# Catalysts

## Q1. (2022) – 9b

| Question number | Indicative content | Mark |
|---|---|---|
| *9(b) | Answers will be credited according to candidate's deployment of knowledge and understanding of the material in relation to the qualities and skills outlined in the generic mark scheme.<br>The indicative content below is not prescriptive and candidates are not required to include all the material that is indicated as relevant.<br>Additional content included in the response must be scientific and relevant.<br><br>**AO1**<br>**DESCRIPTION**<br>• increases the rate of reaction<br>• does not alter products of reaction<br>• is chemically unchanged by reaction<br>• does not get used up<br>• so catalyst mass does not change<br><br>**FUNCTION**<br>• particles must have minimum energy for reactions to occur<br>• this is called activation energy<br>• reaction proceeds by an alternative route<br>• which reduces activation energy<br>• so a greater proportion of collisions are successful<br><br>**DIAGRAM**<br>• reaction profile with catalyst has start and end energies the same<br>• because reactants and products the same (label or in text)<br>• new profile has lower peak<br>• this represents lower activation energy (label or in text)<br><br>**EXAMPLES**<br>• Haber process to make ammonia uses iron catalyst<br>• cracking to make smaller alkanes uses catalyst<br>• (fermentation) to make alcoholic drinks uses (yeast which contains) an enzyme<br>• hydrogen peroxide decomposition uses catalysts<br>• used in catalytic converters<br>• use of enzymes as biological catalysts | **(6)**<br>**AO1** |