

**Question 30****(8 marks)**

Carbonyl chloride,  $\text{COCl}_2$ , is a colourless, poisonous gas that is used in the production of insecticides and a variety of plastics. It is produced through the exothermic reaction between carbon monoxide and chlorine gases. Carbonyl chloride is a liquid below  $8^\circ\text{C}$  at  $100.0\text{ kPa}$ .

The following equation is used to represent the reaction.



- (a) For this industrial process state the conditions that would optimise the: (2 marks)

rate of reaction \_\_\_\_\_

\_\_\_\_\_

yield \_\_\_\_\_

\_\_\_\_\_

- (b) State **one** compromise in conditions that might be required to produce carbonyl chloride,  $\text{COCl}_2$ , in an industrial process. Explain the effect of this condition on the rate and yield and justify why this compromise is required. (6 marks)

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