Name: MARKING SCHEME .....Class:.....Adm No:.....

TIME: 1HR 45 MINS

INSTRUCTION.
Answer all questions in the spaces provided.

1. a) Mechanics is one of the branches of physics state what it deals with. (1mk)

- Motion of bodies under influence of force

b) Name the branch of physics that deals with:
i) Propagation of energy through space. (2mks)

Waves

ii) Behaviour of light as it traverses various media.

Geometrical optics

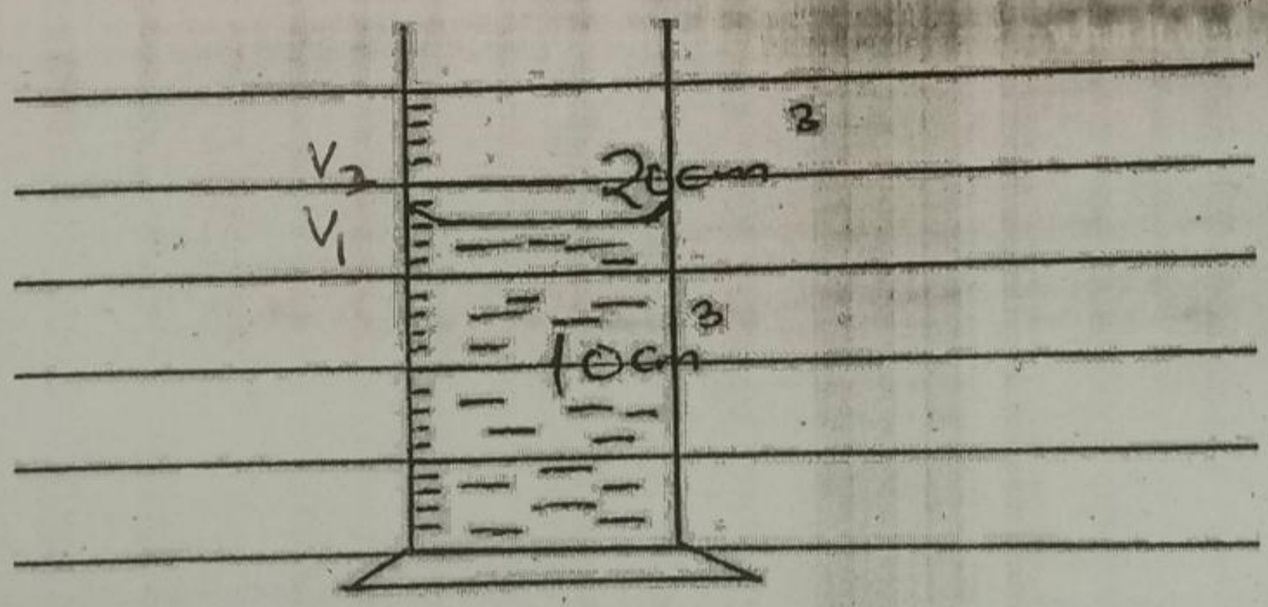
c) One basic laboratory rule is proper dressing. Give an example of proper dressing. (1mk)

- Wearing gloves while handling chemicals

2. Name two instruments for measuring volume of liquids. (2mks)

Pipette, Burrete, measuring cylinder

3. Fig 1 shows a measuring cylinder.



a) Record the reading of volume, V_1 of liquid in the measuring cylinder. (1mk)

$18cm^3$

b) Determine the reading on the measuring cylinder after 5 drops of water each of volume $0.6cm^3$ are added. (2mks)

$V = 0'6 \times 5$ 1
$= 3cm^3$

New reading $18+3 = 21cm^3$

c) Mark the new reading of volume, V_2 on the diagram. (1mk)

4. The mass of a density bottle is 20g when empty and 45g when full of water. When full of mercury its mass is 360g.

a) i. Calculate the mass of water that fills the density bottle. (1mks)

mass 45g - 20g = 25g

ii. Calculate the mass of mercury that fills the density bottle. (1mk)

mass 360g - 20g = 340g

b) i. Given that the density of water is 1g/cm^3, calculate the volume of water that fills the density bottle. (2mks)

$$\text{Volume} = \frac{\text{mass}}{\text{density}} = \frac{25g}{1\,g/cm^3} = 25\,cm^3$$

ii. Give the volume of mercury that fills the density bottle. (1mk)

$$\text{Volume} = \frac{\text{mass}}{\text{density}} = \frac{340g}{25cm^3} = = 25cm^3$$

iii. Calculate the density of mercury. (2mks)

$$\text{density} = \frac{\text{mass}}{\text{volume}} = \frac{340g}{25cm^3} = 13.6\,g/cm^3$$

5. a) Define force and state its SI unit. (2mks)

Force is either a push, a pull or a lift on an object.

SI unit Newton.

b) Differentiate between cohesive and adhesive forces. (2mks)

Cohesive forces are forces of attraction between molecules of the same kind while adhesive forces are forces of attraction between molecules of different kind.

6. List two factors affecting surface tension. (2mks)

- Temperature.
- Impurities

7. A body weighs 65N. Calculate its mass (g= 10N/Kg) (2mks)

$$\text{Mass} = \frac{\text{weight}}{\text{gravitational force}} = \frac{65N}{10N/kg} = 6.5\,kg$$

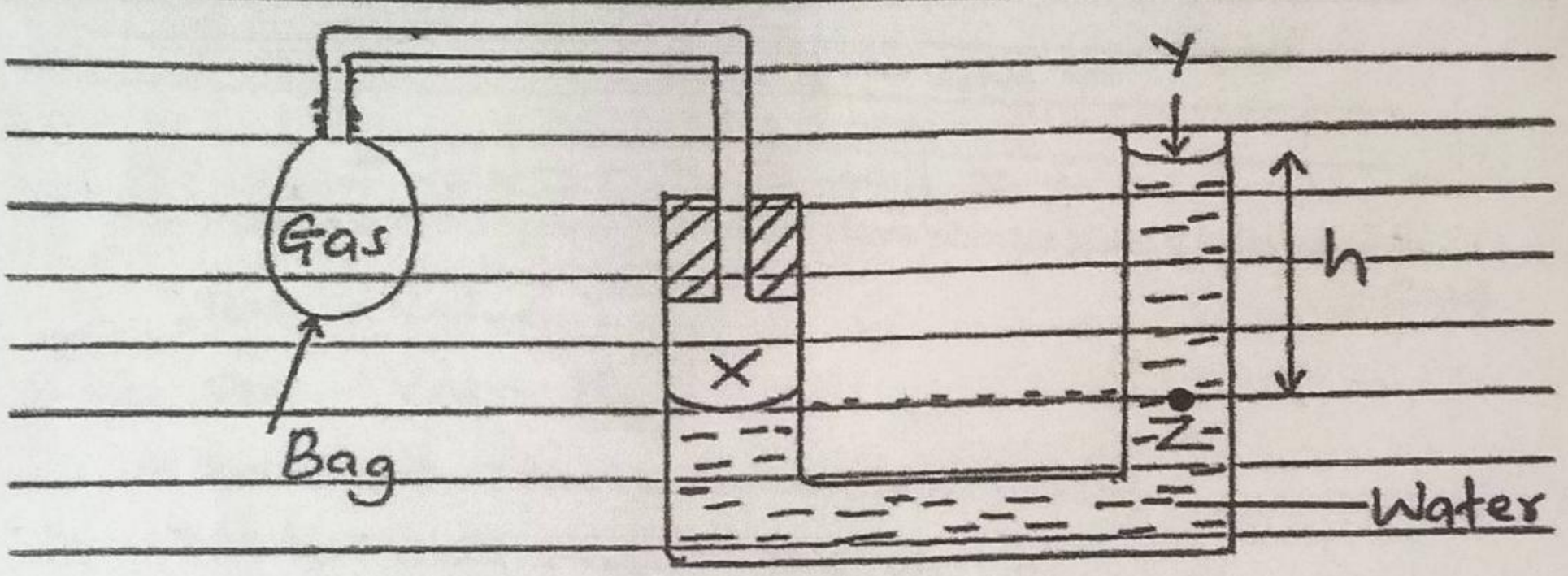
8. Define pressure giving its SI unit. (2mks)

Pressure is defined as force acting normally or perpendicularly per unit^2 area.

SI unit Newton per square metre.

N/m^2.

9. Fig 2. Below shows a liquid manometer being used to measure gas pressure contained in a small bag.



i. Name the pressure acting on surface of water at: (2mks)

X - pressure of the gas.

Y - Atmospheric pressure.

ii. State why pressure at X is equal to pressure at Z. (1mk)

Pressure at the same level is the same.

iii. If h=10cm, atmospheric = 103000N/m^2 and density of water is 1000kg/m^3, determine the pressure of the gas in the small bag. (3mks)

$P_g = h_w \rho_w g_w + P_a$

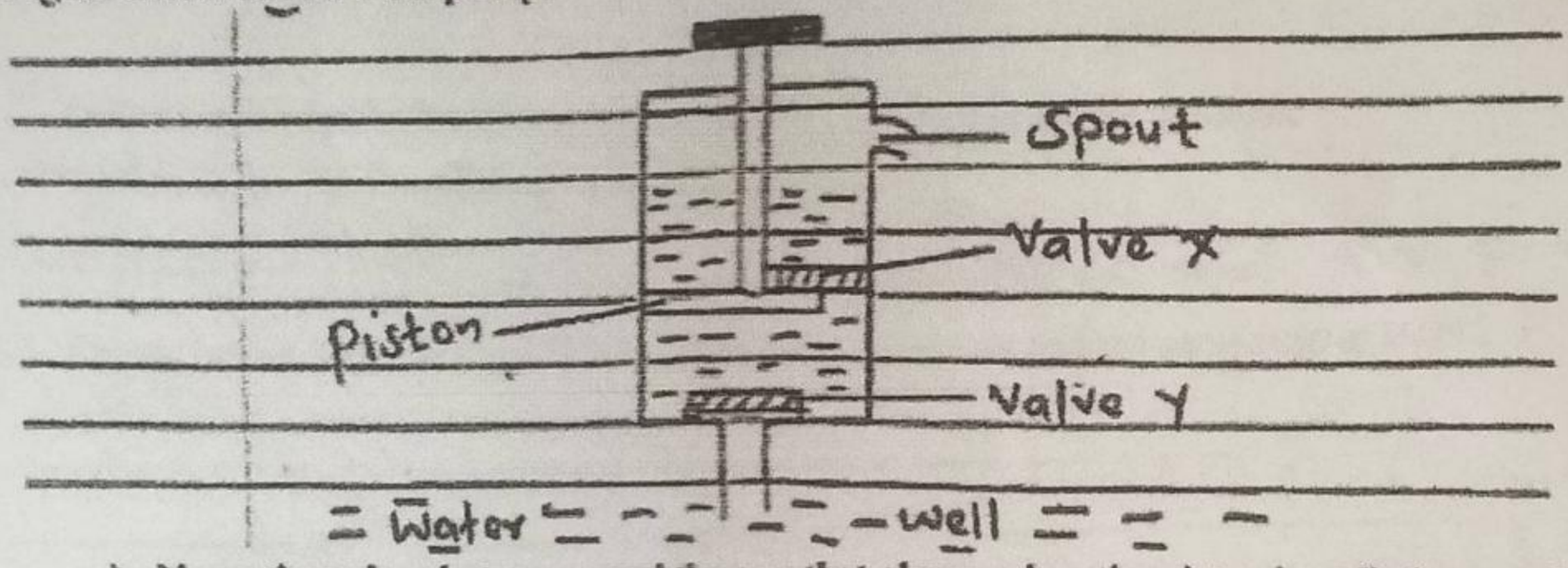
$= (0.1 \times 1000 \times 10) + 103000 = 104000 N/m^2$

1000 +103000

10. State two properties of the hydraulic brake fluid. (2mks)

- Incompressible.
- Low melting point.
- High boiling point
- Non - Corrosive

11. Figure below shows a lift pump.



a) Name the valve that opens and the one that closes when the piston is pulled upwards. (2mks)

Opens – Valve Y

Closes – Valve X

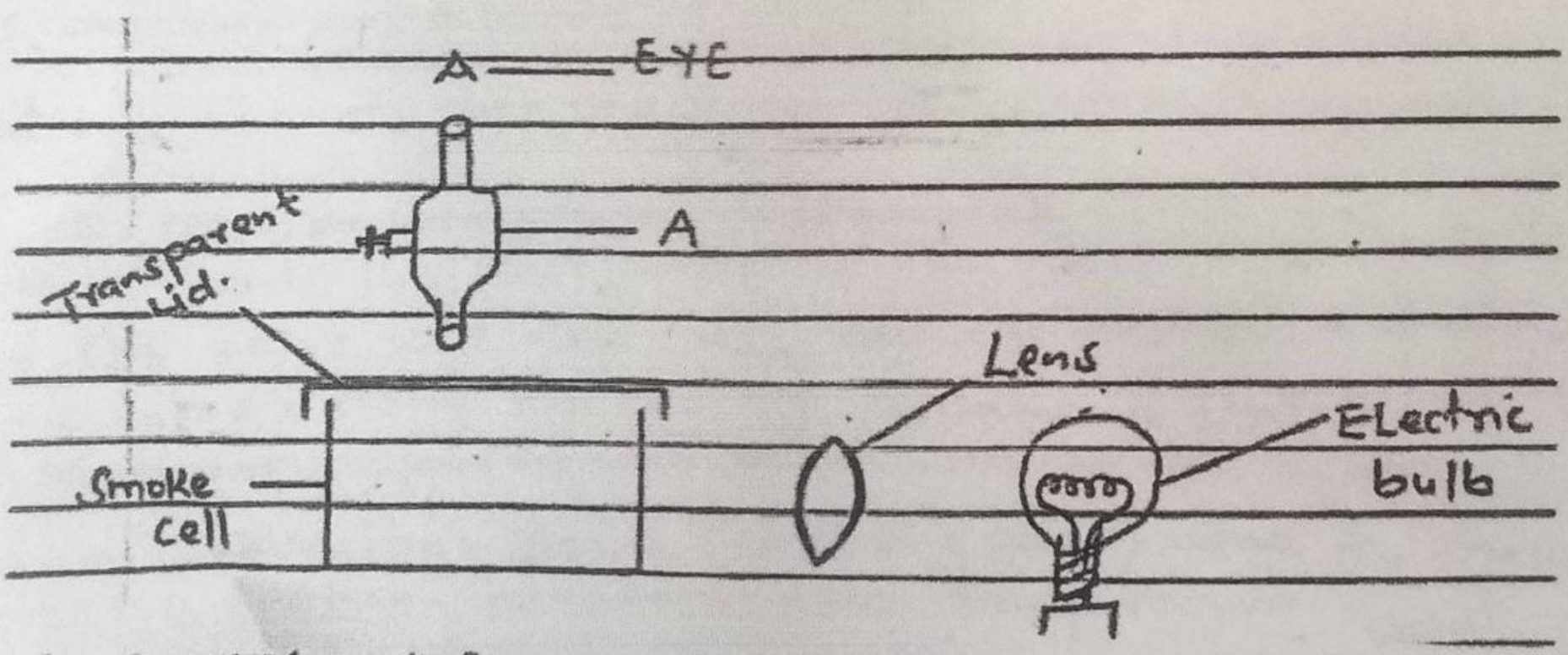
b) Explain why valve Y closes when the piston is pushed downwards. (2mks)

Due to its weight and the pressure of water above it.

12. a) State the kinetic theory of matter. (2mks)

matter is made up of tiny particles which are in constant random motion.

The figure below shows a set up used to study motion of smoke particles in air.
State the purpose of:



i. Apparatus A — Microscope - magnifying particles in the smoke cell. (2mks)

ii. Lens — Converging the rays of light.
– Illuminating the smoke cell.

b) Give two reasons why smoke particles are preferred in this experiment. (2mks)

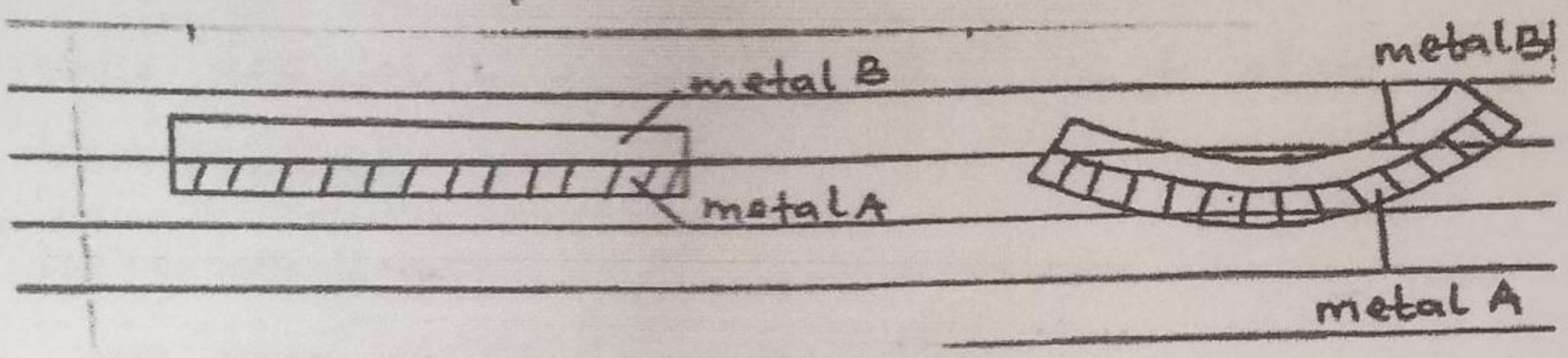
– light.

– Easily visible.

c) State and explain the nature of observed motion of the smoke particles. (2mks)

Constant random motion.
- collision between smoke particles and air particles.

13. Figure below shows bimetallic strip at room temperature and the same strip at 100°C.



i. Compare linear expansivity values of the two metals. (2mks)

Metal A has a high Linear expansivity rate as compared to metal B.

ii. State how the two metals are joined together. (1mk)

By rivets.

iii. State one application of the bimetallic strip. (1mk)

Thermostat in electrical appliances.

14. Give a reason for each of the following.

i. In building contraction steel metal is used to reinforce concrete. (2mks)

Steel and Concrete has the same Linear expansivity rate.

ii. Ordinary glass tumbler breaks when hot water is poured in it.

Hot water heats the inner walls of the glass making it expand while the outer wall does not, causing unequal expansion. This creates strong forces of expansion that break it.

15. State one advantage of alcohol over mercury when used as a thermometer liquid. (1mk)

Alcohol has a low melting point (freezing point) used to make thermometers that can measure low temperature.

16. Convert 298K to °C. (2mks)

298K - 273 = 25°C

17. State the three modes of heat transfer. (3mks)

- Conduction.
- Radiation.
- Convection.

18. State three factors that affect rate of heat transfer by conduction of a given metal conductor. (3mks)

- Length of the material.
- Thickness of the material.
- Type of the material.
- Temperature difference.

19. Explain why metals conduct heat faster than non-metals. (2mks)

Metals use both atom vibration and electrons to conduct.

20. Give a reason why two thin blankets are warmer than one thick blanket. (1mk)

Thin layer which traps air.
Air is a poor conductor of heat.

21. Give two differences between mass and weight. (4mks)

mass is the quantity of matter in an object	weight is the pull of gravity on an object.
It is measured using a beam balance	measured using a spring balance.
Basic quantity	Vector quantity.
SI unit is Kilogram	SI unit is Newton.