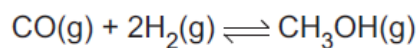


AS Level Chemistry A
H032/01 Breadth in chemistry

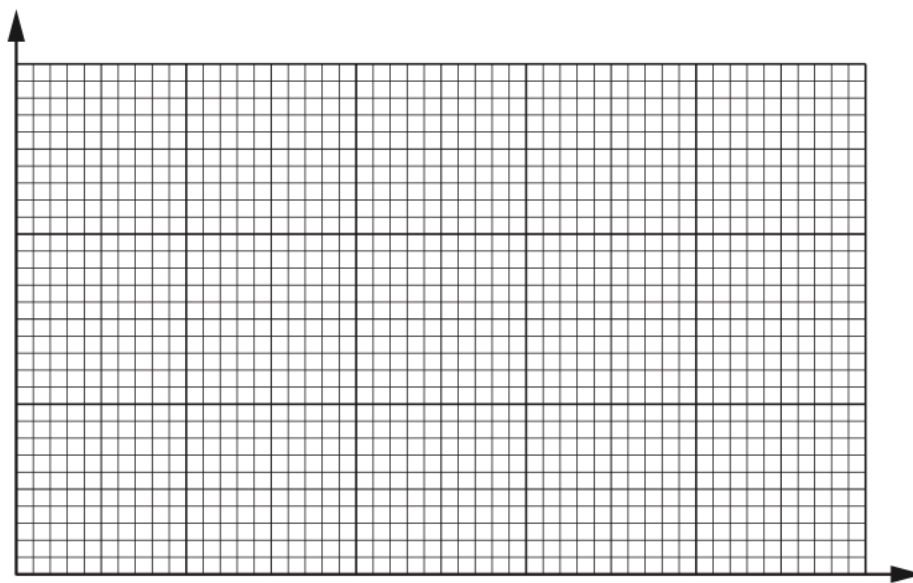
Question Set 10

1. Methanol can be prepared industrially by reacting carbon monoxide with hydrogen in the presence of a copper catalyst. This is a reversible reaction.



- (a) Using the Boltzmann distribution model, explain why the rate of a reaction increases in the presence of a catalyst.

You are provided with the axes below, which should be labelled.

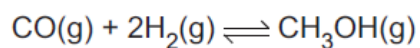


- (b) The reaction for the production of methanol in the presence of the copper catalyst is carried out at 200–300 °C. [4]

Explain why use of the catalyst reduces energy demand and benefits the environment.

[2]

(c) A chemist investigates the equilibrium that produces methanol:



The chemist mixes CO(g) with H₂(g) and leaves the mixture to react until equilibrium is reached.

The equilibrium mixture is analysed and found to contain the following concentrations.

Substance	Concentration /mol dm ⁻³
CO(g)	0.310
H ₂ (g)	0.240
CH ₃ OH(g)	0.260

Calculate the numerical value of K_c for this equilibrium.

Give your answer to an **appropriate** number of significant figures.

[2]

Total Marks for Question Set 10: 8

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