1. Fig. 1.1 shows an ice-hockey player moving on ice. He is preparing to hit the solid disc called a puck.

Fig. 1.1

The disc of mass 0.16 kg is moving horizontally across the surface of the ice at a speed of 15 m / s.

(a) Calculate the magnitude of the momentum of the disc.

(b) The hockey player strikes the disc with his hockey stick and the momentum of the disc changes. The disc gains momentum of 3.0kgm/s at 45° to the original direction of travel of the disc, as shown in Fig. 1.2.

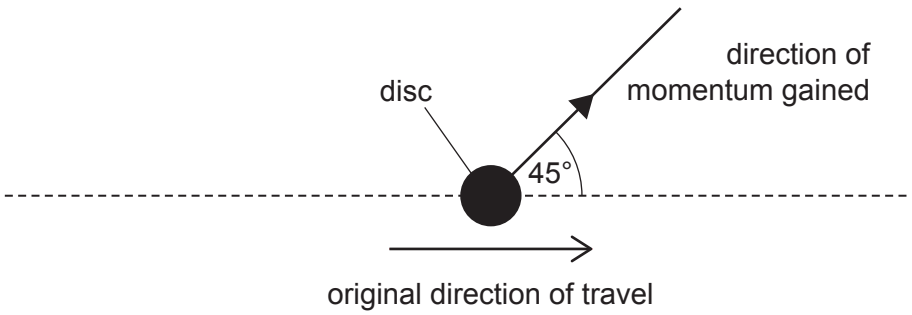


Fig. 1.2 (view from above)

1.

(a) magnitude of momentum = $m \; x \; v$

$= 0.16 \; kg \; x \; 15 \frac{m}{s}$

= **2.4 kg m/s**

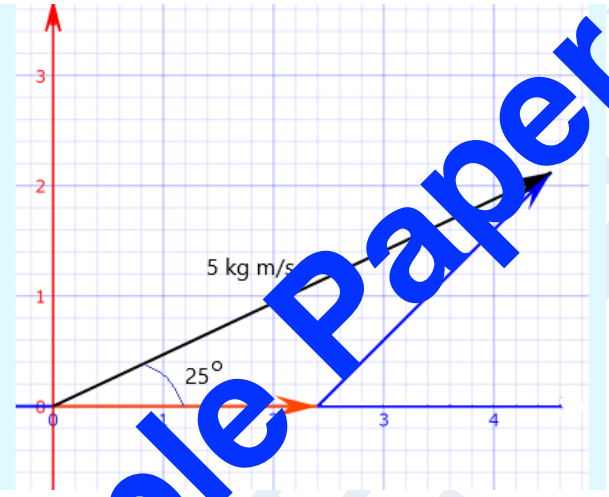
(b)

(i) magnitude of impulse: 3.0 N s

direction of impulse: at 45° to the original direction

(Impulse is the change in momentum)

(ii)



The magnitude of new momentum is 5N and the direction is 2° to original direction

(Graph the initial momentum from (a) and impulse from b(i) using a ruler and protractor and get the resultant)

(*0625_w20_qp_41 - Question 1; Momentum)*

2. A student investigates the stretching of a spring.

Fig. 1.1 shows the set up.

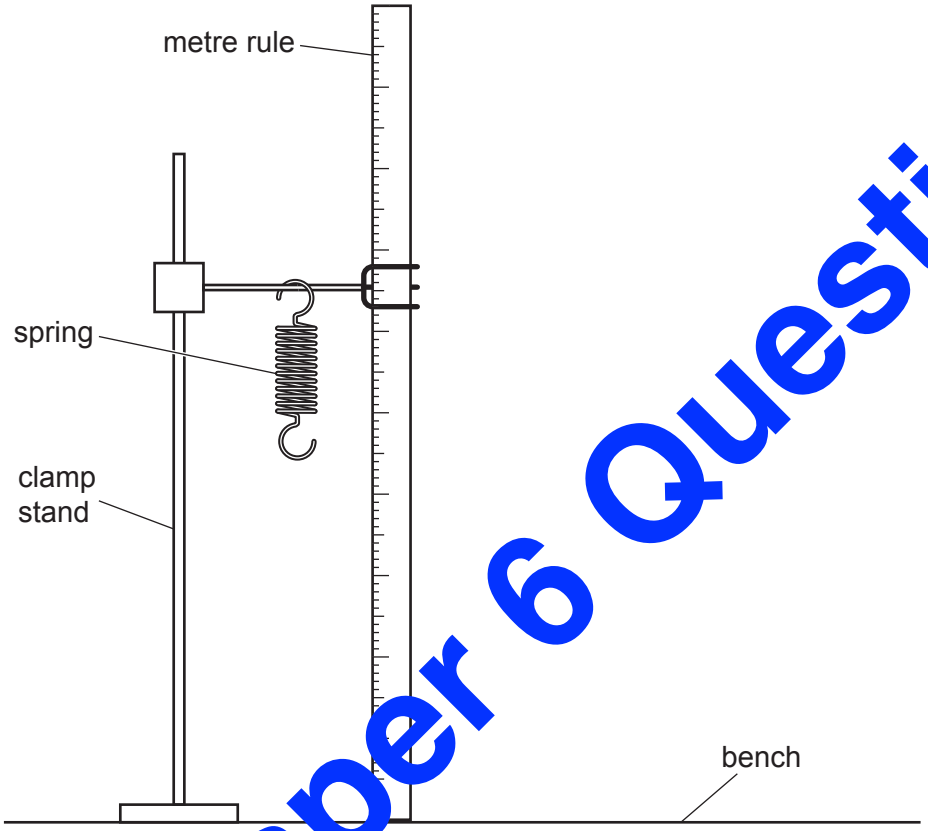


Fig. 1.1

(a) The metre rule is clamped in position near to the spring.

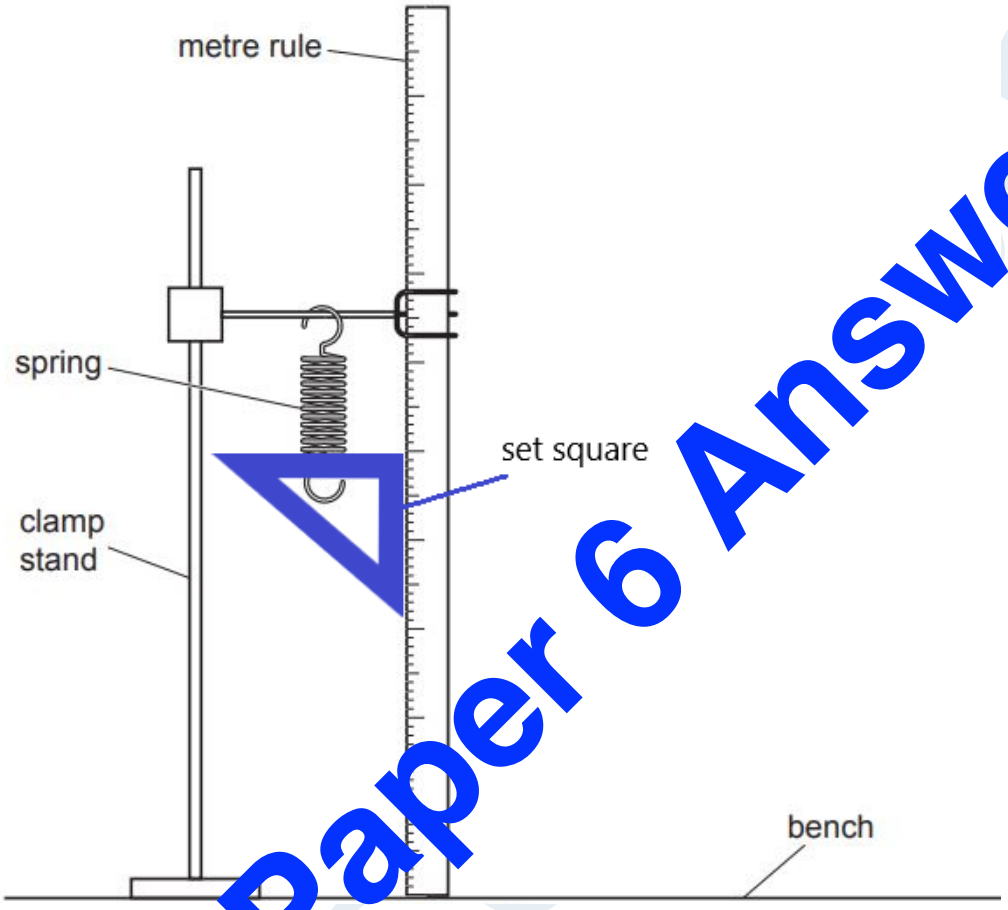
On Fig. 1.1, show clearly how you would use a set square to obtain an accurate reading of the position of the bottom of the coiled part of the spring from the metre rule.

(b) Fig. 1.2 shows the spring drawn to actual size. On Fig. 1.2, measure the length L of the coiled part of the spring.

Fig. 1.2

2.

(a)



(b) 14 mm

Alternative answers:

- 15 mm
- 5 mm

(c) The student adds a load P = 0.20N to the spring. He records the new length l of the coiled part of the spring.

He repeats the procedure using loads P = 0.40 N, 0.60 N, 0.80 N and 1.00 N. All the readings are recorded in Table 1.1.

Table 1.1

P/N	l/mm
0.20	20
0.40	26
0.60	31
0.80	35
1.00	41

(c)