

This print-out should have 27 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering. The due time is Central time.

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**Mlib 76 1079**

15:02, general, multiple choice, > 1 min, fixed.

**001**

Which state of matter is characterized by having molecules close together and confined in their movement?

1. solid
2. gas
3. liquid
4. All of these

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**Mlib 76 1087**

15:02, general, multiple choice, > 1 min, fixed.

**002**

Matter is more likely to exist in what state as the temperature is lowered and/or the pressure is increased?

1. solid
2. liquid
3. gas
4. elemental

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**Mlib 76 1091**

15:02, general, multiple choice, > 1 min, fixed.

**003**

The degree of order of matter is directly proportional to the cohesive forces that hold the matter together. In other words, the more organized the state of matter, the stronger is the glue that holds it together. Which one of the following ranks these cohesive forces from the state with the strongest to that with the weakest cohesive forces?

1. solid > liquid > gas
2. gas > liquid > solid
3. liquid > solid > gas
4. solid = gas = liquid

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**Msci 13 0101**

15:02, general, multiple choice, > 1 min, fixed.

**004**

The density of liquids has what relationship to the density of gases?

1. greater than
2. less than
3. equal to
4. None of these

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**Mlib 04 3055**

15:16, general, multiple choice, > 1 min, fixed.

**005**

Which one of the following statements is NOT applicable to molecular solids?

1. Molecular solids have relatively low melting points.
2. Molecular solids are usually excellent conductors of electric current.
3. Molecular solids are soft compared to covalent solids.

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**Msci 13 1620**

15:15, general, multiple choice, > 1 min, fixed.

**006**

If you melt an ionic solid, it conducts electricity because

1. only electrons are free to move.
2. positive ions move.
3. negative ions move.

4. positive ions move in one direction and negative ions in the opposite direction.

5. positive and negative ions move together.

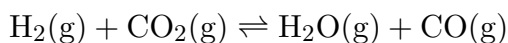
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**Mlib 06 0003**

22:15, general, multiple choice, > 1 min, fixed.

**007**

For the system



at equilibrium, the addition of  $\text{H}_2(\text{g})$  would cause (according to LeChatelier's principle)

1. only more  $\text{H}_2\text{O}(\text{g})$  to form.
2. only more  $\text{CO}(\text{g})$  to form.
3. more  $\text{H}_2\text{O}(\text{g})$  and  $\text{CO}(\text{g})$  to form.
4. only more  $\text{CO}_2(\text{g})$  to form.
5. no change in amounts of products or reactants.

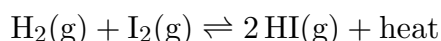
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**Msci 17 0008**

22:15, general, multiple choice, > 1 min, fixed.

**008**

Consider the following system at equilibrium.



Which response includes all the following that will shift the equilibrium to the left, and no others?

- I) increasing the temperature
- II) decreasing the temperature
- III) increasing the pressure
- IV) decreasing the pressure
- V) removing some HI
- VI) adding some HI
- VII) removing some  $\text{I}_2$
- VIII) adding some  $\text{I}_2$

1. I, VI, and VII only

2. II only

3. II, V, and VIII only

4. I, III, V, and VII only

5. II, IV, VII, and VIII only

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**Msci 17 0631**

22:15, general, multiple choice, > 1 min, fixed.

**009**

Which of the following equilibria is unaffected by a pressure change?

1.  $2 \text{NaCl}(\text{s}) \rightleftharpoons 2 \text{Na}(\text{s}) + \text{Cl}_2(\text{g})$
2.  $\text{H}_2(\text{g}) + \text{I}_2(\text{g}) \rightleftharpoons 2 \text{HI}(\text{g})$
3.  $2 \text{NO}_2(\text{g}) \rightleftharpoons \text{N}_2\text{O}_4(\text{g})$
4.  $\text{O}_2(\text{g}) \rightleftharpoons 2 \text{O}(\text{g})$

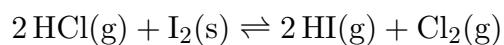
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**Concen Anal 09 76c**

22:15, general, multiple choice, < 1 min, fixed.

**010**

What happens to the concentration of  $\text{HI}(\text{g})$  when the total pressure on the equilibrium reaction



is increased (by compression)?

1. decreases
2. remains the same
3. Unable to determine
4. increases

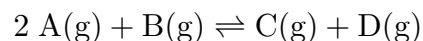
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**Sparks equil 001**

22:15, general, multiple choice, > 1 min, fixed.

**011**

Consider the reaction



$$\Delta H = -52 \text{ kJ/mol}$$

at equilibrium. Which way would the equilibrium shift if

a) the volume of the container were decreased?

1. right
2. left
3. no shift

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**012**

b) some B were added to the container?

1. right
2. left
3. no shift

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**013**

c) some D were removed from the container?

1. right
2. left
3. no shift

---

**014**

d) the temperature were increased?

1. right
2. left
3. no shift

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**Mlib 04 3019**

15:01, general, multiple choice, > 1 min, fixed.

**015**

Sublimation describes which of the following instances?

1. gas  $\rightarrow$  solid
2. solid  $\rightarrow$  gas

3. liquid  $\rightarrow$  gas

4. solid  $\rightarrow$  liquid

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**Mlib 76 0129**

15:01, general, multiple choice, > 1 min, fixed.

**016**

The process by which a gas is converted to a liquid is called

1. condensation.
2. ionization.
3. sublimation.
4. vaporization.

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**Mlib 04 2053**

15:50, general, multiple choice, > 1 min, fixed.

**017**

The temperature at which the vapor pressure of a liquid equals the atmospheric pressure is called the

1. boiling point.
2. freezing point.
3. condensation point.
4. melting point.

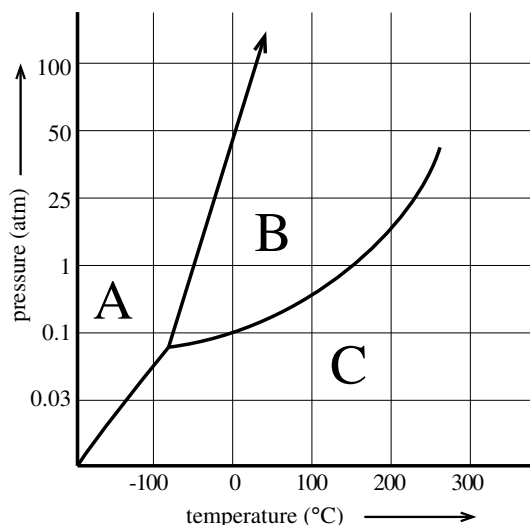
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**Phase diag3b**

15:10, general, multiple choice, < 1 min, fixed.

**018**

Refer to the following phase diagram for the next 2 questions.



What is the normal boiling point of this substance?

1. 150°C
2. 100°C
3. 260°C
4. 230°C
5. 200°C
6. 0°C

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**019**

The zone labeled "C" is which of the following?

1. solid
2. liquid
3. gas
4. solution
5. plasma

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**020**

What is the critical pressure for this substance?

1. 0.08 atm

2. 50 atm
3. 44 atm
4. 1 atm
5. 25 atm
6. > 100 atm

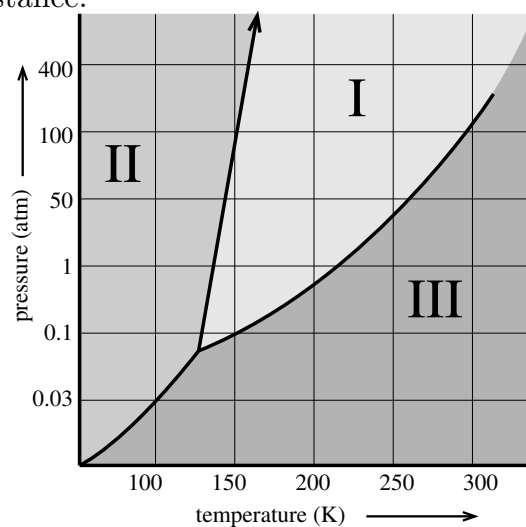
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**Phase diag**

15:10, general, multiple choice, > 1 min, fixed.

**021**

The following is the phase diagram for a given substance.



What is the normal melting point of this substance?

1. 136 K
2. 292 K
3. 216 K
4. 107 K
5. 315 K

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**022**

In the previous phase diagram, the three zones that are depicted as I, II, and III are which of the following?

1. I-solid; II-liquid; III-gas
2. I-liquid; II-gas; III-solid
3. I-liquid; II-solid; III-gas
4. I-gas; II-solid; III-plasma
5. I-vapor; II-solution; III-blend

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**023**

Referring to the same phase diagram, the substance is heated from 100 K to 300 K at a pressure of 50 atm. Which of the following happens to the substance?

1. sublimation
2. vaporization
3. fusion
4. deposition
5. solidification
6. condensation
7. condensation and vaporization
8. fusion and sublimation
9. melting and vaporization
10. sublimation and vaporization

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**Mlib 50 5005**

15:03, general, multiple choice, > 1 min, fixed.

**024**

Which of the following are forces between molecules?

1. intermolecular forces
2. intramolecular forces
3. armed forces

4. super-natural forces

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**Mlib 65 7075**

15:03, general, multiple choice, > 1 min, fixed.

**025**

In which of the compounds

- I)  $\text{NH}_3$
- II)  $\text{HF}$
- III)  $\text{CH}_4$

would you expect to exhibit significant hydrogen bonding?

1. I and II only
2. I and III only
3. III only
4. I, II and III

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**Mlib 72 0086**

15:03, general, multiple choice, > 1 min, fixed.

**026**

Which of the following forces is responsible for the intermolecular attraction in liquid nitrogen ( $\text{N}_2$ )?

1. ionic
2. dipole-dipole
3. dispersion or van der Waals forces
4. hydrogen bonding

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**Mlib 04 0015**

15:03, general, multiple choice, > 1 min, fixed.

**027**

Which is the weakest type of attractive force between particles?

1. ionic bond
2. hydrogen bond
3. covalent bond
4. dispersion forces