1 **(a)** Define the radian.

.....

..... [1]

(b) A circular metal disc spins horizontally about a vertical axis, as shown in Fig. 1.1.

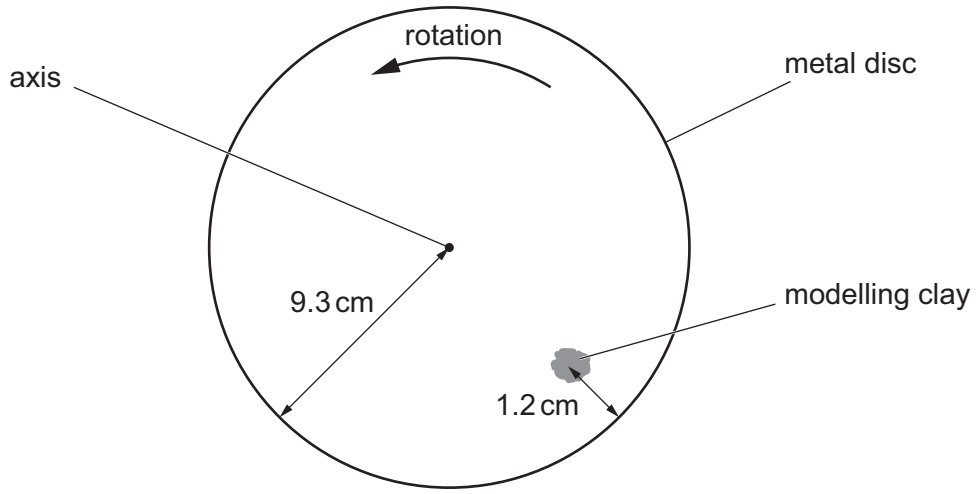

Fig. 1.1 (not to scale)

A piece of modelling clay is attached to the disc.

For the instant when the piece of modelling clay is in the position shown, draw on Fig. 1.1:

(i) an arrow, labelled V, showing the direction of the velocity of the modelling clay [1]

(ii) an arrow, labelled A, showing the direction of the acceleration of the modelling clay. [1]

(c) The metal disc in Fig. 1.1 has a radius of 9.3 cm.
The centre of gravity of the modelling clay is 1.2 cm from the rim of the disc and moves with a speed of $0.68\,m\,s^{-1}$.

(i) Calculate the angular speed ω of the disc.

ω = ... $rad\,s^{-1}$ [2]

(ii) Calculate the acceleration *a* of the centre of gravity of the modelling clay.

a = ... $m s^{-2}$ [2]

(d) A second piece of modelling clay is attached to the disc in the position shown in Fig. 1.2.

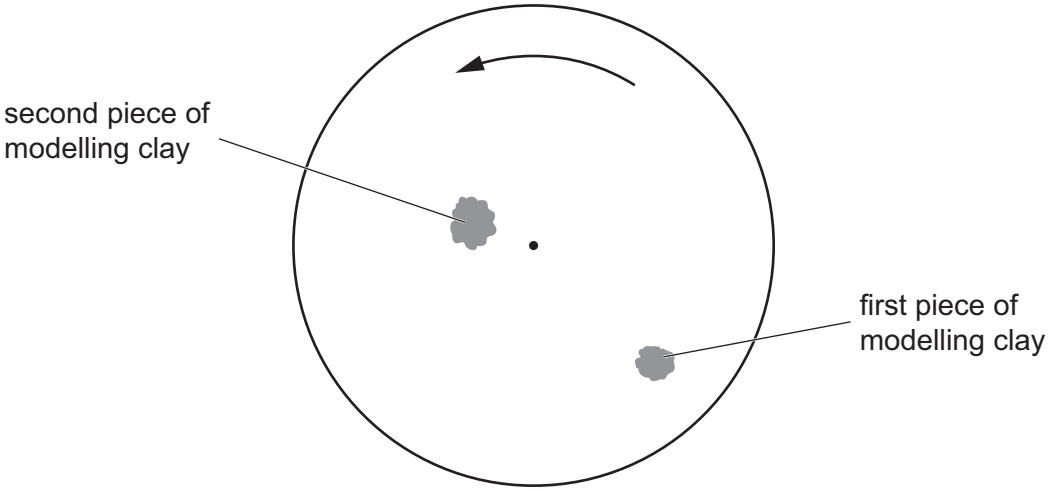

Fig. 1.2

The second piece of modelling clay has a larger mass than the first piece.

By placing **one** tick (✓) in each row, complete Table 1.1 to show how the quantities indicated compare for the two pieces of modelling clay.

Table 1.1

quantity	less for second piece than first piece	same for both pieces	greater for second piece than first piece
angular speed			
linear speed			
acceleration			

[3]

[Total: 10]