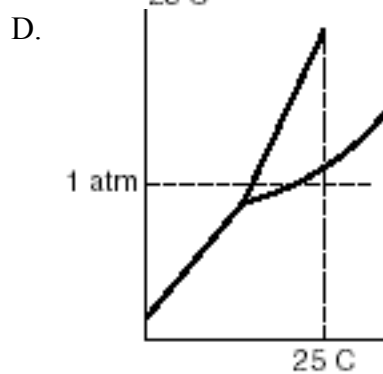
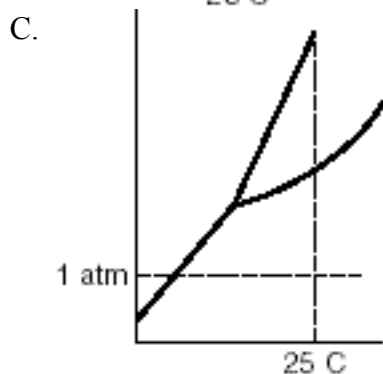
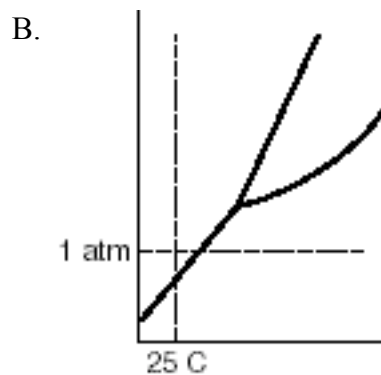
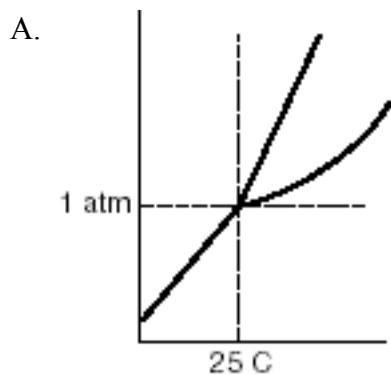


6. For a compound to exhibit dipole-dipole interactions it must
- be an ion.
 - have a hydrogen bound to an oxygen, nitrogen, or fluorine.
 - have a temporary dipole moment.
 - have a permanent dipole moment.
 - be polarizable.
7. Which of the following substances is a solid at 25°C and 1 atm?



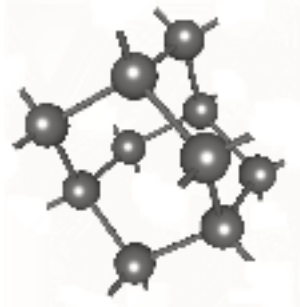
- E. None of these.
8. The vapor pressure of an aqueous solution is found to be 24.9 mm Hg at 25°C. What is the composition of the solution (in terms of mole fraction of solute)? The vapor pressure of water is 25.756 mm Hg at 25°C.
- 1.03
 - 0.0332
 - 0.967
 - 0.0344
 - 0.0522
9. Indicate which of the following pairs of compounds is likely to be miscible.
- Br₂ and HI
 - H₂O and CH₃CH₂CH₂CH₂CH₂CH₂CH₂CH₃
 - CCl₄ and Br₂
 - HF and CCl₄
 - none of these pairs

10. Which of the following properties indicates the presence of weak intermolecular forces in a liquid?
- A. a high boiling point
B. a high vapor pressure
C. a high heat of vaporization
D. a high critical temperature
E. None of these
11. Which of the following liquids would have the highest viscosity at 25°C?
- A. HOCH₂CH₂OH
B. CH₃OCH₃
C. C₂H₅OH
D. CH₂Cl₂
E. CH₃Br
12. The evaporation rate of a solvent _____ as solute is added.
- A. varies in different ways for different solvents.
B. decreases
C. fluctuates
D. remains the same
E. increases
13. Platinum has a face-centered cubic crystal structure and a density of 21.5 g/cm³. What is the radius of the platinum atom?
- A. 69 pm
B. 139 pm
C. 196 pm
D. 277 pm
E. 98 pm
14. MgO has the same crystal structure as NaCl, face-centered cubic. How many oxide ions surround each Mg²⁺ ion as nearest neighbors?
- A. 12
B. 10
C. 4
D. 6
E. 8
15. The number of atoms in a face-centered cubic (fcc) unit cell is
- A. 1
B. 8
C. 2
D. 4
E. 3
16. In the solid state structure of sodium chloride, the closest distance between the centers of ions is observed
- A. between adjacent sodium and chloride ions.
B. between adjacent chloride ions.
C. between adjacent sodium ions.
D. in no predictable fashion.
17. Substitution of one metal for another in a silicate
- A. can occur only if the metals are not ionized.
B. can occur only if the metals have the same mass number.
C. can occur if the charge is the same and ionic radii are similar.
D. cannot occur.
E. can occur only if the metals are +1 ions.

18. Different structural and molecular forms of the elements are called

- A. polymorphs
- B. allotropes
- C. animorphs
- D. types
- E. isotopes

19. A cartoon of the structure of diamond is given below. The dangling bonds are connected to other carbon atoms. The hybridization of atomic orbitals in diamond is



- A. sp^3d .
- B. none, since it is the element.
- C. sp^3 .
- D. sp .
- E. sp^2 .

20. Which one of the following substances crystallizes as a molecular solid?

- A. SiO_2
- B. Sn
- C. CH_3OH
- D. $Al_2(SO_4)_3$
- E. KI

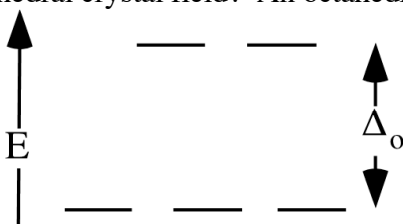
21. Amorphous solids do not give good X-ray diffraction patterns because these solids

- A. flow like a very viscous liquid.
- B. cooled too quickly
- C. exhibit long range disorder within the solid.
- D. exhibit short range order within the solid.
- E. exhibit long range order within the solid.

22. The silicates found in clays and mica are composed of

- A. double chains of SiO_4 tetrahedra with 2 shared O and two O with a single bond.
- B. networked SiO_4 tetrahedra with 4 shared O and no O with a single bond.
- C. single chains of SiO_4 tetrahedra with 2 shared O and one O with a single bond.
- D. sheets of SiO_4 tetrahedra with 3 shared O and one O with a single bond.
- E. isolated SiO_4 tetrahedra with 0 shared O and four O with a single bond.

23. The d-orbitals of the chromium(III) ion lose their degeneracy in the octahedral hole of beryl due to
- conversion of the d atomic orbitals into d *hybrid* orbitals that are no longer degenerate but capable of forming covalent bonds with the beryl lattice.
 - electrostatic repulsions within the octahedral hole.
 - reduction by the beryl mineral, since it acts as a reducing agent.
 - further ionization by the beryl mineral, since it acts as an oxidizing agent.
 - none of the above.
24. Band theory can be used to explain the electrical conductivity of metals and the lack of electrical conductivity of insulating materials. What is the difference between the band structure of conductors and insulators?
- The energy gap between the conduction band (higher energy) and the valence band is medium sized in a conductor while it is small in an insulator.
 - The energy gap between the conduction band (higher energy) and the valence band is small or zero in a conductor while it is large in an insulator.
 - The valence band in an insulator is so stretchy that the electrons cannot escape to conduct electricity.
 - The energy gap between the conduction band (higher energy) and the valence band is large in a conductor while it is very small in an insulator.
 - Insulators do not have enough electrons to fill the conduction band.
25. Which of the following metal ions would have the possibility of both high spin and low spin configurations in an octahedral crystal field? An octahedral field energy diagram is below.



- A. V(II) B. Cu(II) C. Zn(II) D. Ti(II) E. Co(II)

Answer Key for Test "Chem_105_Exam_5_S07_A.mtp", 5/8/07

No. in Q-Bank	No. on Test	Correct Answer
9 40	1	E
9 4	2	C
9 115	3	B
9 114	4	E
9 36	5	D
9 33	6	D
9 100	7	B
9 88	8	B
9 72	9	C
9 117	10	B
9 116	11	A
9 84	12	B
10 115	13	B
10 116	14	D
10 114	15	D
10 1	16	A
10 48	17	C
10 119	18	B
10 58	19	C
10 118	20	C
10 117	21	C
10 120	22	D
10 79	23	B
10 121	24	B
10 92	25	E