

2003 AP[®] CHEMISTRY FREE-RESPONSE QUESTIONS

Compound Name	Compound Formula	ΔH_{vap}° (kJ mol ⁻¹)
Propane	CH ₃ CH ₂ CH ₃	19.0
Propanone	CH ₃ COCH ₃	32.0
1-propanol	CH ₃ CH ₂ CH ₂ OH	47.3

8. Using the information in the table above, answer the following questions about organic compounds.

(a) For propanone,

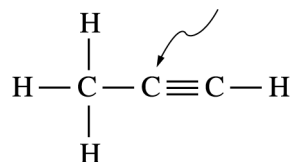
- (i) draw the complete structural formula (showing all atoms and bonds);
- (ii) predict the approximate carbon-to-carbon-to-carbon bond angle.

(b) For each pair of compounds below, explain why they do not have the same value for their standard heat of vaporization, ΔH_{vap}° . (You must include specific information about both compounds in each pair.)

- (i) Propane and propanone
- (ii) Propanone and 1-propanol

(c) Draw the complete structural formula for an isomer of the molecule you drew in part (a) (i).

(d) Given the structural formula for propyne below,



- (i) indicate the hybridization of the carbon atom indicated by the arrow in the structure above;
- (ii) indicate the total number of sigma (σ) bonds and the total number of pi (π) bonds in the molecule.

END OF EXAMINATION