



Name _____ Class _____ Roll no. _____ Date _____ Marks _____ / 40

1 Key words**[4]**

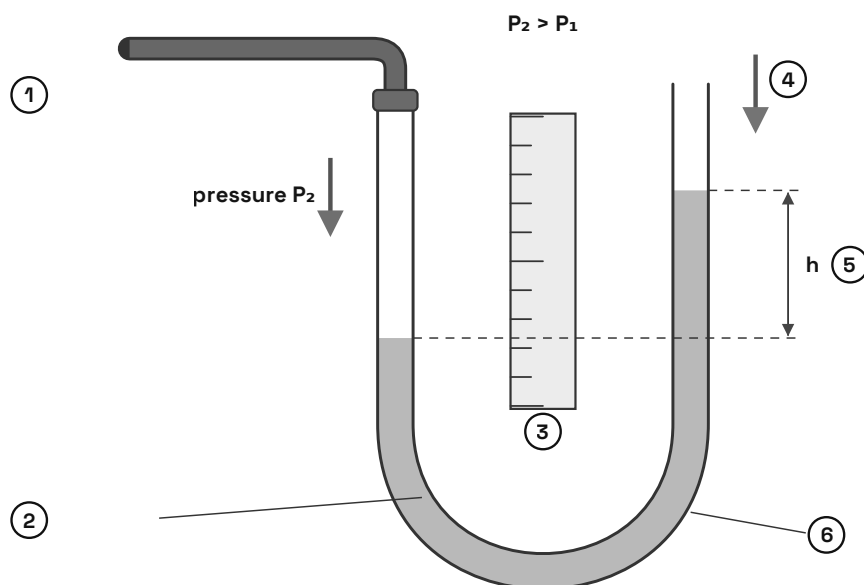
Fill in the blanks with words from the box. Two words in the box are not needed. Each blank carries 0.5 mark.

barometer efficiency fulcrum input work lever manometer mechanical advantage
pascal pressure velocity ratio

A rigid bar that can turn about a fixed point is a _____, and the fixed point is called the _____. The ratio of the load to the effort is the _____, and the ratio of the velocity of the effort to the velocity of the load is the _____. Output work divided by input work, as a percentage, is the _____ of a machine. The force acting perpendicularly on a unit area is called _____, and its SI unit, N/m^2 , is also called the _____. Atmospheric pressure is measured with a _____.

2 Label the diagram**[3]**

The diagram shows a U-tube manometer. Write the names of the parts numbered 1 to 6. Each carries 0.5 mark.



1. _____

2. _____

3. _____

4. _____

5. _____

6. _____



[5]

Choose the correct option for each of the following questions.

- i. Which one of these simple machines is a second-class lever? [1]
a. shovel
b. dhiki
c. nutcracker
d. hammer
- ii. Which one of these is not affected by friction? [1]
a. mechanical advantage
b. velocity ratio
c. efficiency
d. input work
- iii. What is the atmospheric pressure at sea level? [1]
a. 760 mmHg
b. 700 mmHg
c. 1000 mmHg
d. 750 mmHg
- iv. What is the pressure of water at a depth of 60 m, where $g = 9.8 \text{ m/s}^2$? (Density of water = 1000 kg/m^3) [1]
a. 588 Pa
b. 5880 Pa
c. 58,800 Pa
d. 588,000 Pa
- v. What does an air-braking system work on? [1]
a. atmospheric pressure
b. compressed air
c. liquid pressure
d. pressure

[3]

Write very short answers to the following questions.

- a. Which class of lever is a pair of scissors? [1]
-
-
- b. What is the instrument used to measure the pressure of a liquid called? [1]
-
-
- c. Which instrument is used to measure the pressure of the air in a tyre? [1]

[8]

Give reasons.

- a. The efficiency of a lever is never 100%. [2]



- b. It is easier to lift the load in a wheelbarrow when the load is shifted towards its wheel. [2]

- c. Football boots have studs on their soles. [2]

- d. The bottom of a dam is made wider than its top. [2]

6 Long answers [8]

Write long answers to the following questions.

- a. Write any four differences between mechanical advantage and velocity ratio. [4]

- b. Prove that the pressure exerted by a liquid is $P = h\rho g$, where the symbols have their usual meanings. [4]



[7]

a. An effort of 75 N is needed to lift a load of 300 N with a lever. Calculate the effort distance if the load is 25 cm from the fulcrum.

Answer:

- b. An effort of 300 N lifts a load of 900 N with a lever 2 m long. The load is at one end, 50 cm from the fulcrum, and the effort is applied at the other end. Calculate the mechanical advantage, velocity ratio and efficiency of the lever.

[illegible]

Answer:

- c. A liquid in a container is 2 m deep, and its pressure at the bottom is $24,696 \text{ N/m}^2$. Find the density of the liquid. ($g = 9.8 \text{ m/s}^2$)

[illegible]

Answer:

[2]

An elephant is far heavier than a woman in shoes with thin, pointed heels, yet the heels can dent a soft wooden floor that the elephant's feet don't. How can this be?

(not marked)

Hang a meter stick from a stand at its middle. Hang an effort on the left and a load on the right, slide them until the rule balances, and fill in the table (a mass of 100 g weighs about 1 N).

S.N.	Effort, E (N)	Effort distance, E.D. (cm)	$E \times E.D.$	Load, L (N)	Load distance, L.D. (cm)	$L \times L.D.$
1						
2						
3						

