CHAPTER 11 TOPICS

- WHAT DETERMINES THE PHASE OF COMPOUNDS?
- WHAT ARE THE INTER-MOLECULAR FORCES?
- PHASE CHANGES, PHASE DIAGRAMS
- VOLATILITY - VAPOR PRESSURE - B.P.
- HEATING CURVES
- VISCOSITY, SURFACE TENSION

TO ACCOMPANY AW BW 0955

$PV = nRT$ $\quad R = 0.08206 \frac{L \cdot ATM}{K \cdot MOL}$

$P_i = X_i P_T$

$q = SH \cdot MASS \cdot \Delta T$

$q = \Delta H \cdot moles$

MOLARITY [M] = moles solute / L sol'n

MOLALITY [m] = moles solute / kg solvent

RAOULT'S LAW $P_A = X_A P_A^\circ$

MOLAL $\Delta T_f = K_f \cdot m \cdot i$

$\Delta T_b = K_b \cdot m \cdot i$

HYDROCARBONS

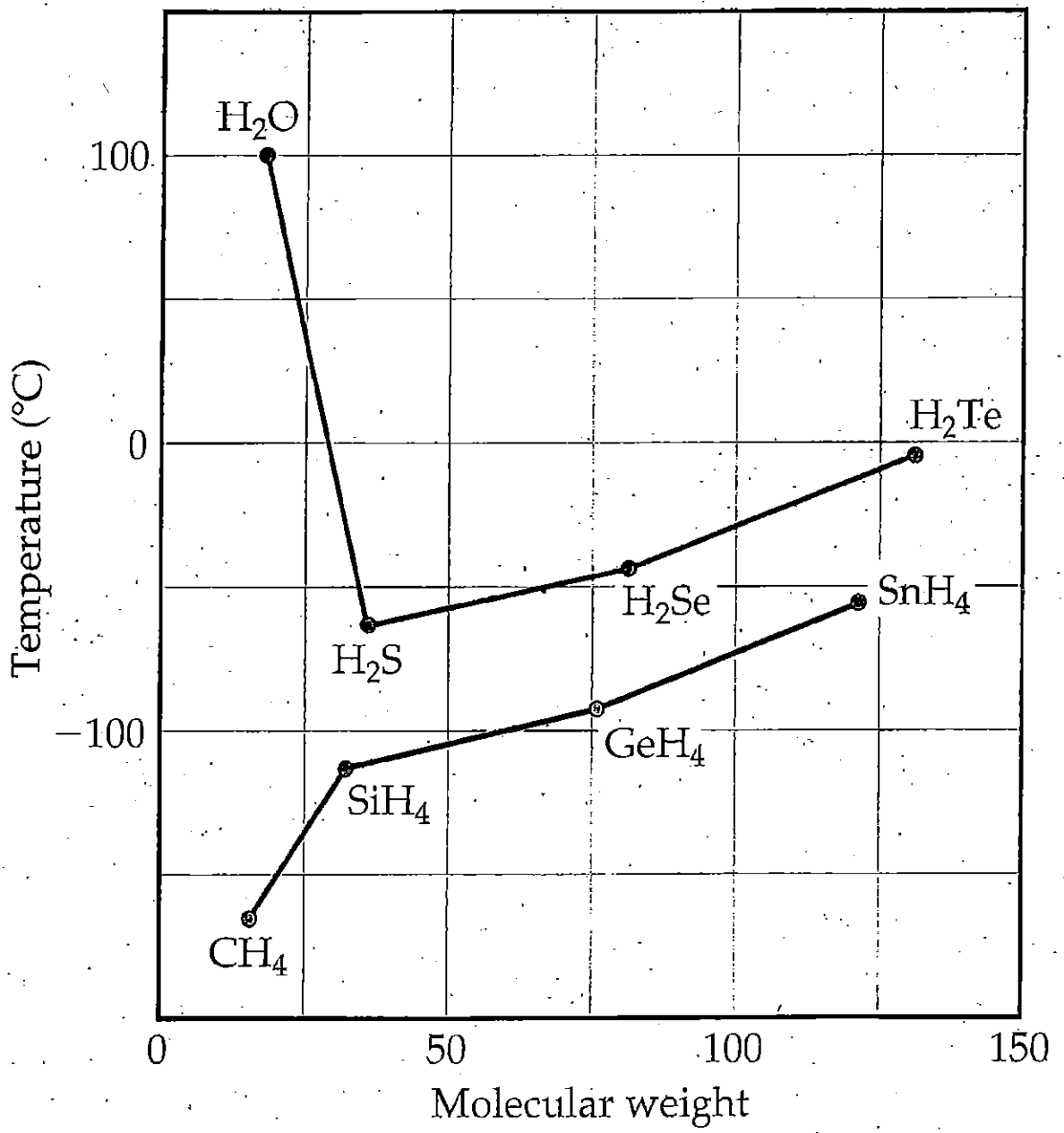
PROPANE	C_3H_8	GAS
OCTANE	C_8H_{18}	LIQUID
"WAX"	$C_{24}H_{50}$	SOLID

BP	VOLATILITY	VAPOR PRESSURE
LOW	HIGH	HIGH
HIGH	LOW	LOW

INTERMOLECULAR FORCES

LONDON DISPERSION	DIPOLE	H-BONDING	IONIC
$CH_3CH_2CH_3$	$CH_3\overset{\overset{O}{\|}}{C}-CH_3$	$CH_2(OH)-CH_2(OH)$	NaCl
GAS	VOLATILE LIQUID BP 56°C	NON-VOLATILE LIQUID BP ≈ 200°C	SOLID
PROPANE	ACETONE	ETHYLENE GLYCOL	TABLE SALT

Figure 11.7 Boiling Point as a Function of Molecular Weight



WHAT ARE THE RELATIONSHIPS BETWEEN:

- EVAPORATION
- BOILING
- VAPOR PRESSURE
- TEMPERATURE

T-135 **Figure 11.24 Vapor Pressure as a Function of Temperature**

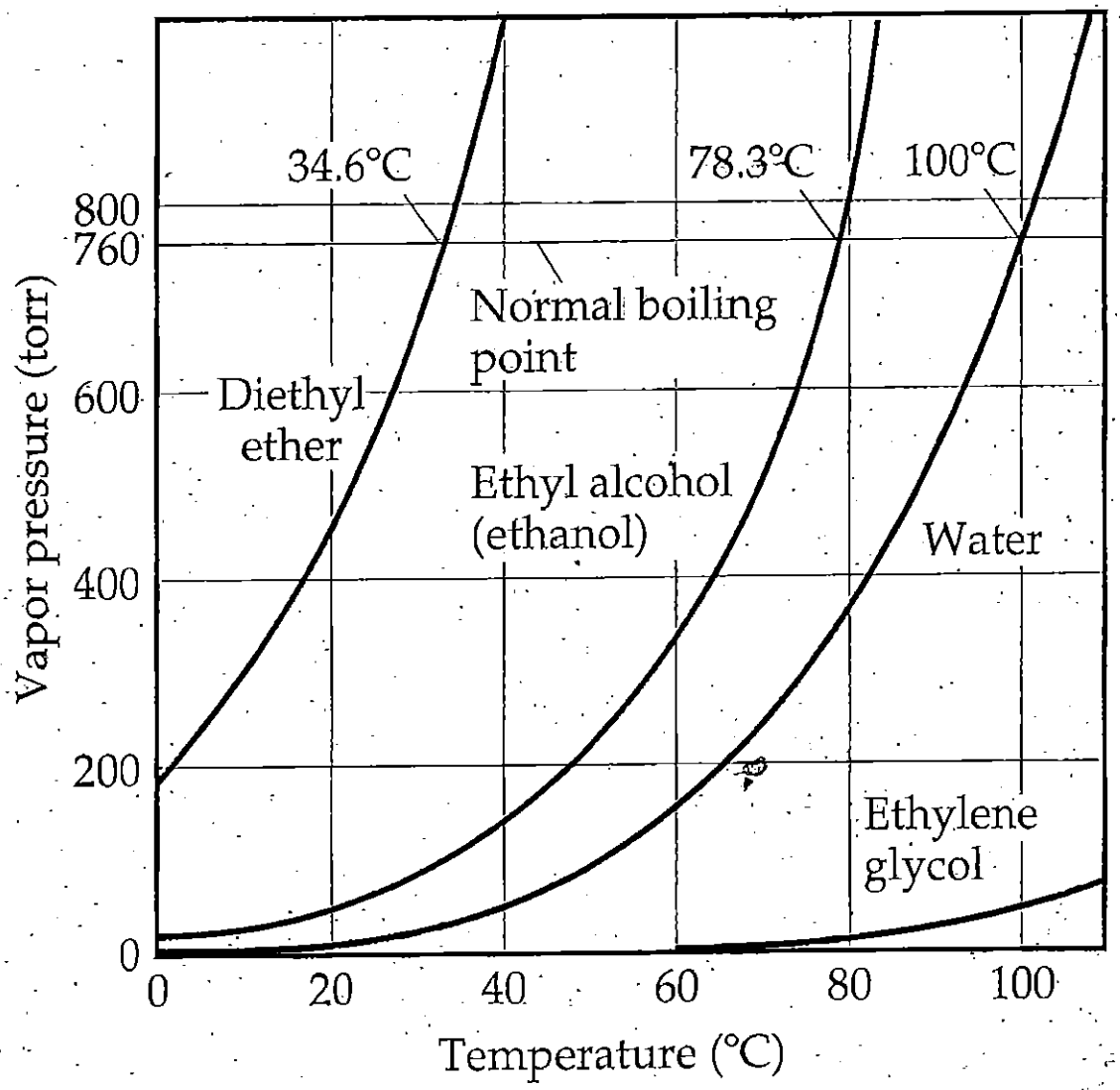


Figure 11.17 Phase Changes and Their Names

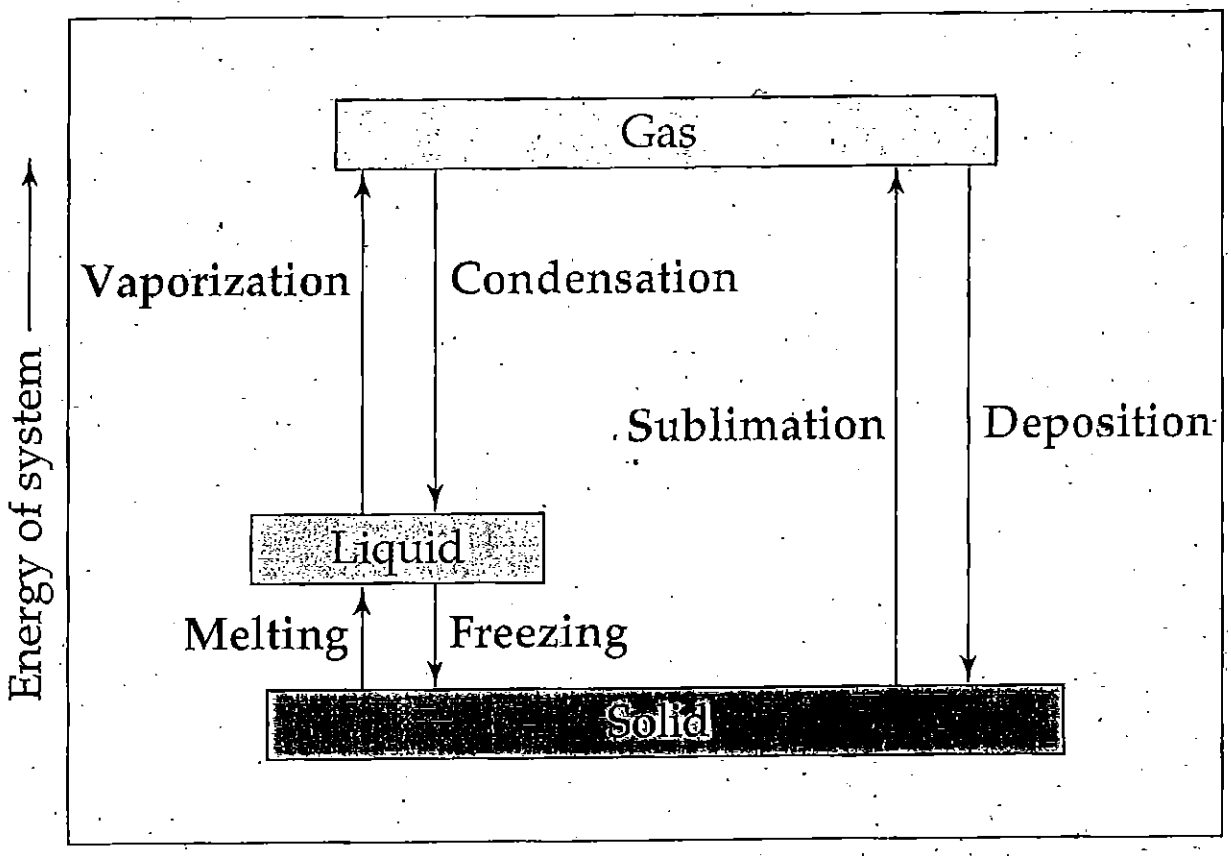


Figure 11.26 General Phase Diagram

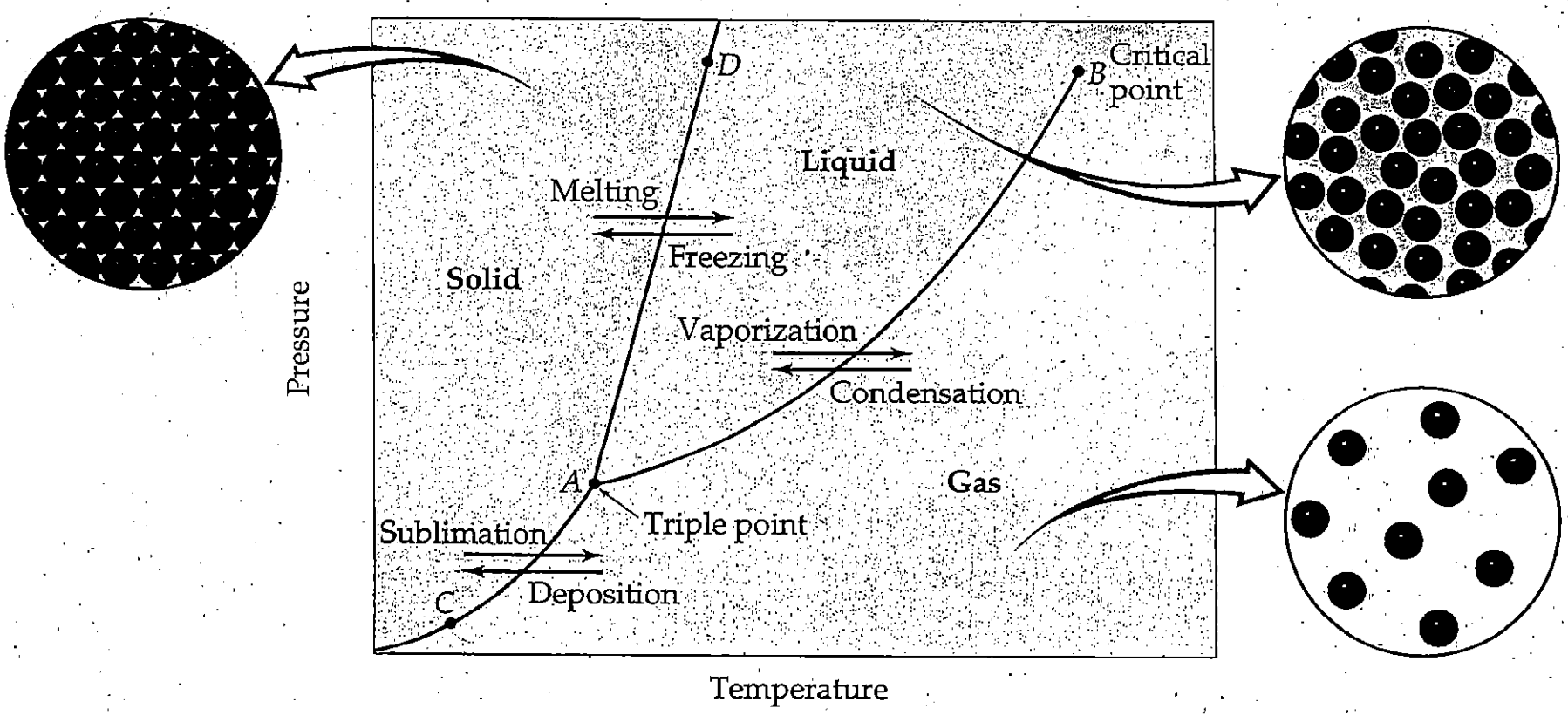


Figure 11.27 Phase Diagrams of H_2O and CO_2

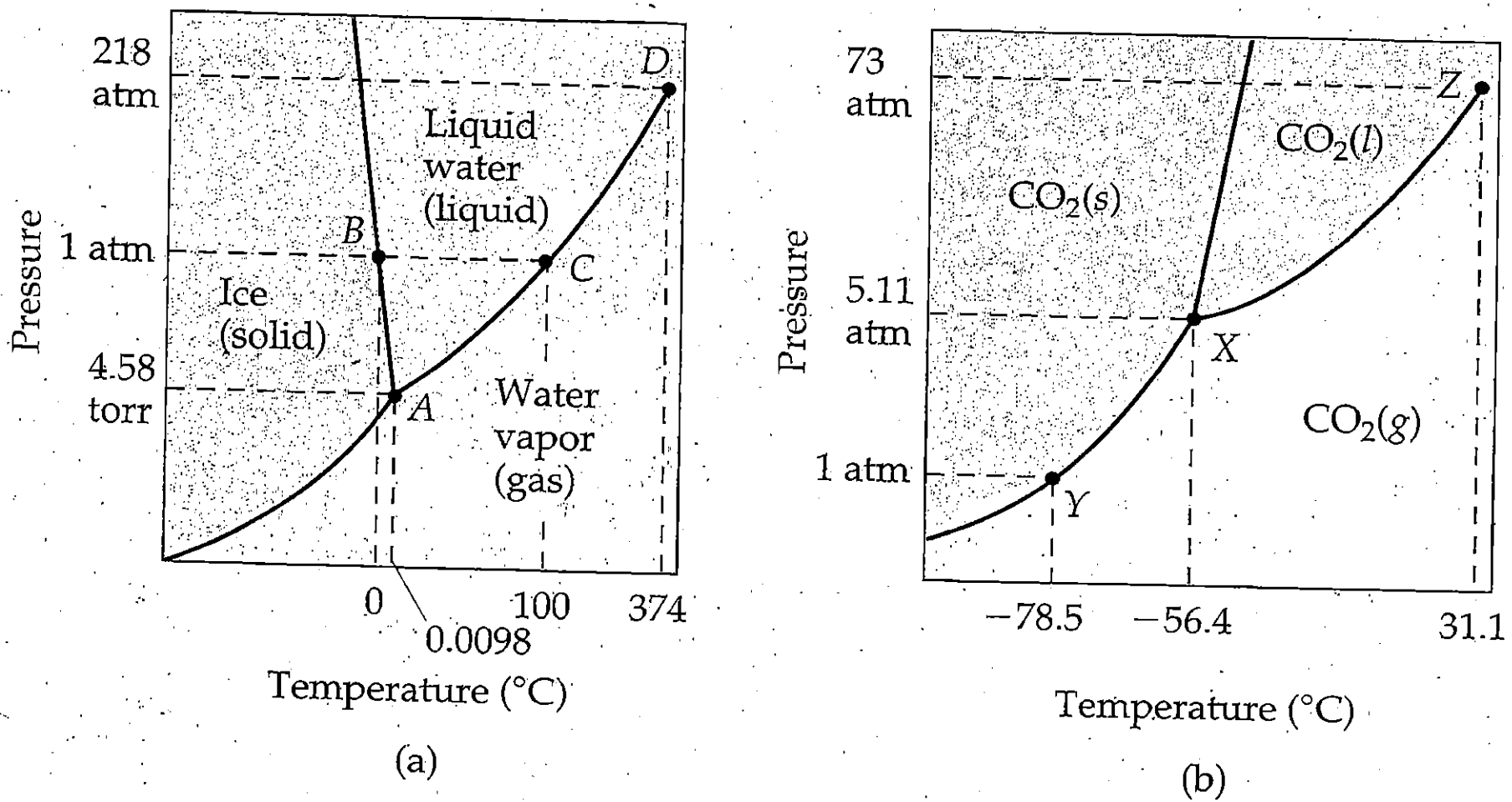


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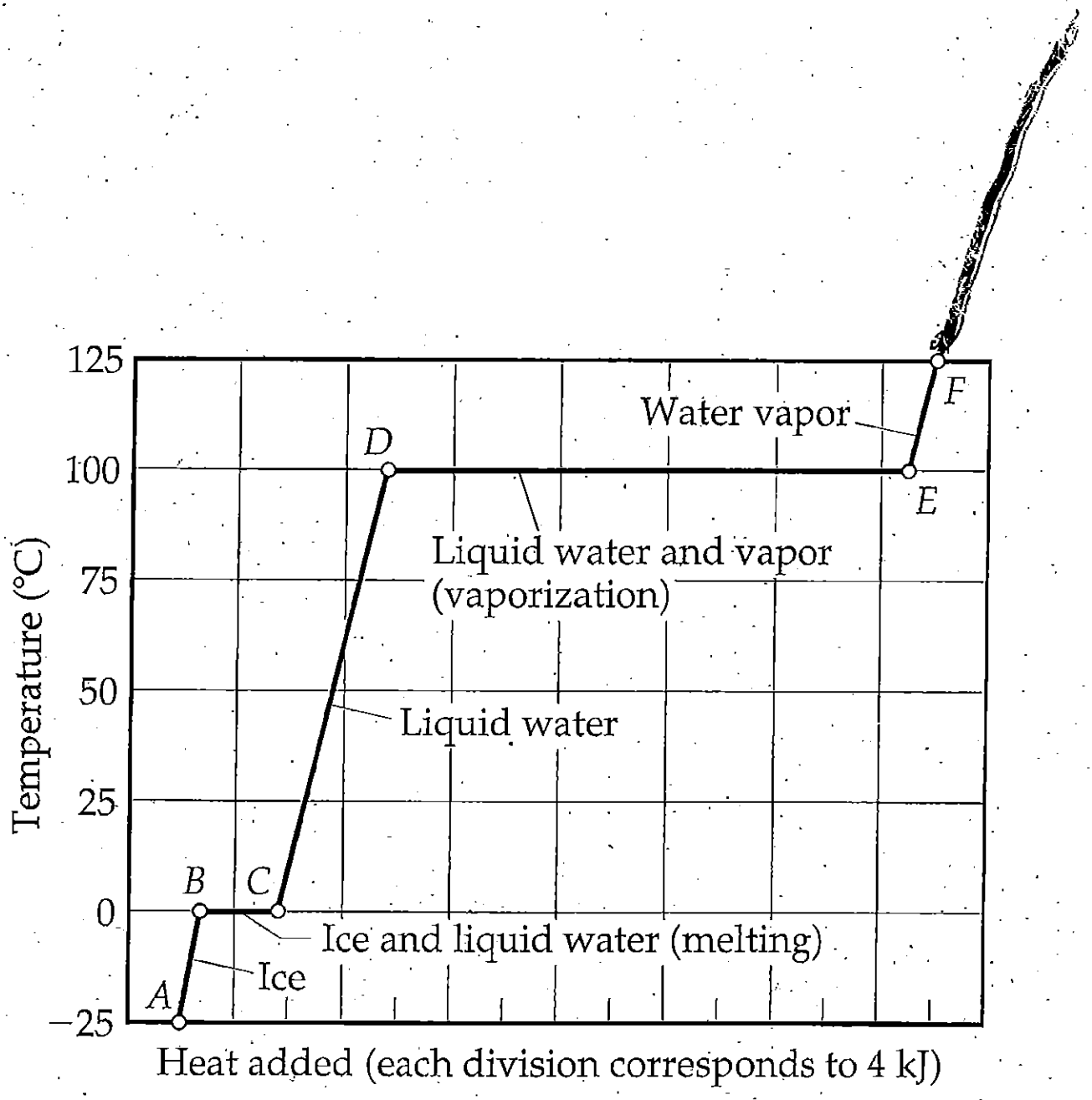
Figure 11.19 Heating Curve for Water



HEATING CURVE FOR WATER (1 mole)

$T_i = 25°C$

$T_f = 127°C$

HEAT REQ. FOR SEGMENT:

A → B

$Q = SH \cdot MASS \cdot \Delta T$

$= \left(2.03 \frac{J}{g \cdot K}\right) \cdot (18g) \cdot (273 - 248)$

$= \boxed{0.913\ KJ}$

B → C

$Q = \Delta H_{FUSION} \cdot mole$

$= \left(6.01 \frac{KJ}{mol}\right) \cdot (1\ mole) = \boxed{6.01\ KJ}$

C → D

$Q = SH \cdot MASS \cdot \Delta T$

$= \left(4.18 \frac{J}{g \cdot K}\right) \cdot (18g) \cdot (373 - 273) = 7,524\ J$

$\boxed{7.524\ KJ}$

D → E

$Q = \Delta H_{VAP} \cdot mole$

$= 40.67 \frac{KJ}{mol} \times 1\ Mole = \boxed{40.67\ KJ}$

E → F

$Q = SH \cdot MASS \cdot \Delta T$

$\left(1.84 \frac{J}{g \cdot K}\right) \cdot (18g) \cdot (400 - 373) = 894\ J$

$= \boxed{.894\ KJ}$

TOTAL Q = 56.0 ~~KJ~~