The Brigade School Revision Test (2020-21) Paper 2

Total points 7/13

Class 10 Subject: Physics Simple Machines
Marks 13

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0 of 0 points

Name: *

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Class: *

10 A

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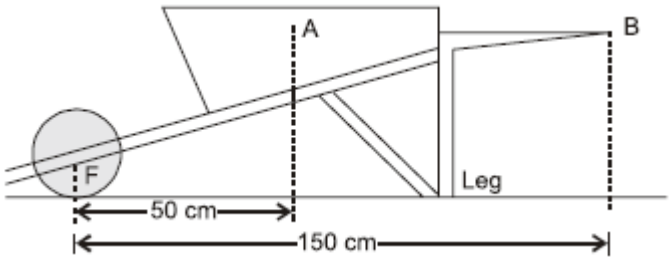
TBSG

Physics Paper 2

7 of 13 points

Objective paper 13 Marks

✗ 1. In the diagram of a stationary wheelbarrow, the centre of gravity is at A. The wheel and the leg are in contact with the ground. The horizontal distance between A and F is 50 cm and that between B and F is 150 cm. (a) What is the direction of the force acting at A ? Name the force.(b) What is the direction of the minimum force at B to keep the leg off the ground? What is this force called? (c) What is the MA of the wheel barrow? * 2.5/3



(a) The force is acting downwards. The force is the weight of the wheel barrow, its the load.
(b) The minimum force acts upwards. The force is the effort.
(c) M.A. = 3

Feedback

: (a) At point A, the weight of wheelbarrow and sand acts vertically downwards. It is called load. (1/2 + 1/2)
(b) The direction of the minimum force at B to keep the leg off the ground vertically upwards is called effort and denoted by E. (1/2 + 1/2)
(c) MA = EA/LA= 150/50 = 3 (1/2 + 1/2)

✗ 2. A boy uses a single fixed pulley to lift a load of 50 kg to some height. Another boy uses a single movable pulley to lift the same load to the same height. Compare the effort applied by them. Give a reason in support of your answer. * 2/3

The boy using a single movable pulley requires lesser effort compared to the boy using fixed pulley because,
E(fixed pulley) = L / MA
= 50/1
= 50 kgf
E(movable pulley) = L / MA
= 50/2
= 25 kgf

Feedback

For fixed pulley: L =50 kgf; MA = 1; MA = L/E= 50/1 = 50 kgf (1)
For movable pulley: L =50 kgf; MA = 2; MA = L/E= 50/2 = 25 kgf (1)
Ratio: E1:E2 = 50:25= 2:1 (1)

✕ 3. The diagram below shows a lever in use. (a) To which class of lever does it belong? Give one example of this lever with reason. (b) How will the MA of lever change if load is shifted towards the fulcrum without changing its dimensions. * 2.5/3

(a) The lever belongs to class 1.
Eg : Crowbar as the fulcrum is between the load and effort.
(b) The MA of the lever becomes greater than 1 and thus acts as a force multiplier.

Feedback

(a) Class 1 lever as fulcrum is between load and effort. (1/2 +1/2)
Example: any relevant example (1)
(b)MA of the lever would increase. because EA would increase and MA = EA/ LA (1/2 + 1/2)

✗ 4. A pulley system has a velocity ratio of 4 and an efficiency of 90%. Calculate:(a) the mechanical advantage of the system.(b) the effort required to raise a load of 300 N by the system. * 0/4

(a) If n is the no. of pulleys then VR = n and MA = VR ,
thus, MA = n = 4.
(b) MA = L/E
4 = 300 / E
E = 75 N

Feedback

Given: velocity ratio of a pulley system (VR) = 4
Efficiency of the pulley system (η) = 90%
We know that
(a) Efficiency (η) = MA / VR ; 90/100 = MA/4 ; MA = (90 x 4) /100 = 3.6 (1+1)
(b) Load, L = 300 N, MA = 3.6, Effort, E =? MA = L/E; 3.6 = 300/E ; E = 300/3.6 = 83.3 N (1+1)