N2019 A level Planning Question_Suggested Solutions

(a) <u>Procedure</u>

- 1. Using a 50 cm³ measuring cylinder, transfer 30 cm³ of $I_2(aq)$ into a 250 cm³ beaker. To the same beaker, add 30 cm³ of $H_2SO_4(aq)$ using another 50 cm³ measuring cylinder.
- 2. Measure 30 cm³ of CH₃COCH₃(aq) into a 50 cm³ measuring cylinder.
- 3. Add the CH₃COCH₃(aq) into the same 250 cm³ beaker in step 1. Start the stopwatch immediately. Stir the mixture using a glass rod to ensure even mixing.
- 4. Using a 10.0 cm³ pipette, transfer 10.0 cm³ of the reaction mixture into a 250 cm³ conical flask. At time 2 min, add 10 cm³ of NaHCO₃(aq), measured using a 10 cm³ measuring cylinder, into the 250 cm³ conical flask.
- Immediately titrate the iodine present in the conical flask against Na₂S₂O₃(aq) from a burette, until the solution turns pale yellow. Add 1 cm³ starch from a dropper and continue the titration until the blue-black solution in the conical flask turns colourless.
- 6. Repeat steps 4 and 5 at 6, 10, 14, 18, 22, 26 minutes.
- 7. Record the titration results in a suitable table.



The volume of $Na_2S_2O_3$ used for titrating a sample of quenched aliquot at time t is proportional to the concentration of I_2 present in the reaction mixture at time t.

Since the gradient of the graph is constant with a negative value, the rate of reaction is constant. Hence, the order of reaction with respect to iodine is zero since the reaction rate is independent of the concentration of iodine.