2 **(a)** Define power.

……..……..

……..…….. [1]

(b) An aircraft of mass 1200 kg climbs upwards with a constant velocity of 45 m s^{-1}, as shown in **Fig. 2**.

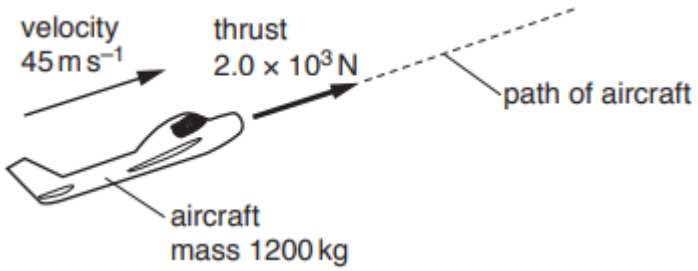

Fig. 2

The aircraft's engine produces a thrust of 2.0×10^3 N to move the aircraft through the air. The rate of increase in height is 3.3 m s^{-1}.

(i) Calculate the power produced by the thrust.

Power = …….. W [2]

(ii) Determine, for a time interval of 3.0 minutes,

1. the work done by the thrust to move the aircraft,

Work done = …….. J [1]

2. the increase in gravitational potential energy of the aircraft,

Increase in GPE = …… J [2]

3. the work done against air resistance. Explain your working.

……

……

Work done = …….. J [2]

(iii) Use your answer in **(b)(ii) 3** to calculate the force due to air resistance acting on the aircraft.

Force due to air resistance = …….. N [1]