4. In a harbour, the water level rises and falls with the tides with simple harmonic motion.

On a particular day, the depths of water in the harbour at low and high tide are 4 m and 10 m respectively.

Low tide occurs at 12:00 and high tide occurs at 18:20

(a) Find, in $m\,h^{-1}$, the speed at which the water level is rising on this particular day at 13:35

(6)

A ship can only safely enter the harbour when the depth of water is at least 8.5 m.

(b) Find the earliest time after 12:00 on this particular day at which it is safe for the ship to enter the harbour, giving your answer to the nearest minute.

(4)

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA
DO NOT WRITE IN THIS AREA

Question 4 continued

(Total for Question 4 is 10 marks)