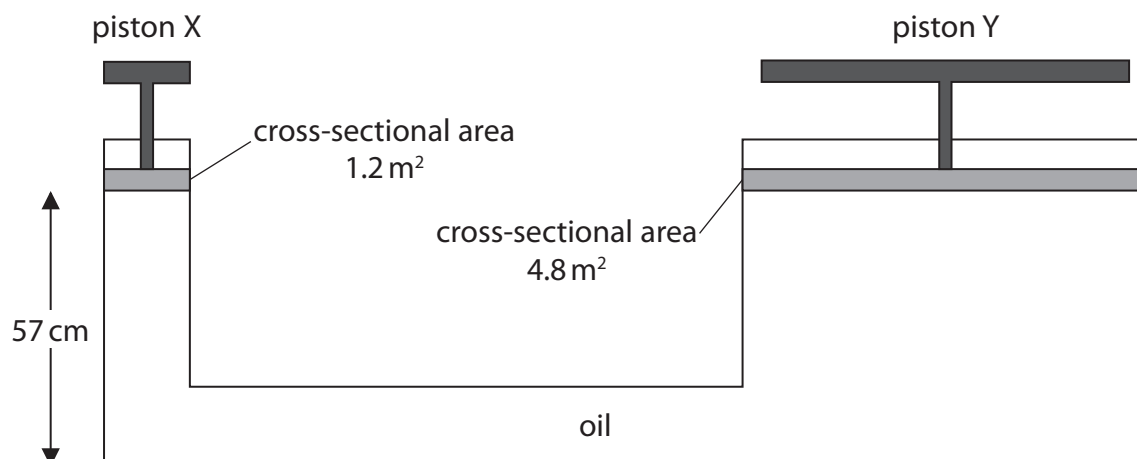**10** The diagram shows a device called a hydraulic lift.

The hydraulic lift consists of a tube of oil with a piston at each end.

(a) Calculate the pressure difference between the bottom of piston X and the bottom of the oil.

[density of oil = 820 kg/m³]

(3)

pressure difference = ... Pa

(b) A 24 kg mass is placed on piston X.

(i) Calculate the weight of the 24 kg mass.

Give the unit.

(3)

weight = ... unit ....

(ii) Calculate the extra pressure on the oil due to the mass.

(2)

extra pressure = ... Pa

(iii) The oil transfers the same extra pressure to piston Y.

Calculate the force acting upwards on piston Y due to the extra pressure.

(3)

force = ... N

(c) Piston Y starts at rest, rises slowly and then comes to rest.

State how the following energy stores have changed from before the motion to after the motion is complete.

(4)

Energy store	Change
gravitational potential energy of piston X	
gravitational potential energy of piston Y	
chemical energy of piston Y	
kinetic energy of piston Y	

(Total for Question 10 = 15 marks)