

Question 9**(8 marks)**

The concentration, C , of a drug in the blood of a patient t hours after the initial dose can be modelled by the equation below.

$$C = 4e^{-0.05t} \text{ mg/L}$$

Patients requiring this drug are said to be in crisis if the concentration of the drug in their blood falls below 2.5 mg/L.

A patient is given a dose of the drug at 9 am.

- (a) What was the concentration in the patient's blood immediately following the initial dose? (1 mark)
- (b) What is the concentration of the drug in the patient's blood at 11.30 am? (2 marks)
- (c) Find the rate of change of C at 1 pm. (2 marks)

- (d) What is the latest time the patient can receive another dose of the drug if they are to avoid being in crisis? (3 marks)