

This print-out should have 11 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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**ChemPrin3e 01 01**

08:01, general, multiple choice, < 1 min, wording-variable.

**001**

What is the correct order of increasing energy?

1. microwaves, visible light, ultraviolet light, x-rays,  $\gamma$ -rays
2. microwaves, ultraviolet light, visible light, x-rays,  $\gamma$ -rays
3. x-rays,  $\gamma$ -rays, microwaves, visible light, ultraviolet light
4. microwaves, x-rays,  $\gamma$ -rays, visible light, ultraviolet light
5. ultraviolet light, visible light, microwaves, x-rays,  $\gamma$ -rays

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**ChemPrin3e 01 02**

08:01, general, multiple choice, < 1 min, wording-variable.

**002**

What is the correct order of increasing frequency?

1. radio waves, infrared radiation, visible light, ultraviolet radiation
2. radio waves, infrared radiation, ultraviolet radiation, visible light
3. infrared radiation, radio waves, visible light, ultraviolet radiation
4. radio waves, visible light, ultraviolet radiation, infrared radiation
5. ultraviolet radiation, visible light, infrared radiation, radio waves

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**ChemPrin3e 01 04**

08:01, general, multiple choice, < 1 min, normal.

**003**

Light with a frequency of  $7.1 \times 10^{14}$  Hz lies in the violet region of the visible spectrum. What is the wavelength of this frequency of light? Answer in units of nm.

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**004**

When an electron beam strikes a block of copper, x-rays of frequency  $2 \times 10^{18}$  Hz are emitted. What is the wavelength of these x-rays? Answer in units of pm.

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**Msci 05 0905 alt**

08:02, general, multiple choice, < 1 min, fixed.

**005**

The lower the energy of electromagnetic radiation, the

1. shorter its wavelength.
2. longer its wavelength.
3. greater its mass.
4. higher its frequency.
5. higher the velocity of light.

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**Mlib 76 0073**

08:04, general, multiple choice, > 1 min, fixed.

**006**

The lines in an atomic line emission spectrum are due to

1. the movement of electrons from higher energy states to lower energy states in atoms.
  2. nuclear transitions in atoms.
  3. the movement of electrons from lower energy states to higher energy states in atoms.
  4. the presence of isotopes.
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**Msci 05 1003**

08:04, general, multiple choice, &gt; 1 min, fixed.

**007**

Which light packs the highest energy per photon?

1. red
2. green
3. blue
4. infrared
5. ultraviolet

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**Mlib 61 5076**

08:01, general, multiple choice, &gt; 1 min, fixed.

**008**

Frequency is measured in Hertz and has the units

1.  $\text{sec}^{-1}$ .
2. meters.
3. Joules · sec.
4. meter/sec.

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**Msci 05 1111**

08:04, general, multiple choice, &gt; 1 min, fixed.

**009**

Consider the statements

- Z1) When an electron falls to a lower energy level in an atom it emits electromagnetic radiation.
- Z2) The energy of electromagnetic radiation is directly proportional to its frequency.
- Z3) The product of wavelength and the speed of light is frequency.

Which response includes all statements that are true, and no others?

1. Z1 only
2. Z1 and Z3 only

3. Z2 and Z3 only

4. Z2 only

5. Z1, Z2 and Z3

6. Z1 and Z2 only

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**Mlib 02 3055**

08:08, general, multiple choice, &gt; 1 min, fixed.

**010**The shape of a  $d$  orbital is thought to resemble

1. a sphere.
2. a dumbbell.
3. a cloverleaf.
4. Too complex to describe.

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**Mlib 02 3001**

08:08, general, multiple choice, &gt; 1 min, fixed.

**011**A single  $f$  orbital can be occupied by a maximum of how many electrons?

1. 2
2. 6
3. 7
4. 10
5. 14