NAME……..…ADM.NO……CLASS:…….

FORM ONE PHYSICS NOVEMBER 2021
TIME: 2 HRS.

INSTRUCTION TO CANDIDATES:

a) *Write your **name**, **Admission number** and **class** in the spaces provided above.*
b) *This paper consists of **TWO** Sections; Section **A** and Section **B**.*
c) *Answer **ALL** the questions in both Section **A** and **B** in the spaces provided.*
d) ***ALL** working **MUST** be clearly shown.*
e) *Candidates should check the question paper to ascertain that all the **8** pages are printed as indicated and that no questions are missing.*
f) *Candidates should answer the questions in English.*

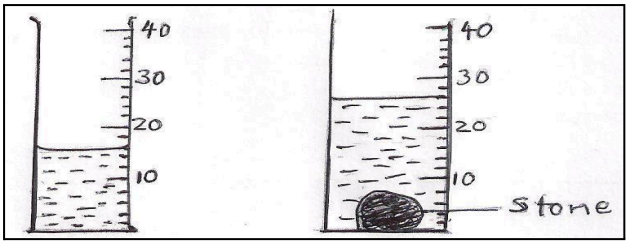
Where necessary, take:
g = 10N/kg
Density of water = 1000kg/m^3

For Examiners Use only

Section	**Marks**	**Marks awarded**
A	25 Marks	
B	55 Marks	
	Total (80Marks)	

Section A: 25 marks

1. The figure below shows the volume of water in a measuring cylinder before and after immersing a stone. If the mass of the stone is 125g, determine its density. (3mks)



V=26-16 = 10cm^3

Density= mass/v = $\frac{125}{10}$ = 12.5g/cm^3 or 12500kg/m^3

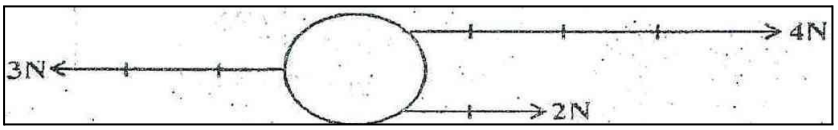
2. A drug manufacturer gives the mass of an active ingredient in a table as 4.0mg. Express this quantity in kilogrammes (1mk)

$\frac{4}{1.0\,x10^{6}}$= 4.0 x 10^{-6}kg

3. Giving an example, define the termderived quantities. (2mks)

Quantities which we choose to define interms of other quantities.Examples area and volume

4. A body is acted upon by three forces as shown below.



Draw on the body below to show the resultant force acting on it. (2mks)

(4 + 2) – 3 =6 -3= 3 N

5. Stateany two the difference between mass and weight (2mks)

Mass is quantity of matter contained in a substance while weight is pull of gravity.
SI unit of mass is kilogramme while that of weight is Newton

6. Explain why water wets the glass while mercury does not.(2mks)

Water wets the glass because adhesive force between water and glass molecules is greater than cohesive force between water molecules. Mercury does not wet the glass because cohesive force between mercury molecules is greater than adhesive force between glass molecules and mercury molecules .

7. Name the instruments you would use to measure each of the following:
   (a) The length of a football field. (1mk)

Surveyor's tape measure

   (b) The height of a 20 litrejerrican (1mk)

Carpenterstape measure/metre rule

   (c) The circumference of your waist. (1mk)

Tailors tape measure

8. The water level in a burette is 30cm^3. If 55 drops of water fall from the burette and the average volume of one drop is 0.12cm^3, what is the final water level in the burette? (2mks)

0.12x 5.5 =6.6cm^3

Final burette readings 30.0+ 6.6 = 36.6 cm^3

9. A man has a mass of 70kg. Determine
   (a) His weight on earth, where the gravitational field strength is 10N/kg. (2mks)

W= mg =70x10

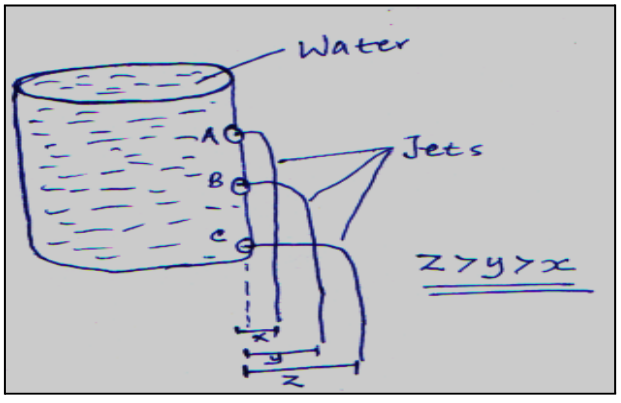
= 700N

   (b) The gravitational field strength on the moon if his weight on the moon is 119N (2mks)

Gravitational field strength= $\frac{w}{m}$

$= \frac{119}{70}$ **= 1.7N/kg**

10. With the aid of a diagram show that pressure increases with depth (2mk)



11. Describe an experiment to show that matter is made up of small particles (2mk)

-Tear a small piece of paper from your book, cut it into small pieces. Cut the small pieces into other further small pieces. Continue until the papers obtained cannot be further cut in smaller pieces. The pieces of the paper obtained at the end illustrate constituents of matter.

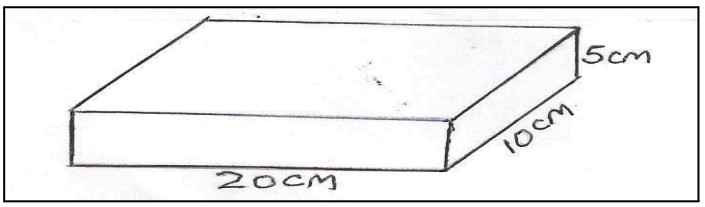
- **Dissolving a solute in a solvent.**
- **Grinding a piece of chalk.**
- **Diluting potassium manganate IV and copper II sulphate**

Section B: 55 marks

12. (a) Define pressure and state its SI unit (2mks)

Pressure is force acting normally per unit area SI unit: Newton per square meter or pascal

(b) The figure below shows the measurements of a solid of mass 50kg.



Determine:

(i) The weight of the solid (1mk)

W=mg = 50 x 10 = 500N

(ii) The minimum pressure the solid can exert on a flat surface (3mks)

$P_{min} = \frac{force}{Max\ Area} = \frac{500}{0.02} =$ **25000N/m²**

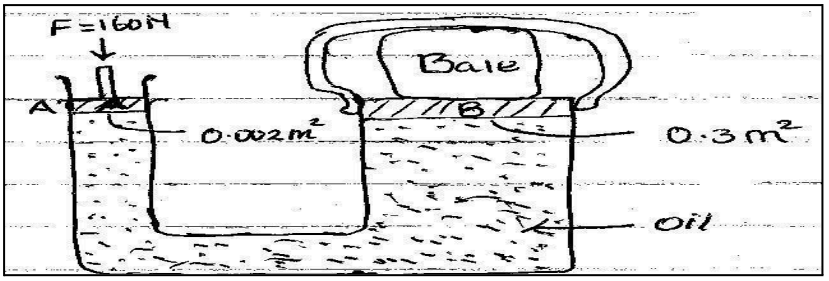
(iii) The maximum pressure the solid can exert on a flat surface (3mks)

$P_{max} = \frac{force}{Min\ Area} = \frac{500}{0.005} =$ **100000N/m²**

(iv) A sea diver is 35m below the surface of sea water. If the density of the sea water is 1.03gcm^{-3}, the atmospheric pressure 103 000Nm^{-2} and g is 10N/kg; determine the total pressure on him. (3mks)

Total pressure= pressure due to water+ atmospheric pressure
= 1030 x 35 x 10 + 103000
= 360500+ 103000
= 463500 Pascals

13. The diagram below shows a simple hydraulic lift



If aforce of 160N is applied on the small piston. Determine:

(i) The pressure at the side of small piston A. (2mks)

Pressure at A $=\frac{F}{A}=\frac{160}{0.002}$ **= 80000N/m²**

(ii) Pressure experienced by the oil (1mk)

80000N/m²

(iii) Force produced on Large pistonB to compress the bale (3mks)

Force at B = Pressure x Area at B **=80000x 0.3 =24000N/m²**

(iv) State **two** factors that affect pressure other than depth. (2mk)

-Density and gravitational field strength,

-

14. a)Define the term diffusion (1mk)

Movement of molecules from where they're highly concentrated to where they are lowly concentrated

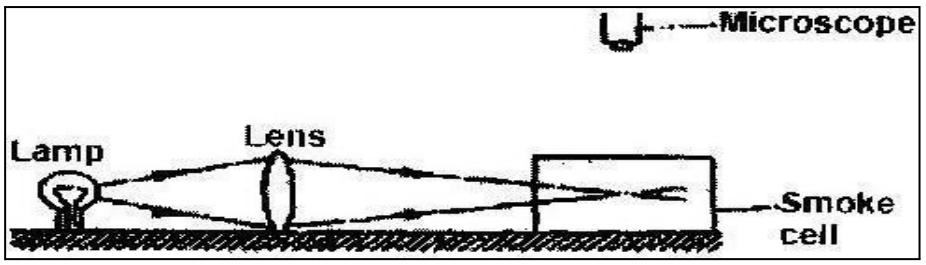
b) Distinguish between solid and liquid states of matter in terms of intermolecular forces. (2mks)

Solid molecules have less intermolecular distances between theirmoleculesthus stronger intermolecular forces than liquids; Liquid molecules have relatively greater intermolecular distancesthus weaker intermolecular forces than solid molecules.

c) Hydrochloric gas diffuses faster thanammonia gas. Suggest a reason for this observation.(2mks)

Diffusion is affected by density of a molecule. Ammonia gas which has a less density than HCL gas diffuses faster than HCL gas which has a greater density.

b) Brown motion of smoke particles can be studied by using the apparatus shown below. To observe the motion, some smoke is enclosed in the smoke cell and then observed through the microscope.



(a) Explain the role of the lens, lamp and microscope in the experiment (3mks)

Lens-concentrate/focus light to the smoke cell

Lamp – illuminates/provides light to the smoke cell

Microscope-magnify/enlarge the smoke particles

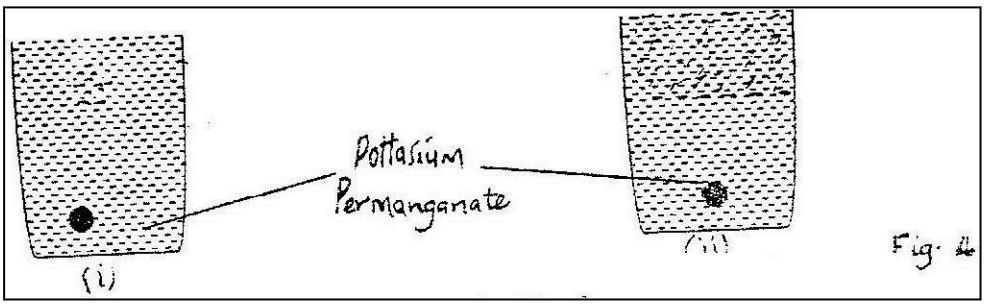
(b) State and explain the nature of the observed motion of the smoke particles(2 marks)

Random or Brownian motion: due to collision with the invisible air molecules

(c) State what will be observed about the motion of the smoke particles if the temperature surrounding the smoke cell is slightly raised. (1 mark)

Smoke particles move faster than before or increase their speed of their movement

15. The figure below shows a beaker filled with water. Some potassium permanganate was gently introduced at the bottom of the beaker at the position shown.



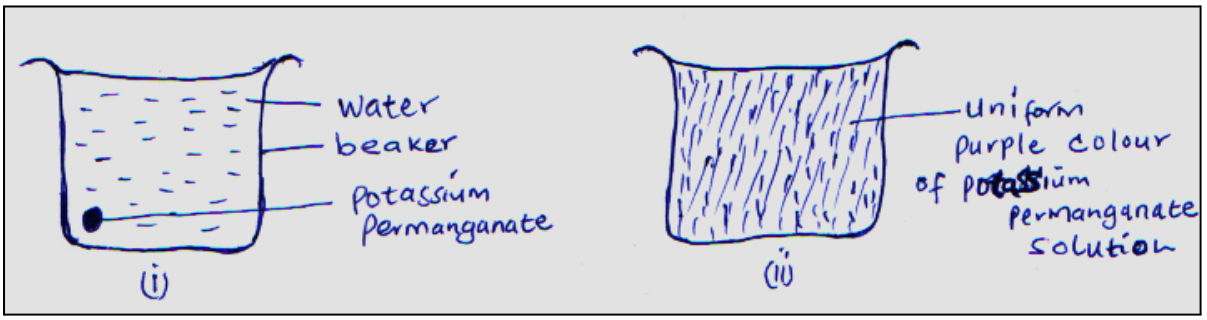


Figure (ii) shows uniform distribution of potassium permanganate after about 10 minutes. Explain how this appearance was caused(2mks)

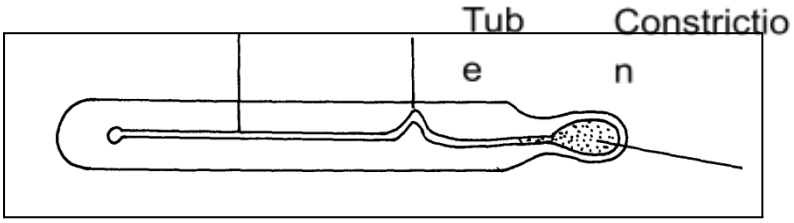
-diffussion

-Potassium permangate move from a region of high concentration to region of low concentration until a uniform purple colour is obtained at end of the experiment

16. a)Define the term temperature and state its SI unit (2mks)

Degree of hotness or coldness of a body or place. SI unit;Kelvin

b)The figure is of a below represent mercury in a clinical thermometer.



Explain why;

(i) There is a constriction on the tube (1mk)

Cut the mercury thread hence allow/enable temperature readings to be taken before mercury flows back to the bulb

(ii) The bulb is thin (1mk)

Increase sensitivity of the thermometer

(iii) Mercury is the mostly preferred thermometric liquid in clinical thermometer than alcohol (2mks)

Mercury has relatively uniform expansion and contraction as compared to alcohol.

Mercury is more visible as compared to alcohol which is less visible.

(iv) A clinical thermometer breaks if sterilized using boiling water (1mk)

Because it measures a maximum of 43^0c while boiling water is at 100^0c thus breaking it.

c) Convert

(i) Temperatures of -173^{o}c to Kelvin (2mks)

-173+273 = 100K

(ii) Temperatures of 376K to ^{o}c.

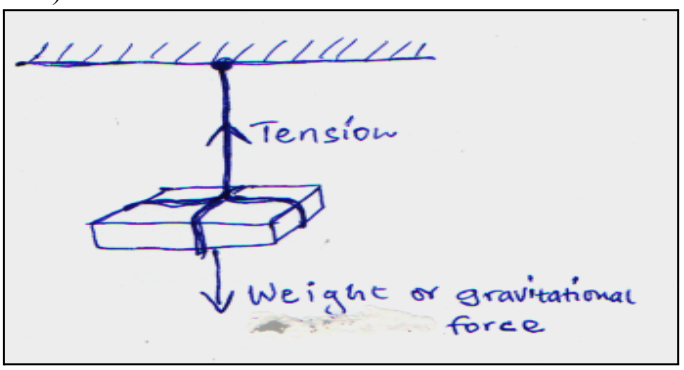
(2mks)

376-273 = 103^{0}c

17 a) Giving an example in each, sate the difference between scalar and vector quantity.(4marks)

Scalar quantity have size/magnitude only e.g. mass and density
Vector quantity have both magnitude and direction e.g. momentum, weight and velocity.

b) A concrete slab of mass 20g is held by a steel cable of a crane as shown below. Name and show the forces acting on the slab (2mks)



c)State any **three** examples of contact forces. (3mks)

Frictional force, action and reaction force, cohesive and adhesive forces.

d) State any **three**effects of a force on a body(3mks)

- **makes a stationary body to move**
- **stops a moving body**
- **distorts/deforms a moving body**
- **changes direction of a moving body**