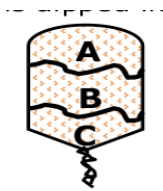


2. FORCE

1. Define force and give its **SI** units
2. Name two effects of force
3. State the reason why it is not correct to quote the weight of solid objects in kilograms
4. Name the type of force that:
 - (i) Attracts bodies toward the centre of the earth.
 - (ii) Opposes motion between two surfaces in contact.
 - (iii) Makes an object appear lighter when being lifted out of water.
 - (iv) Attracts pieces of papers to a plastic ruler when the ruler is rubbed on hair.
 - (v) Enables a body to move in a circular motion

SURFACE TENSION

1. What is surface tension?
2. State **two** factors that lowers the surface tension force on a water surface.
3. State one way of making the surface tension of a liquid stronger.
4. State the effect of a decrease in temperature on surface tension.
5. A steel needle placed on water is found to float even though steel is denser than water. But when the water is heated the needle sinks. Explain why.
6. Explain a metal pin was observed to float on the surface of pure water. However the pin sank when a few drops of soap solution were carefully added to the water.
7. Explain the washing effect of soap.
8. If a tent is touched with a finger on inner surface, when it is raining, it allows the rain water to leak through. Give a reason for this observation.
9. The diagram below shows a wire loop with two threads tied across it. The loop is dipped into a soap solution such that the soap film covers it as shown.



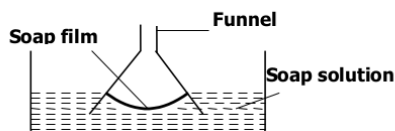
Region **B** is punctured such that the soap film in that section is broken. On the space alongside the diagram sketch the resulting shape of the wire loop. Give a reason for the shape.

10. The diagram below shows a wire loop with a thread tied across it. The loop is dipped into a soap solution such that the soap film covers it as shown.



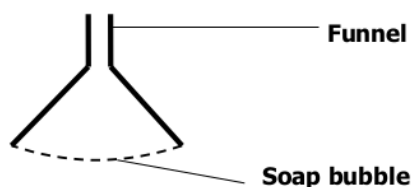
Region **X** is punctured such that the soap film in that section is broken. On the space alongside the diagram sketch the resulting shape of the wire loop. Give a reason for the shape.

11. Figure shows a funnel dipped into a liquid soap solution.



State and explain what happens to the soap bubble when the funnel is removed.

12. A glass funnel is dipped in soap solution, then taken out and blown gently to form a soap bubble as shown below



Explain why the bubble flattens to a film which then rises up the funnel.

13. The figure below shows a small toy boat floating on water in a basin. X and Y are two point near the toy.



When a hot metal rod is dipped into the water at point X, the toy is observed to move towards Y. Explain this observation.

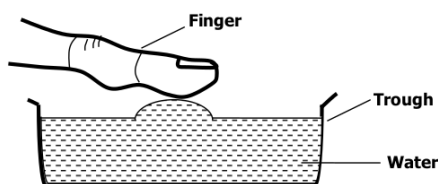
14. The Figure below shows a toy boat. A piece of soap is attached to end A and then the toy placed on a surface of clean water.



Explain the observation that would be made immediately.

ADHESIVE AND COHESIVE FORCE

1. Differentiate **cohesive** force from **adhesive** force.
2. Anyango placed her finger on a water as shown in the diagram below



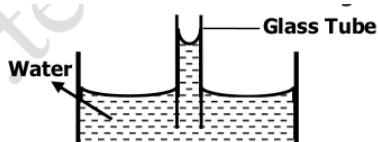
Name the force that lifts the water to the finger

3. Explain the reason why water spilled on a glass surface wets the surface.
4. When building a house using bricks a damp course is laid just above the brick foundation. Explain why the damp course is necessary
5. Name **two** types of forces which can act between objects without contact.
6. Name **two** types of forces which can act between objects in contact.
7. Give a reason why lamp – wicks are usually made of cotton.
8. The diagram below shows drop of liquids X and Y carefully put on a clean flat glass slab



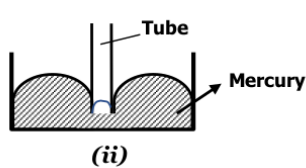
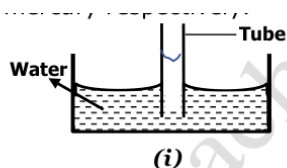
Explain the shapes of the drops

10. Explain why you can dry your hands with a towel but not with a sheet of polythene
11. When drops of water are sprinkled on a greasy glass plate they form spherical shapes. Explain.
12. Name **two** kinds forces that determine the shape of a liquid drop on solid surface.
13. State **two** factors which determine the height to which a liquid rises up a capillary tube If dipped into the liquid.
14. Explain the following observation. Rain drops falling freely are spherical
15. Fig shows the meniscus of water in a glass tube.



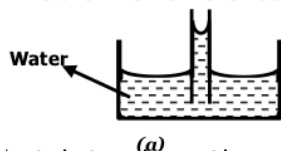
Explain why the meniscus of the liquid is shaped as shown.

16. The figures (i) and (ii) below shows two capillary tubes dipped in water and mercury respectively.



Explain your answer in above.

17. The diagram below shows a capillary tube immersed in water.

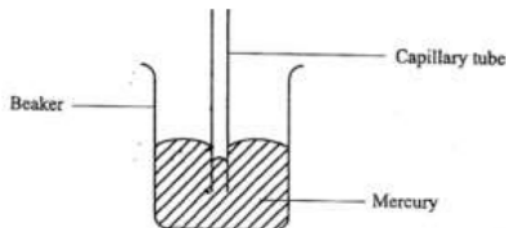


Using figure (b) sketch to show the appearance of the capillary tube if it was inserted in mercury.

18. The diagram below shows two clear glass tubes containing water and mercury



19. Explain the shapes of the surface of each of the liquids inside the tube.
Figure shows a narrow tube dipped in water.



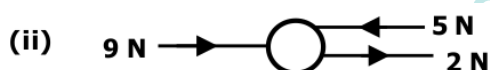
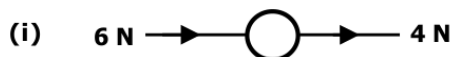
The temperature of the liquid (water) is raised. Indicate on the diagram the new level of water. Explain your answer.

MASS AND WEIGHT

- State **three** differences between mass and weight.
- State the reason why it is not correct to quote the weight of solid objects in kilograms
- Differentiate vector quantity from a scalar quantity and give an example of each
- Using a scale of 1 cm to represent 10 N, draw a diagram to show the direction and magnitude of the resultant force for two forces acting as shown below.



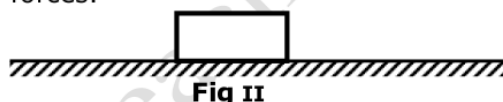
- Show diagrammatically how you can combine forces of:
 - 9 N, 7 N and 2 N to give a resultant force of 4 N.
 - 3 N, 5 N and 7 N to give a resultant force of 15 N.
- Determine the resultant vector due to the forces below



7. The fig (I) below shows a body acted on by two forces $F_1=3\text{ N}$ and $F_2=8\text{ N}$

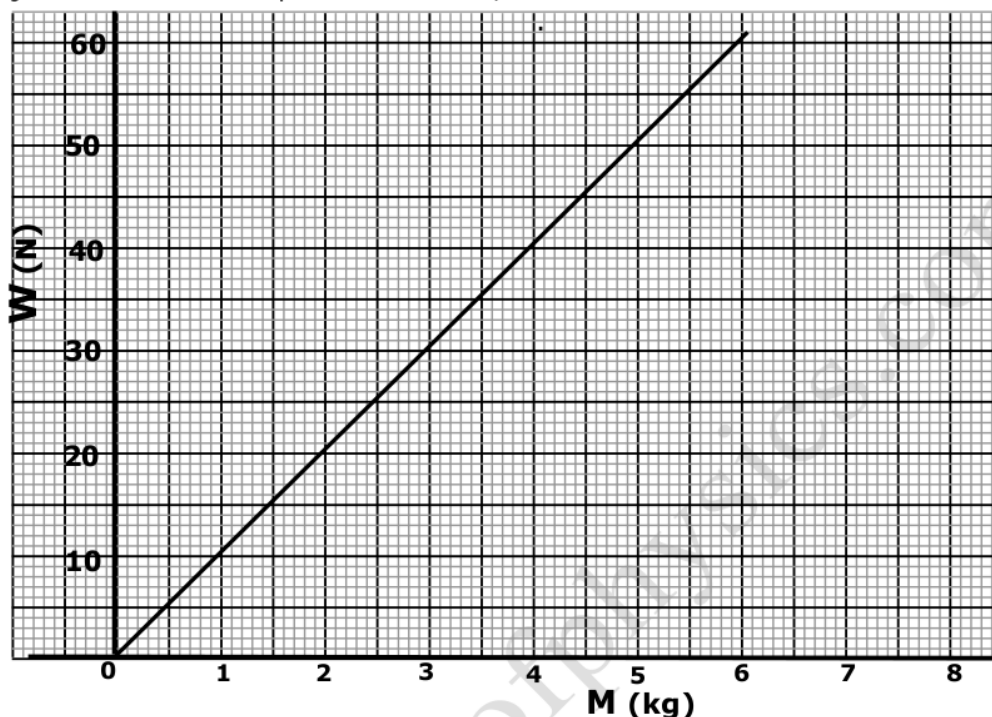


On the fig (II) below draw the force F_3 that has the same effect on the body as the two forces.



- Show diagrammatically how you can combine forces of 9 N and 2N to give a resultant force of
i) 7 N ii) 11 N
- Show diagrammatically how you can combine forces of:
 - 9 N, 7 N and 2N to give a resultant force of 4 N
 - 3 N, 5 N and 7 N to give a resultant force of 15 N.
- Show diagrammatically how you can combine forces of: 12 N, 7 N and 5 N to give a resultant force of
i) 24 N ii) 0 N iii) 14 N iv) 10 N
- Show diagrammatically how you can combine forces of: 18 N, 7 N and 6 N to give a resultant force of 15 N
- A student was heard saying "the mass of a ball on the moon is one sixth its mass on earth". Give a reason why this statement is wrong.
- The weight of a person increases as one move away from the equator towards the poles. Give a reason for this.
- Give a reason why the weight of a body varies from place to place.
- A bag of sand is found to have the same weight on planet earth as an identical bag of cotton on planet Jupiter. Explain why the masses of the two bags must be different.
- Explain a bag of sugar is found to have the same weight on planet moon as an identical bag of dry saw dust on the earth.
- An astronaut weighs 800 N on earth where $g=10\text{ N/kg}$. Calculate
 - His mass **ANS 80 kg**
 - His weight on the moon where $g=1.6\text{ N/kg}$ **ANS 128 N**

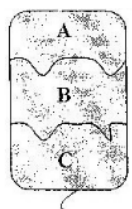
18. An astronaut weighs **800 N** on mars where $g=16 \text{ N/kg}$. Calculate
 i) His mass **ANS 50 kg**
 ii) His weight on Jupiter where $g=20\text{N/kg}$. **ANS 1000 N**
19. An object weighs **600 N** on Earth. What would its weight be on another planet of gravitational acceleration **8 N/kg**. **ANS 480 N**
20. A body weighs **600 N** on the surface of the earth where $g = 10 \text{ N/Kg}$ and **150N** on the surface of Venus. Calculate the value force of gravity on Venus. **ANS 2.5 N/kg**
21. An astronaut weighs **1200 N** on Jupiter which has gravitational strength of **20N/Kg**. Calculate
 i) His mass on Jupiter **ANS 60 kg**
 ii) His weight on the Earth, where $g = 10 \text{ N/Kg}$ **ANS 600 N**
22. The weight of a stone on the moon is found to be **48 N**. Determine its weight on earth given that the gravitational force on the moon is **1.6 N/kg** **ANS 300 N**
23. An object weighs **8.0 N** on Earth. What would its weight be on another planet of gravitational acceleration **6.25 N/kg** given that acceleration due to gravity on earth is **9.8 N/kg** **ANS 5.102 N**
24. The graph in the figure below shows the variation of the weights W of various objects with their respective masses,



Use the graph to determine the gravitational field strength.

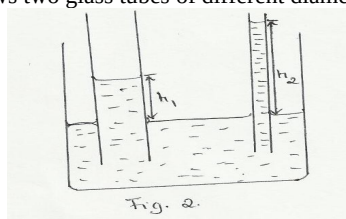
RANDOM QUESTIONS

1. The diagram below shows a wire loop with two threads tied across it. The loop is dipped into a Soap solution such that the soap film covers it as shown. Region B is punctured such that the soap film in that section is broken. On the space alongside the diagram sketch the resulting shape of the wire loop. Give a reason for the shape.



Surface tension is broken in region B and surface tension on side A and C Pulls the thread.

2. The diagram in figure 2 shows two glass tubes of different diameters dipped in water.



Explain why h_2 is greater than h_1

(3 Marks)

- Adhesive force support water column or more capillarity in tube 2
- Surface tension is the same in both tubes and equal to the weight of water column supported
- Narrow tube has longer column to equate weight to wider tube
- Volume of water in the tubes is same hence narrower tube higher column