Answer **all** the questions in the spaces provided.

1 **(a)** State the principle of conservation of linear momentum.

……..

……..

…….....[2]

(b) Along a horizontal frictionless surface, ball A moves with speed v towards a stationary ball B as shown in Fig. 1.1. Ball A has mass 4.0 kg and ball B has mass 12 kg.

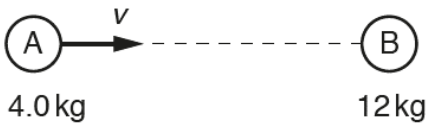

Fig. 1.1

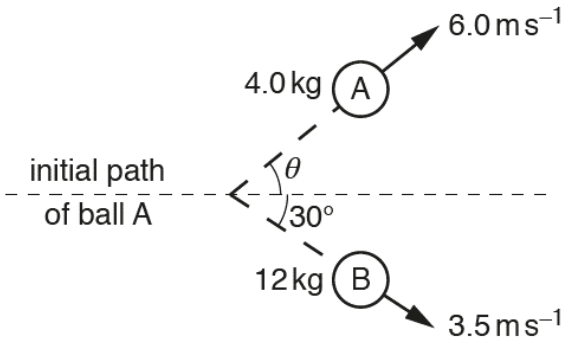

Fig. 1.2

The balls collide and then move apart as shown in Fig. 1.2.
Ball A has velocity 6.0 m s^{-1} at an angle of θ to the direction of its initial path.
Ball B has velocity 3.5 m s^{-1} at an angle of 30° to the direction of the initial path of ball A.

(i) By considering the components of momentum at right−angles to the direction of the initial path of ball A, determine θ.

θ = ...° [2]

(ii) Hence, determine the initial speed v of ball A.

v = ... m s^{-1} [2]

(iii) State and explain whether the collision is elastic or inelastic.

……..

……..... [2]

[Total: 8]