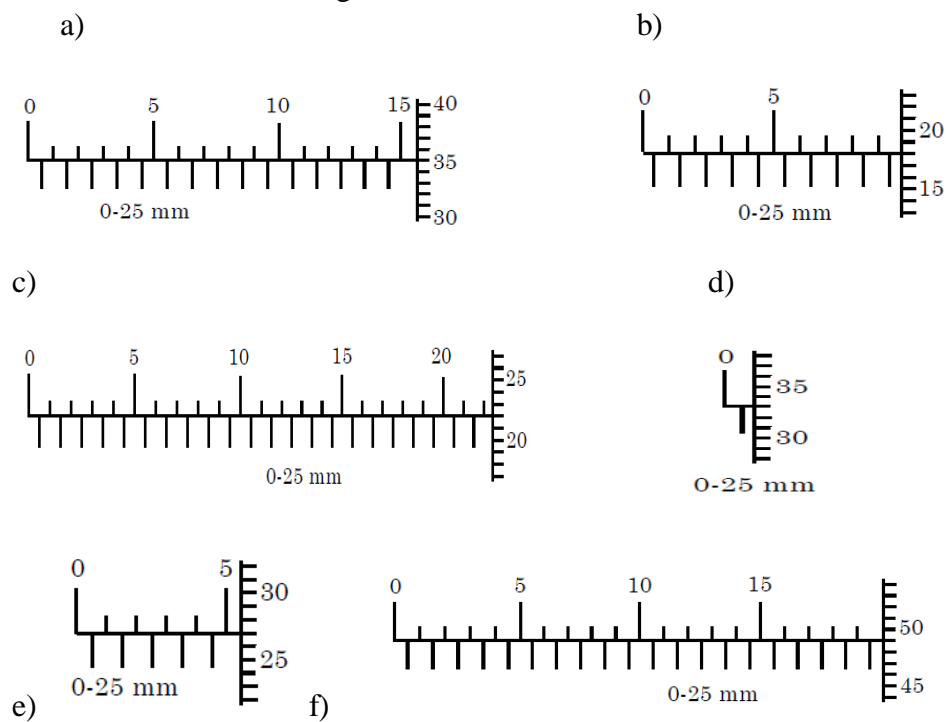
EXERCISES C

1. Explain why it is important to observe laboratory rules and regulations.
2. State five laboratory safety rules and regulations.

3. Draw hazard symbols for a) corrosive substance

    (b) Describe the steps you would take to guard against the hazard depicted by each symbol.

4. In every school, there is a procedure to be followed by every member of the school community in case of fire outbreak. Describe the procedure to be followed in your school. You may need to consult your teacher and other sources to answer this question.

5. Give three safety measures to be taken in case of fire outbreak.

EXERCISE D

1. Read the following Vernier caliper measurements. (The scales have been enlarged for easier reading.) The Vernier caliper is calibrated in metric units

(a)

a)

b)

c)

d)

e)

f)

g)

1. Read the following micrometer measurements.

a)

b)

0-25 mm

0-25 mm

c)

d)

0-25 mm

0-25 mm

e)

f)

0-25 mm

0-25 mm

EXERCISE E

1. Define the term area
2. Explain clearly you would determine the surface areas of the following:
   a. A laboratory bench   b. cylindrical object.
3. A cylindrical has a diameter of 4.2cm. How many times would a thread of 132 cm be wound around the cylinder?
4. A page of a book measures 14.5 cm × 21.4 cm. What is its area in square millimiters?

The diameter of a cylindrical pencil is 9 mm. Calculate the cross-sectional area in square centimetres

EXERCISE F

1. Define the volume and state its SI unit.
2. A tank full of a liquid has a volume of o.6m^3. find the volume of the tank: a) litres   b)cm^3 c)ml
3. A metal block measures 5cm by 4cm by 10cm. Calculate the volume of the block.
4. A beaker of radius 5cm contains water to a height of 10cm.
   a) What is the volume of the water in the beaker?

When a stone is completely immersed in the beaker, water rises to height of 19cm. What is the volume of the stone?.

EXERCISE G

1. An object of volume 0.004 m^3 has mass 36kg. Determine its density n kg/ m^3 .
2. The density of mercury is 13.6 g/cm^3. What volume will have a mass of 200g.
3. The volume of methylated spirit is0.8g/cm^3 . Calculate the volume of 20g of the liquid.
4. A eureka can of cross section area 60cm^2 is filled with the water to a height of 10cm. A piece of steel is lowered carefully into the can, then removed. If the height of the water dropped to 7cm, after overflowing, determine the volume of steel metal.

EVALUATION 1

1. Define the term Physics.
2. Explain why Physics is an important science.
3. Discuss the relationship between physics and society.
4. State the career opportunities that physics opens for you.
5. Describe the scientific investigation processes.
6. Distinguish between a fundamental (base) quantity and a derived quantity. Give one example of each.
7. Name three fundamental quantities and their SI units.
8. Give a reason why it was necessary to establish SI units.
9. How many micrometres are there in 4 cm?
10. Express the following in millimetres: a) 2.7 m   **(b)** 26.9 cm   **(c)** 356 μm.
11. Name the instruments you would use to measure each of the following:
    (a) the length of a football field.
    (b) the height of a 20 litre-jerrican.
    (c) the circumference of your waist.
12. A sea vessel carries 2 megatonnes of cargo. What is this mass in kg?
13. Explain how you would measure the external diameter of a measuring cylinder.
14. Describe briefly how you would measure:
    a) the volume of a single drop of water from a burette.
    b) the time taken by an ant to cover a distance of 2 m.
15. Drops of water coming from a crack in a water tap are collected at regular intervals as shown in Figure below

(a)   (b)
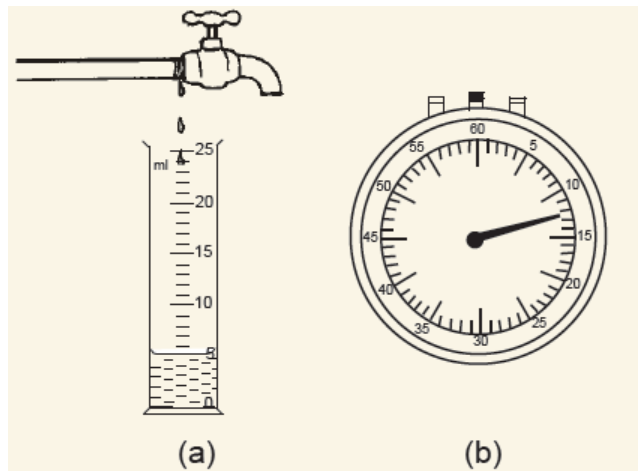
    a) What is the time taken to collect this volume?
    b) The measuring cylinder used has a capacity of 25 ml. What is the time taken to fill the measuring cylinder?
    c) Estimate the volume of air in your classroom.
16. A solid cube of aluminium has sides 10 cm long.
        a) Calculate its volume.
        b) What mass in kilogram of aluminium has a mass of 100 g?
17. A Eureka can of cross sectional area 60 cm2 is filled with water to a height of 10 cm. A piece of steel is lowered carefully into the can as shown in Fig. 1.40 then removed. If the height of the water dropped to 7 cm, after overflowing, determine the volume of steel metal.
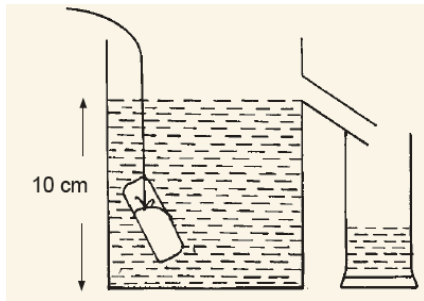
18. Describe how you would determine the volume of an irregular shaped object such as a small stone.

19. How you would determine the circumference of a test tube using a cotton thread and and a meter rule? State any precautions that need to be taken.

20. What is the mass of air in a room measuring $5m \times 10m \times 10m$? (Take the density of air to be $1.293 kgm^{-3}$).

EVALUATION 2

1. What is physics?
2. What name is given to a branch of physics which deals with
   a) action of forces on an object in motion
   b) relationship between heat, other forms of energy and work
   c) behaviour and physical properties of light
   d) study of celestial bodies and universe as a whole.
3. State at least 4 career opportunities that physics opens for you.
4. Describe the scientific investigation processes.
5. Distinguish between a fundamental (basic) quantity and derived quantity.
6. Name 7 fundamental quantities and their S.I. units
7. Name the instruments you would use to measure each of the following:
   a) the diameter of a solid sphere
   b) the density
   c) the air pressure
   d) the electric current
   e) The temperature of human body.
8. A beaker of radius 7cm contains water to a height of 10cm. When a stone is completely immersed in the beaker; water rises to a height of 19cm. What is the volume of that stone? Use $\pi = \frac{22}{7}$.
9. Convert the following:
   a) 3nm into Gm
   b) 15Mm into pm
   c) 2μm into m

10. State the expressions (formula) for the volume of the following solids:
   a) prism
   b) cylinder
   c) cone
   d) pyramid
   e) Sphere.

11. $15dm^3$ of an object weigh $15kg$. Find the density, then the relative density of that object.

   Does this object float over water or sink in water? Explain why.

Discuss the relationship between physics; society and technology (give 4 clear points).