Chapter Summary Worksheet

Chapter 15
Mass spectra, infrared spectra and the greenhouse effect

Print out and complete this worksheet to generate a summary for Chapter 15.

1 Which would **not** produce a fragment at $m/e = 29$ in its mass spectrum?

- ☐ **A** $(CH_3)_2CHCHO$
- ☐ **B** $CH_2{=}CHCH(OH)CH_3$
- ☐ **C** $C_2H_5COCH_3$
- ☐ **D** $CH_2{=}C(OH)C_2H_5$

2 Which is **not** infrared active and so could **not** be a greenhouse gas?

- ☐ **A** sulfur dioxide, SO_2
- ☐ **B** hydrogen chloride, HCl
- ☐ **C** chlorine, Cl_2
- ☐ **D** hydrogen sulfide, H_2S

3 A substance has peaks in its mass spectrum at m/e values of 88, 45 and 29 and peaks in its infrared spectrum at 1715 cm^{-1} and 3010 cm^{-1}. The substance is

- ☐ **A** $CH_2OHCH{=}CHCH_2OH$
- ☐ **B** $CH_3CH_2CH_2COOH$
- ☐ **C** $(CH_3)_2CHCOOH$
- ☐ **D** $C_2H_5COCH_2OH$

4 Which gas has the greatest global warming potential (GWP)?

- ☐ **A** carbon dioxide, CO_2
- ☐ **B** methane, CH_4
- ☐ **C** nitrous oxide, N_2O
- ☐ **D** HCFC-22, $CHClF_2$

5 Which gas makes the greatest contribution to global warming?

- ☐ **A** HCFC-22, $CHClF_2$
- ☐ **B** carbon dioxide, CO_2
- ☐ **C** methane, CH_4
- ☐ **D** water vapour, H_2O

6 Which is a true statement?

- ☐ **A** A molecule must be polar to absorb infrared radiation.
- ☐ **B** The radiation emitted by the Sun is at a lower wavelength than that radiated by the Earth.
- ☐ **C** All vibrations of a carbon dioxide molecule are infrared active because the bonds are polar.
- ☐ **D** Ozone cannot be a greenhouse gas because it has linear molecules.

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