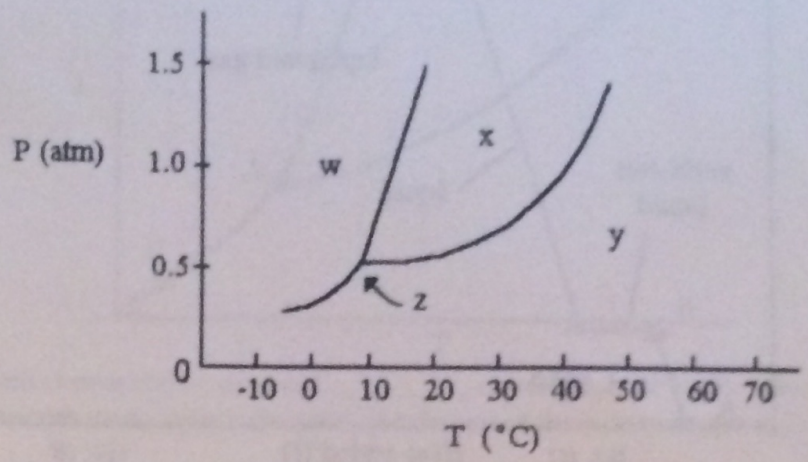
MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.



1) The phase diagram of a substance is given above. This substance is a _____ at -10 °C and 1.0 atm. 1) _____

A) supercritical fluid
B) liquid
C) gas
D) crystal
E) solid

TRUE/FALSE. Fill in A if the answer is TRUE and B is the answer is FALSE

2) The principal source of the difference in the normal boiling points of ICl (97 °C; molecular mass 162 amu) and Br_2 (59 °C; molecular mass 160 amu) is both dipole-dipole interactions and London dispersion forces. 2) _____

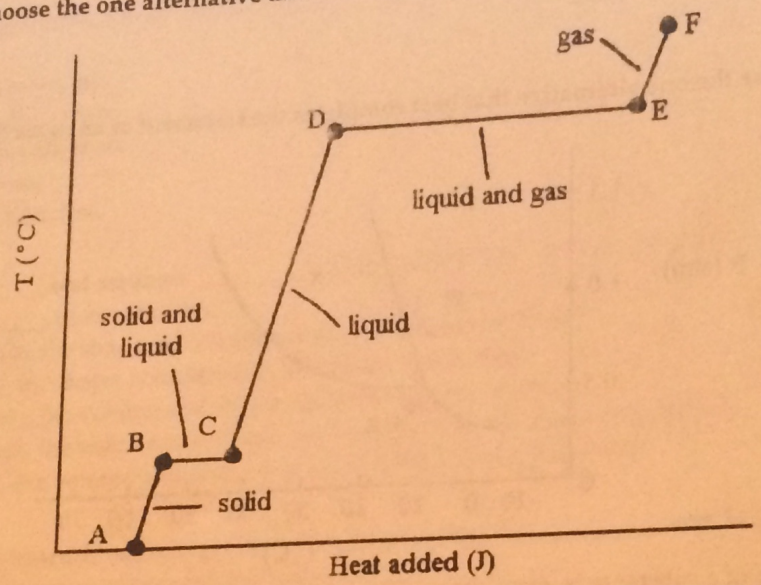
3) The boiling points of normal hydrocarbons are higher than those of branched hydrocarbons of similar molecular weight because the London-dispersion forces between normal hydrocarbons are greater than those between branched hydrocarbons. 3) _____

4) Heats of vaporization are greater than heats of fusion. 4) _____

5) Under ordinary conditions, a substance will sublime rather than melt if its triple point occurs at a pressure above atmospheric pressure. 5) _____

6) Molecules containing only single bonds do not exhibit liquid-crystal behavior because free rotation can occur around single bonds making these molecules flexible. 6) _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.



7) The heating curve shown was generated by measuring the heat flow and temperature for a solid as it was heated. The slope of the _____ segment corresponds to the heat capacity of the liquid of the substance. 7) _____

A) AB B) BC C) CD D) DE E) EF

8) The heating curve shown was generated by measuring the heat flow and temperature for a solid as it was heated. The slope of the _____ segment corresponds to the heat capacity of the solid. 8) _____

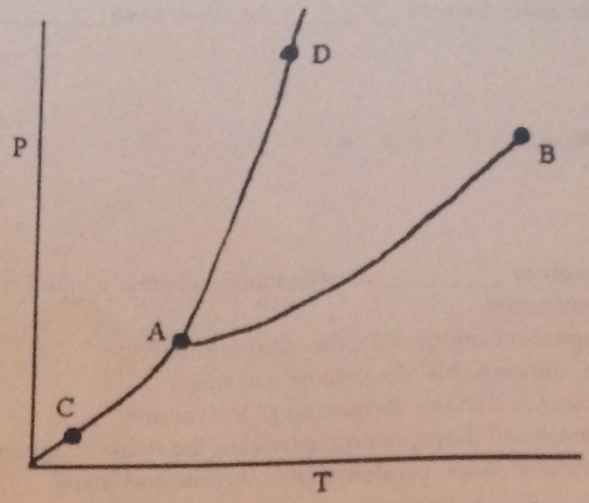
A) AB B) BC C) CD D) DE E) EF

9) The heating curve shown was generated by measuring the heat flow and temperature for a solid as it was heated. The slope of the _____ segment corresponds to the heat capacity of the gas. 9) _____

A) AB B) BC C) CD D) DE E) EF

10) The heating curve shown was generated by measuring the heat flow and temperature of a solid as it was heated. The heat flow into the sample in the segment _____ will yield the value of the ΔH_{fusion} of this substance. 10) _____

A) AB B) BC C) CD D) DE E) EF



11) On the phase diagram shown above, segment _____ corresponds to the conditions of temperature and pressure under which the solid and the gas of the substance are in equilibrium. 11) _____

A) CD B) AD C) AC D) AB E) BC

12) On the phase diagram shown above, the coordinates of point _____ correspond to the critical temperature and pressure. 12) _____

A) A B) B C) C D) D E) E

13) On the phase diagram shown above, the coordinates of point _____ correspond to the triple point. 13) _____

A) A B) B C) C D) D E) E

14) A _____ liquid crystal has the least order and is the most liquid-like. 14) _____

A) smectic C
B) nematic
C) smectic
D) smectic B
E) cholesteric

15) Crystalline solids _____. 15) _____

A) exist only at high temperatures
B) have highly ordered structures
C) exist only at very low temperatures
D) have their particles arranged randomly
E) are usually very soft

16) In liquids, the attractive intermolecular forces are _____. 16) _____

A) strong enough to hold molecules relatively close together
B) strong enough to hold molecules relatively close together but not strong enough to keep molecules from moving past each other
C) strong enough to keep the molecules confined to vibrating about their fixed lattice points
D) not strong enough to keep molecules from moving past each other
E) very weak compared with kinetic energies of the molecules

17) As a solid element melts, the atoms become _____ and they have _____ attraction for one another. 17) _____

A) more separated, less
B) closer together, more
C) more separated, more
D) larger, greater
E) closer together, less

18) A gas is _____ and assumes _____ of its container whereas a liquid is _____ and assumes _____ of its container. 18) _____

A) compressible, the shape, not compressible, the volume and shape
B) condensed, the shape, compressible, the volume and shape
C) compressible, the volume and shape, compressible, the volume
D) compressible, the volume and shape, not compressible, the shape of a portion
E) condensed, the volume and shape, condensed, the volume and shape

19) The strongest interparticle attractions exist between particles of a _____ and the weakest interparticle attractions exist between particles of a _____. 19) _____

A) solid, liquid
B) solid, gas
C) gas, solid
D) liquid, solid
E) liquid, gas

20) Together, liquids and solids constitute _____ phases of matter. 20) _____

A) the condensed
B) all of the
C) the fluid
D) the disordered
E) the compressible