**PHYSICS PAPER**

**FORM 1 TERM 3 2017**

**MARKING SCHEME**

1. (a) Define laboratory.
(1 mark)
***A building specifically designed for scientific work and may contain many pieces of apparatus and materials for use.***
(b) State **five** safety rules a student should follow while in the laboratory.
(5 marks)

- ***Proper dressing must be observed, no loose clothing, hair and closed shoes must be worn.***
- ***Identify the location of electricity switches, fire-fighting equipment, first aid kit, gas and water supply systems.***
- ***Keep all windows open whenever working in the laboratory.***
- ***Follow all instructions carefully and never attempt anything in doubt.***
- ***No eating or drinking allowed in the laboratory.***
- ***Ensure that all electrical switches, gas and water taps are turned off when not in use.***
- ***Keep floors and working surfaces dry. Any spillage must be wiped off immediately.***
- ***All apparatus must be cleaned and returned in the correct location of storage after use.***
- ***Hands must be washed before leaving the laboratory.***
- ***Any accidents must be reported to the teacher immediately.***

2. (a) What is Physics?
(1 mark)
***Physics is a science whose objective is the study of components of matter and their mutual interactions. Or***
***The study of matter and its relation to energy.***
(b) Identify the branch of Physics that deals with:
(5 marks)
(i) the movement of charge from one point to another through a conductor. ***electricity***
(ii) motion of bodies under the influence of force. ***Mechanics***

(iii) the transformation of heat from one form to another. ***Heat/Thermodynamics***
(iv) magnets and magnetic fields and their extensive applications. ***Magnetism***
(v) the study of light as it travels from one media to another. ***Optics***

3. List **five** professionals who require Physics as a foundation in order to pursue their careers. (5 marks)
    - ***Doctors***
    - ***Nurses***
    - ***Technologists***
    - ***Engineers***
    - ***Pharmacists***
    - ***Meteorologist***
    - ***Surveyors***
4. Identify SI units for the following quantities. (5 marks)
    (a) Length ***metre***
    (b) Mass ***kilogram***
    (c) Time ***second***
    (d) Amount of substance ***mole***
    (e) Electric current ***ampere***
5. Define the following terms as used in measurement. (4 marks)
    (a) Length
    ***measure of distance between two points in space.***
    (b) Area
    ***measure of the extent of a surface.***
    (c) Mass
    ***quantity of matter contained in a substance.***
    (d) Density
    ***mass per unit volume of a substance.***
6. List ***four*** apparatus in the laboratory used for measuring volume. (4 marks)
    - ***Measuring cylinder***
    - ***Eureka can***
    - ***Pipette***
    - ***Burette***
    - ***volumetric flask***
    - ***beaker***
7. Differentiate between accuracy an error. (2 marks)

***Accuracy is the closeness of a measurement to the correct value of the quantity being measured.***

***An error is the deviation of measurement to the correct value being measured.***

8. (a) You have a rock A with a volume of 15cm3 and a mass of 45 g. What is its density?
(2 marks)

***Density=mass***
***Volume***
***= 45g***
***15cm$^3$***
***= 3.0 g/cm$^3$***

(b) You have a different rock B with a volume of 30cm3 and a mass of 60g. What is its density?

(2 marks)

***Density=mass***
***Volume***
***= 60g***
***30cm$^3$***
***= 2.0 g/cm$^3$***

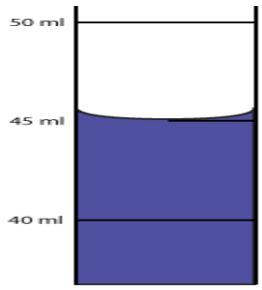
(c) Which rock is heavier? Which is lighter?
(2 marks)

***Rock A is lighter as it has a mas of 45g, while rock B is heavier.***

(d) Which rock is more dense? Give a reason.
(2 marks)

***Rock A is denser (density = 3.0)***

9. The volume of a solution was measured as below. If the mass of solution is measured to be 60.75 grams, what is the density of the solution?
(2 marks)




***Density=mass***
***Volume***

$= \frac{60.75g}{45cm^3}$

$= 1.35\ g/cm^3$

10. What is the mass of a cylinder of lead that is 2.50 cm in diameter, and 5.50 cm long. The density of lead is 11.4 g/cm$^3$.

(a) Calculate the volume in two decimal places of the cylinder. Take $\pi = 3.14$ (3 marks)

$V = \pi r^2 h$

$V = 3.14 \times 1.25 \times 1.25 \times 5.50$

$V = 26.9843750cm^3$

$V = 26.98cm^3$

(b) Determine the mass of the cylinder. Leave your answer as a whole number. (3 marks)

**Mass=density x volume**

**= 11.4 x 26.98**

**= 307.572**

**= 308g**

11. The mass of an empty density bottle is 20 g. Its mass when filled with water is 40.0 g and 50.0 g when filled with liquid A.

(a) Determine the mass of water in kilograms. (3 marks)

***Mass of water = 40 – 20***

***= 20 g***

***= 0.02 kg.***

(b) Find the mass of liquid A (in kilograms). (3 marks)

***Mass of liquid = 50 – 20***

***= 30 g***

***= 0.03 kg***

(c) Find the volume of water. (2 marks)

***Volume of water = 0.02 / 1,000***

***= 0.00002 m3***

(d) Calculate the density of liquid A if the density of water is 1,000 kgm-3. (2 marks)

***density of liquid = 0.03 / 0.00002***

***= 1,500 k/gm$^3$***

12. (a) What is force as used in Physics? (1 mark)

***Force is a push or a pull.***

b) Name and explain any four types of force.
(4 marks)

- ***Gravitational force –this is the force of attraction between two bodies of given masses.***
- ***Force of friction – this is a force which opposes the relative motion of two surfaces in contact with each other.***
- ***Tension force – this is the pull or compression of a string or spring at both its ends.***
- ***Upthrust force – this is the upward force acting on an object immersed in a fluid.***
- ***Cohesive and adhesive forces – cohesive is the force of attraction of molecules of the same kind while adhesive is the force of attraction of molecules of different kinds.***
- ***Magnetic force – this is a force which causes attraction or repulsion in a magnet.***
- ***Electrostatic force – this is the force of attraction or repulsion of static charges.***
- ***Centripetal force – this is a force which constrains a body to move in a circular orbit or path.***
- ***Surface tension – this is the force which causes the surface of a liquid to behave like a stretched skin.***

c) Explain how the following factors affect surface tension.
(2 marks)

(a) Impurities

***They reduce the surface tension of a liquid***

(b) Temperature

***Rise in temperature reduces tension by weakening inter-molecular forces.***

13. Give three differences between mass and weight. (3 marks)

| ***Mass*** | ***Weight*** |
|---|---|
| ***It is the quantity of matter in a body*** | ***It is the pull of gravity on a body*** |
| ***It is measured in kilograms*** | ***It is measured in newton's*** |
| ***It is the same everywhere*** | ***It changes from place to place*** |
| ***It is measured using a beam balance*** | ***Measured using a spring balance*** |
| ***Has magnitude only*** | ***Has both magnitude and direction*** |

14. The length of a spring is 16.0 cm. Its length becomes 20.0 cm when supporting a weight of 5.0 N. Calculate the length of the spring when supporting a weight of 2.5 N.
(3 marks)

***2.5 x 0.8 = 2.0 cm***

***Hence the length becomes = 16.0 + 2.0***

***= 18.0 cm.***