



Name _____ Class _____ Roll no. _____ Date _____ Marks _____ / 35

1 Key words**[4]**

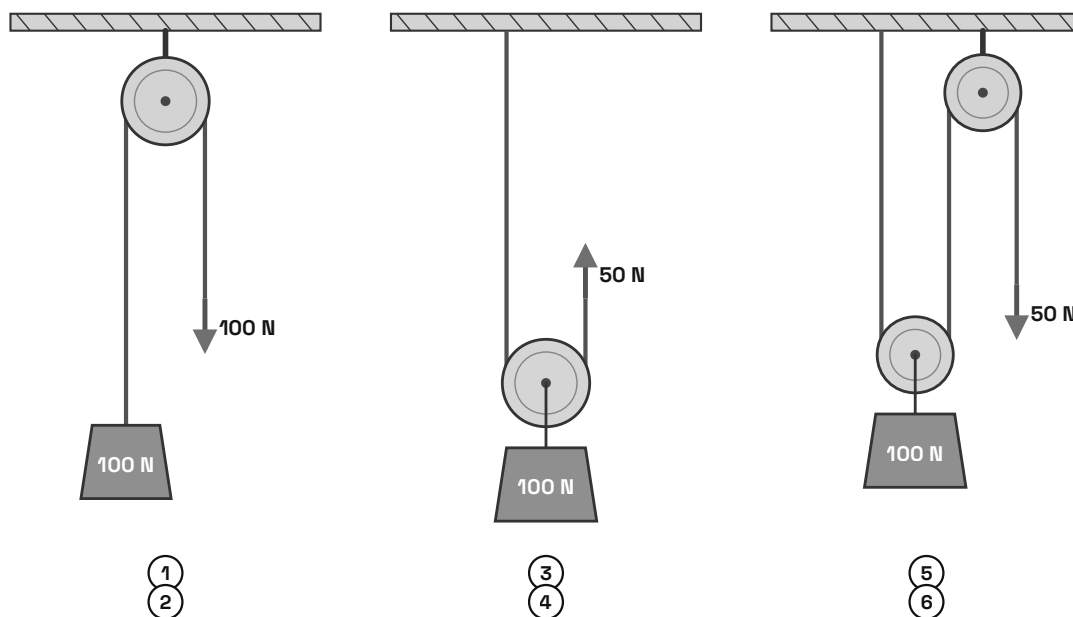
Fill in the blanks with words from the box. Two words in the box are not needed. Each blank carries 0.5 mark.

continuous lever fixed pulley friction inclined plane lever mechanical advantage
movable pulley perfect machine pitch velocity ratio

The ratio of the load to the effort is the _____ of a machine, and the ratio of the effort distance to the load distance is its _____. A _____ is used mainly to change the direction of a force. The wedge and the screw are special forms of the _____. The distance between two neighboring threads of a screw is its _____. The wheel and axle is also called a _____. A machine whose output work equals its input work is a _____, but in every real machine some work is lost to _____.

2 Label the diagram**[3]**

The diagram shows three pulley systems, each holding a 100 N load. Under each system, write its name at 1, 3 and 5, and what it does to the effort at 2, 4 and 6. Each carries 0.5 mark.



1. _____

2. _____

3. _____

4. _____

5. _____

6. _____



[5]

Choose the correct option for each of the following questions.

- i. Why is a single fixed pulley used, even though it gives no mechanical advantage? [1]
 - a. to magnify the force
 - b. to increase the velocity of an object
 - c. to increase efficiency
 - d. to change the direction of the force
- ii. What is the velocity ratio of a pulley system of three pulleys? [1]
 - a. one
 - b. two
 - c. three
 - d. four
- iii. A wooden plank 6 m long is used to load goods into a truck 2 m high. What is the velocity ratio of this inclined plane? [1]
 - a. one
 - b. two
 - c. three
 - d. four
- iv. What is the efficiency of a perfect machine? [1]
 - a. 100%
 - b. less than 100%
 - c. more than 100%
 - d. 0%
- v. Which simple machines make up a wheelbarrow with a single wheel? [1]
 - a. wheel and axle, and lever
 - b. pulley and wedge
 - c. inclined plane and screw
 - d. lever and wedge

[3]

Write very short answers to the following questions.

- Write the formula for the velocity ratio of a wheel and axle. [1]

- Why do mechanical advantage and velocity ratio have no unit? [1]

- Name the simple machines that make up a pair of scissors. [1]

[6]

Write short answers to the following questions.

- a. Write any two differences between velocity ratio (VR) and mechanical advantage (MA). [2]



[2]

[2]

[4]

Write a long answer to the following question.

Draw a diagram of a wheel and axle, and show that its velocity ratio is $R \div r$.

[illegible]

[8]

Solve the following problems. Show your working.

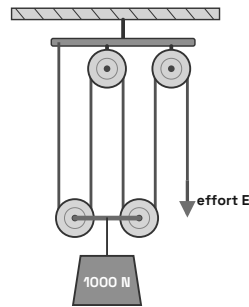
[4]

[illegible]

Answer:



- b. The figure shows a pulley system of four pulleys. Its efficiency is 80%.



four rope segments hold the lower block

- Find its mechanical advantage. (2)
- How much effort is needed to lift a load of 1000 N? (1)
- Find the output work when the load is lifted 6 m. (1)

Answer:

8 Think

Think, then answer.

If more pulleys mean less effort, why don't cranes use a hundred of them?

9 Activity: Three planks, one height (Activity 8.3)

(not marked)

Weigh a small smooth block with a spring balance: this is the load. Lean each plank against a support 60 cm high and pull the block steadily up it with the spring balance, parallel to the plank. Load = _____ N.

Length of the plank, l (cm)	$VR = l \div h$	Effort (N)	$MA = \text{load} \div \text{effort}$
200			
300			
400			

Which plank needs the least effort? How do VR and MA change as the plank gets longer?

