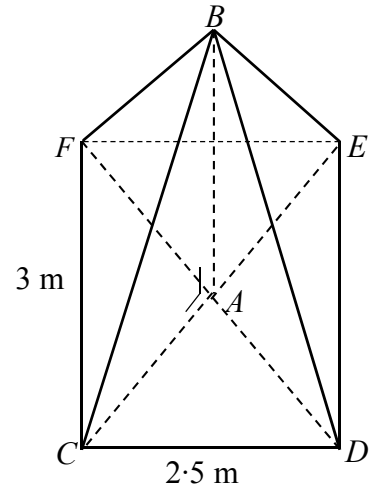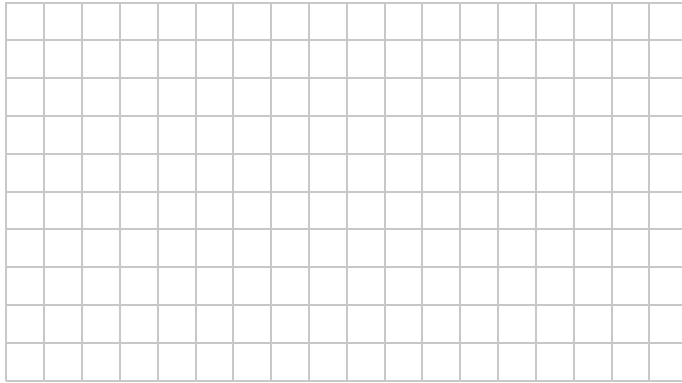**Question 7** (55 marks)
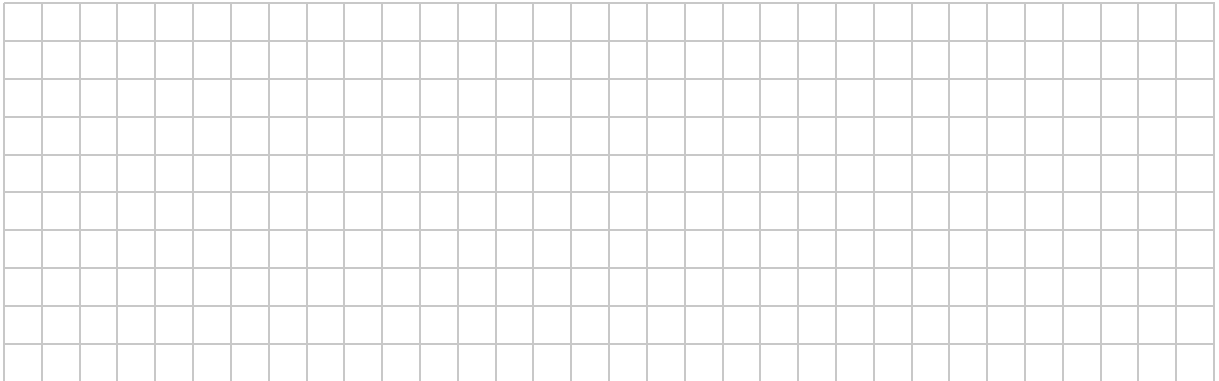
A glass Roof Lantern in the shape of a pyramid has a rectangular base *CDEF* and its apex is at *B* as shown. The vertical height of the pyramid is |*AB*|, where *A* is the point of intersection of the diagonals of the base as shown in the diagram.
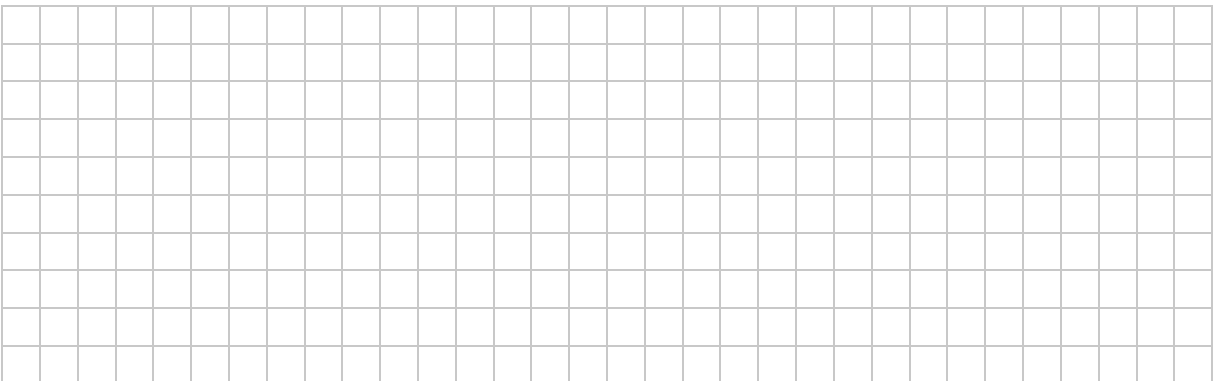Also |*CD*| = 2·5 m and |*CF*| = 3 m.

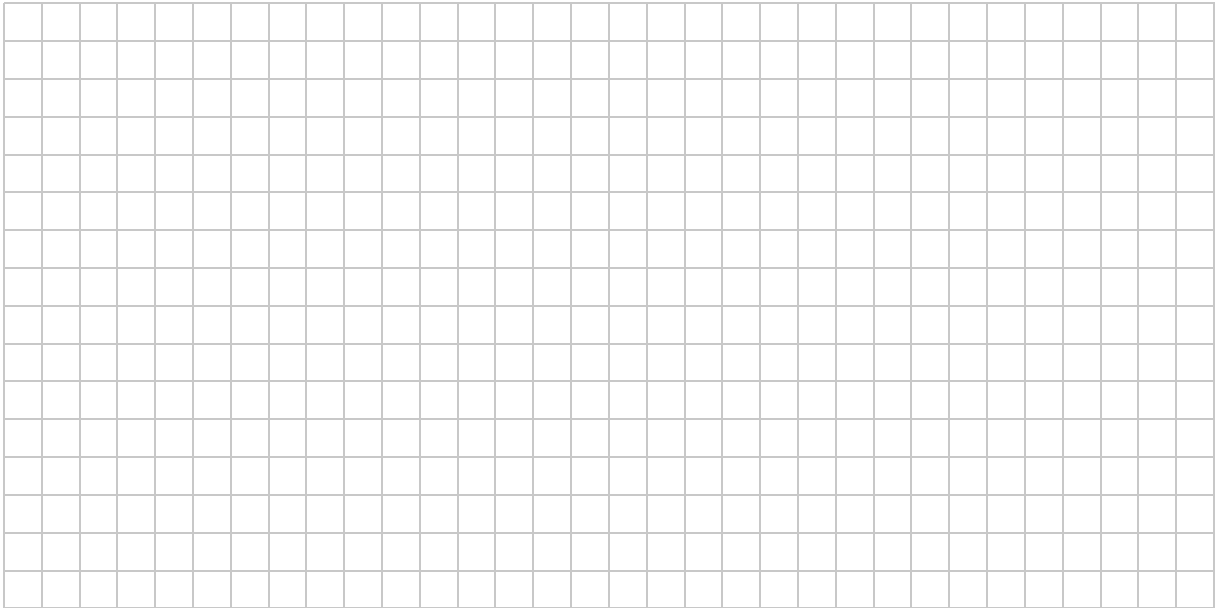**(a)** **(i)** Show that |*AC*| = 1·95 m, correct to two decimal places.

(ii) The angle of elevation of *B* from *C* is 50° (i.e. |∠*BCA*| = 50°).
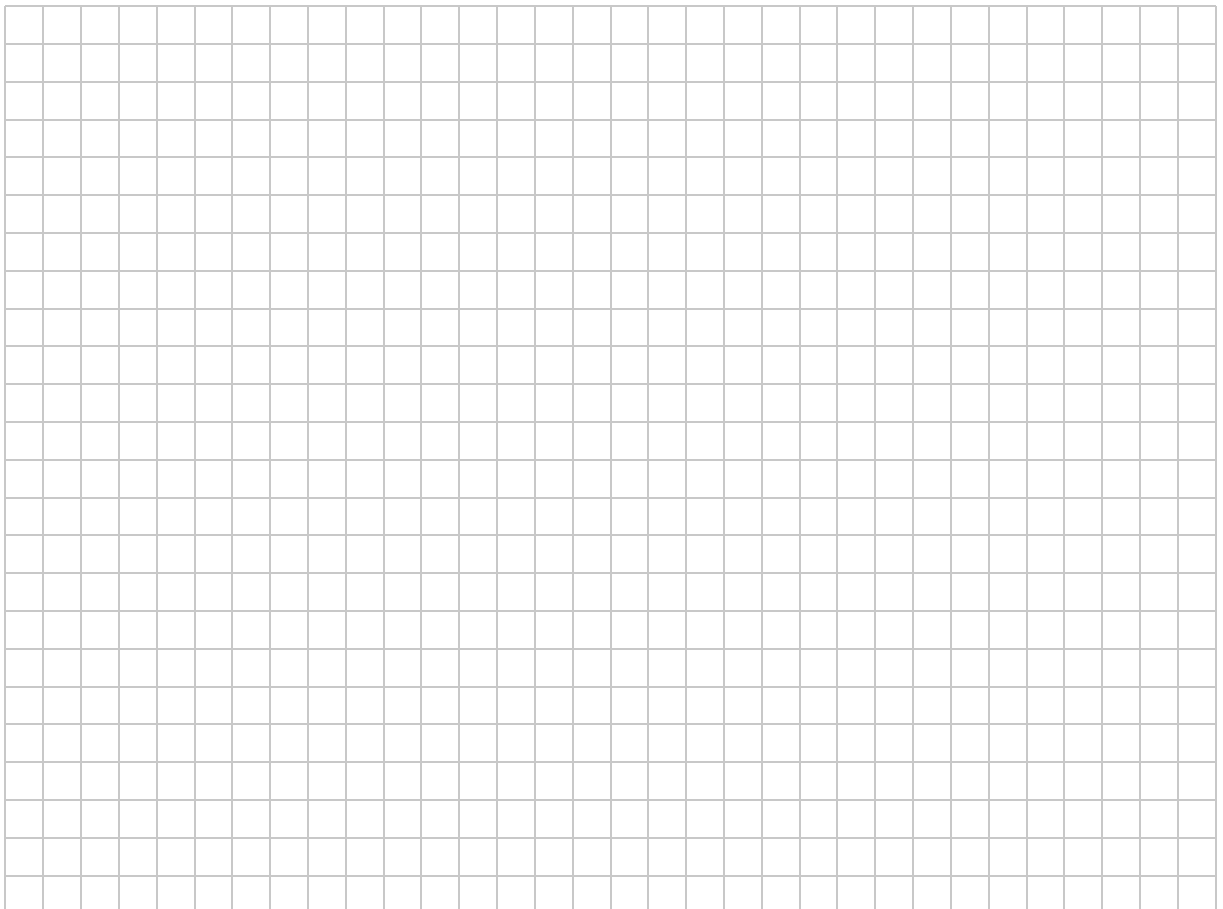Show that |*AB*| = 2·3 m, correct to one decimal place.

(iii) Find |*BC*|, correct to the nearest metre.

(iv) Find $|\angle BCD|$, correct to the nearest degree.

(v) Find the area of glass required to glaze all four triangular sides of the pyramid. Give your answer correct to the nearest m^2.

(b) Another Roof Lantern, in the shape of a pyramid, has a square base *CDEF*. The vertical height $|AB| = 3$ m, where *A* is the point of intersection of the diagonals of the base as shown.

The angle of elevation of *B* from *C* is 60°

(i.e. $|\angle BCA| = 60°$).

Find the length of the side of the square base of the lantern.

Give your answer in the form $\sqrt{a}$ m, where $a \in \mathbb{N}$.