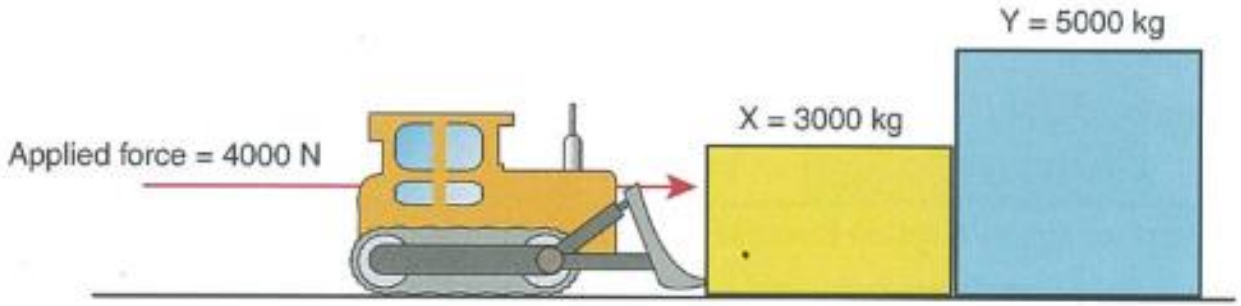
Y11 Physics

End of Year Extras Amazon

Q

Q1

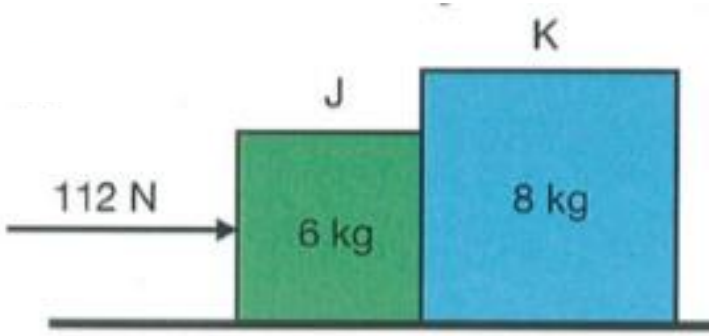
Consider a bulldozer pushing with a force of 6000 N on object X which has a mass of 3000 kg. Object X is in contact with object Y, mass 5000 kg, and pushes it along in front of itself. There is a frictional force of 0.25 N kg^{-1} acting on the system as it moves across the surface. The diagram summarises the situation.



Find the acceleration of each mass, the net force on each mass and the force X puts on Y and the force Y puts on X.

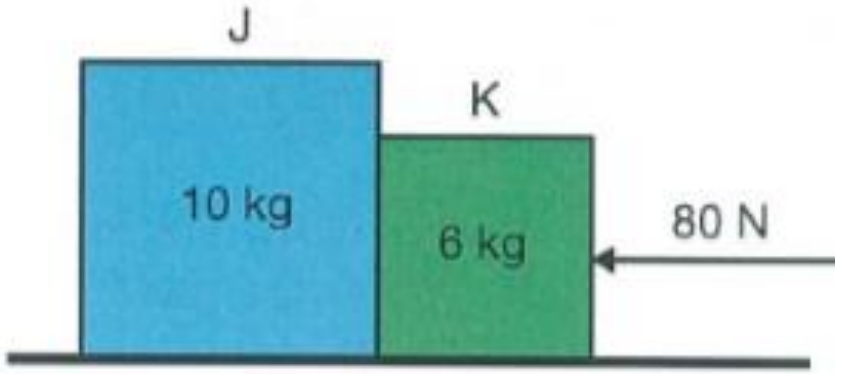
Q2

(a) The acceleration of the system.
(b) The acceleration of each object.
(c) The net force on each object.
(d) The value of the action/reaction force pair at each contact surface.



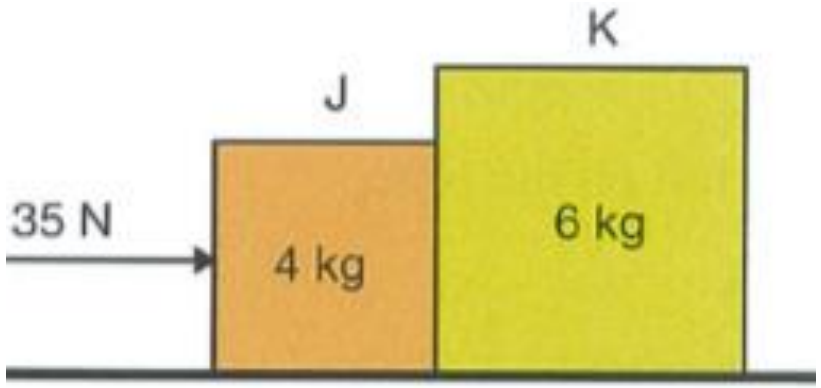
Q3

(a) The acceleration of the system.
(b) The acceleration of each object.
(c) The net force on each object.
(d) The value of the action/reaction force pair at each contact surface.



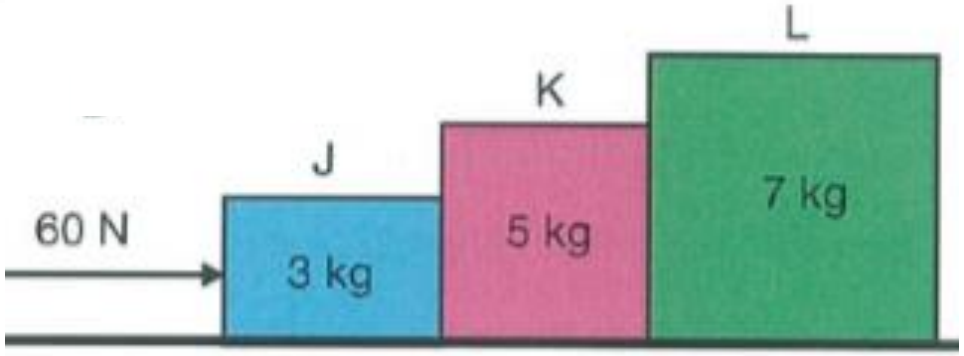
Q4

(a) The acceleration of the system.
(b) The acceleration of each object.
(c) The net force on each object.
(d) The value of the action/reaction force pair at each contact surface.



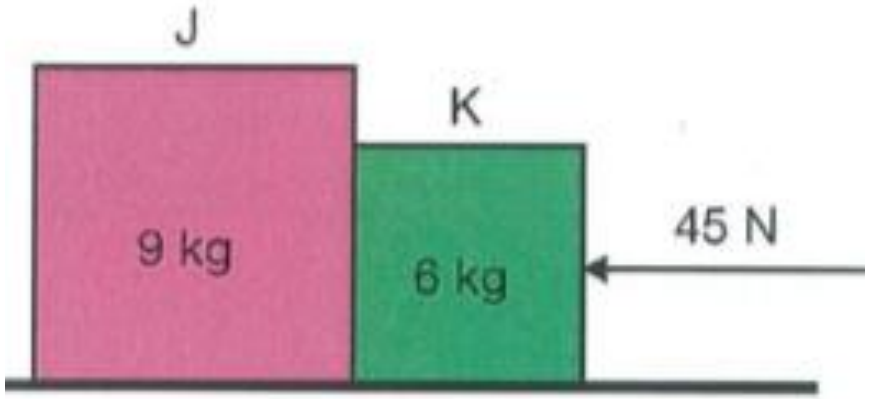
Q5

(a) The acceleration of the system.
(b) The acceleration of each object.
(c) The net force on each object.
(d) The value of the action/reaction force pair at each contact surface.



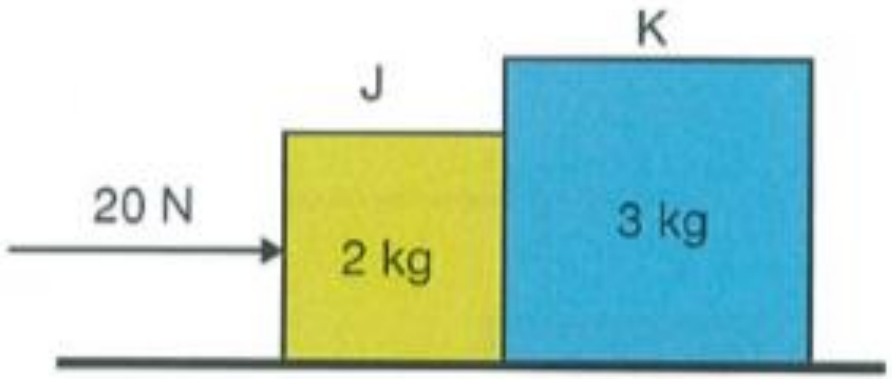
Q6

(a) The acceleration of the system.
(b) The acceleration of each object.
(c) The net force on each object.
(d) The value of the action/reaction force pair at each contact surface.



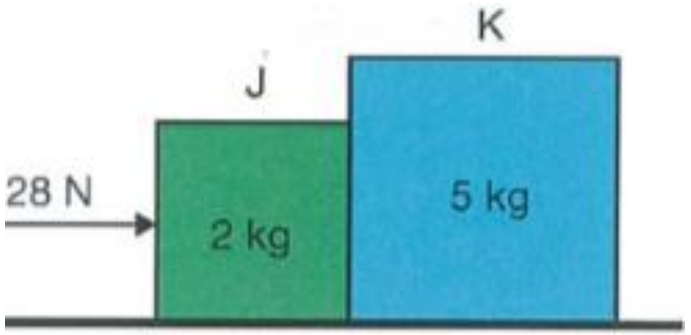
Q7

(a) The acceleration of the system.
(b) The acceleration of each object.
(c) The net force on each object.
(d) The value of the action/reaction force pair at each contact surface.



Q8

(a) The acceleration of the system.
(b) The acceleration of each object.
(c) The net force on each object.
(d) The value of the action/reaction force pair at each contact surface.

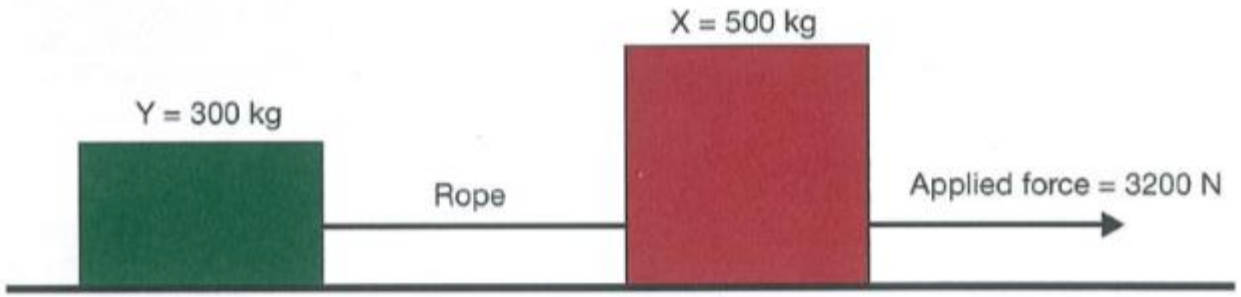


Q9

(a) The acceleration of the system.
(b) The acceleration of each object.
(c) The net force on each object.
(d) The value of the action/reaction force pair at each contact surface.

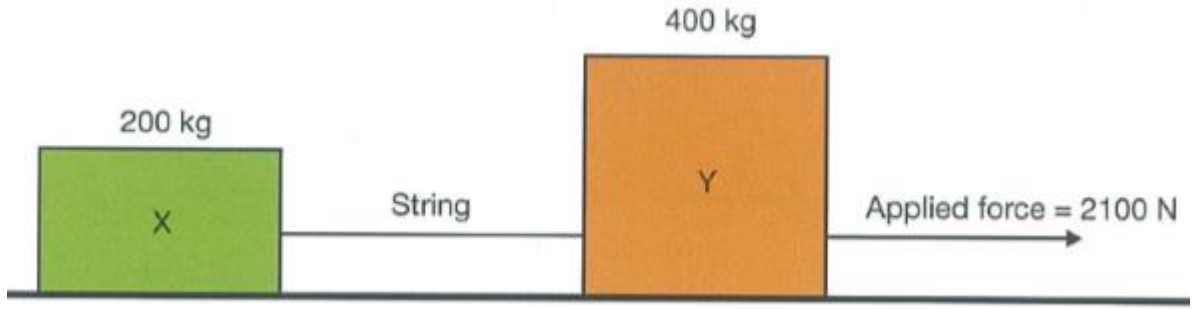
Q10

Consider a force of 320 N pulling block X which has a mass of 500 kg and is connected to block Y, mass 300 kg, by rope 2. The blocks are resting on a frictionless surface. The diagram summarises the situation. Find the acceleration of the system and of each mass, the net force acting on each mass and the tension in the rope.



Q11

(a) The acceleration of the system.
(b) The acceleration of each object.
(c) The net force on each object.
(d) The tension in each string or rope.



Q12

(a) $a = 105/(150 + 60) = 0.5$ m s^{-2} to the left
(b) Both 0.5 m s^{-2} to the left
(c) $F_J = 150 \times 0.5 = 75$ N, $F_K = 60 \times 0.5 = 30$ N both to the left
(d) $T = F_K = 30$ N (both directions)