1 Fig. 3.1 shows a simple turbine, similar to those used in a nuclear power station.

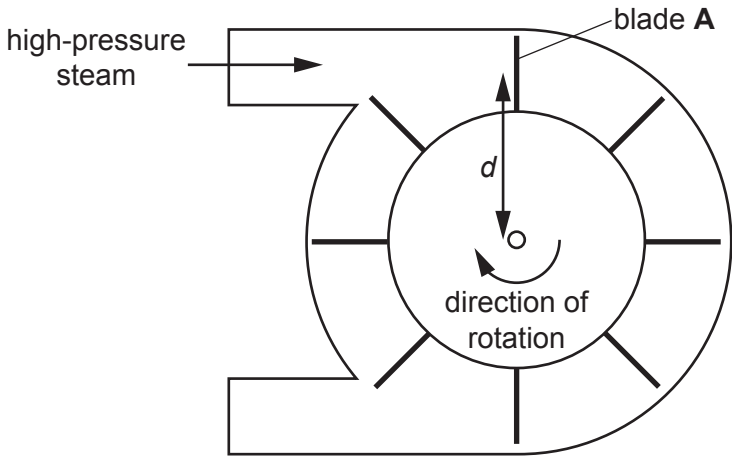

Fig. 3.1

(i) The high-pressure steam is at a pressure of 1.8×10^7 Pa.

Blade **A** has a surface area of $0.12\,m^2$.

Show that the force acting on blade **A** is 2.2×10^6 N.

[1]

(ii) The moment of the force, from the high-pressure steam acting on blade **A**, is 1.35×10^6 N m.

Calculate the distance *d*, from the centre of blade **A** to the pivot of the turbine.

distance *d* = ... m [2]

MARK SCHEME:

)(i)	$1.8 \times 10^7 \times 0.12$;	**1**
ı(ii)	(d =) $m \div f$ / (d =) $1.35 \times 10^6 \div 2.2 \times 10^6$; (d =) 0.61 **or** 0.63 (m) ;	**2**

2 Fig. 9.1 shows a simple d.c. motor with a coil of wire containing 100 turns.

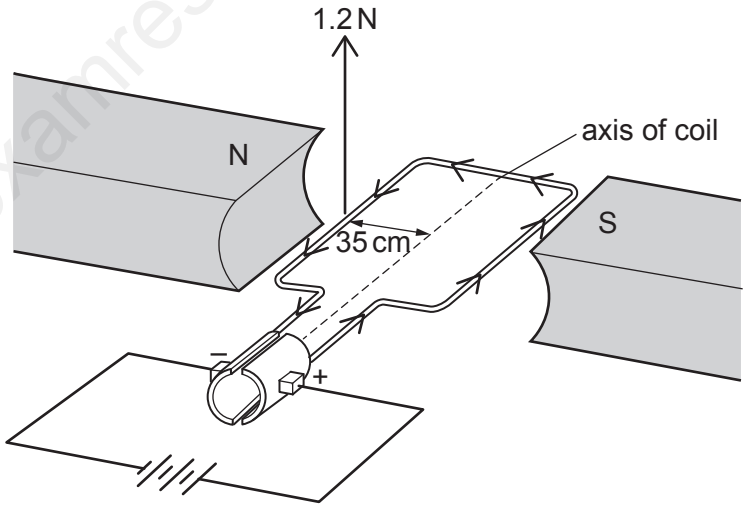

Fig. 9.1

(a) The current in the coil causes forces to act on the coil, which make it turn about its axis.

(i) Fig. 9.1 shows a force of 1.2 N acting at 90° to the coil, at a distance of 3.5 cm from the axis.

Calculate the moment of the force on the coil.

moment = ... Nm [3]

MARK SCHEME:

(a)(i)	(3.5 cm =) 0.035 (m) ; (moment =) $f \times d$ / 1.2 × 0.035 ; (moment =) 0.042 (N m) ; **or** (35 cm =) 0.35 (m) ; (moment =) $f \times d$ / 1.2 × 0.35 ; (moment =) 0.42 (N m);	**3**