

- 13** Liquids X and Y are stored in large open tanks. Liquid X has a density of  $800 \text{ kg m}^{-3}$  and liquid Y has a density of  $1200 \text{ kg m}^{-3}$ .

At which depths are the pressures equal?

	depth in liquid X / m	depth in liquid Y / m
<b>A</b>	8	20
<b>B</b>	10	15
<b>C</b>	15	10
<b>D</b>	20	8

- 14** A train of mass  $3.3 \times 10^6 \text{ kg}$  is moving at a constant speed up a slope inclined at an angle of  $0.64^\circ$  to the horizontal. The engine of the train is producing a useful output power of 14 MW.

Assume that there are no frictional forces opposing the motion of the train.

What is the speed of the train?

- A**  $0.43 \text{ ms}^{-1}$       **B**  $4.2 \text{ ms}^{-1}$       **C**  $39 \text{ ms}^{-1}$       **D**  $380 \text{ ms}^{-1}$

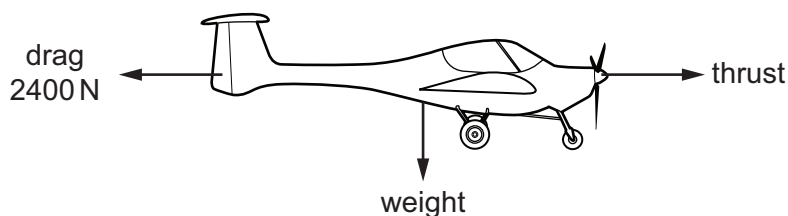
- 15** A cannon-ball of mass  $3.50 \text{ kg}$  is fired at a speed of  $22.0 \text{ ms}^{-1}$  from a gun on a ship at a height of  $6.00 \text{ m}$  above sea level.

The total energy of the cannon-ball is the sum of the gravitational potential energy relative to the surface of the sea and the kinetic energy.

What is the total energy of the cannon-ball as it leaves the gun?

- A** 206 J      **B** 641 J      **C** 847 J      **D** 1050 J

- 16** An aircraft travels at a constant velocity of  $90 \text{ ms}^{-1}$  in horizontal flight. The diagram shows some of the forces acting on the aircraft.



The mass of the aircraft is  $2000 \text{ kg}$ .

What is the power produced by the thrust force?

- A**  $1.8 \times 10^5 \text{ W}$       **B**  $2.2 \times 10^5 \text{ W}$       **C**  $1.8 \times 10^6 \text{ W}$       **D**  $2.0 \times 10^6 \text{ W}$