Posting ID: 426731
Course: CHE 105 2015 SU
Instructor: Sarah Edwards

Question #: 1

Which statement is **false**?

A. Potential energy is associated with the position or composition of an object.
B. Kinetic energy is associated with the motion of an of an object.
C. Chemical energy is created during a chemical reaction.
D. Thermal energy is associated with molecular motion.

Question #: 2

What is the total change in internal energy for a system that does 42 kJ of work and absorbs 17 kJ of heat?

A. +59 kJ
B. +25 kJ
C. −25 kJ
D. −59 kJ

Question #: 3

A 23.4 g sample of water, originally at 25 °C, gains 1.2 kJ of heat. What is the final temperature of the water?
C_S (H_2O) = 4.18 J/g·°C.
1 °C

1. _____

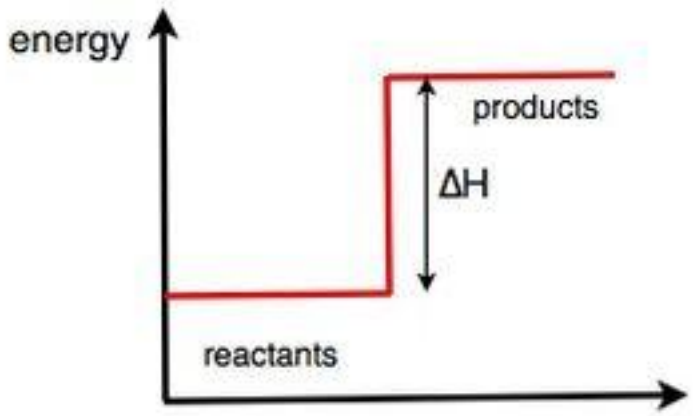
Question #: 4

A balloon inflates from 1.68 L to 2.50 L against a constant external pressure of 3.45 atm. How much work is done by the balloon?

A. +2.83 J
B. +283 J
C. +0.820 J
D. −287 J

Question #: 5

Is the reaction shown in this figure endothermic or exothermic? 1



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Question #: 6

Given the following reactions:

$CH_2CO(g) + 2\ O_2(g) \rightarrow 2\ CO_2(g) + H_2O(g)$ $\quad \Delta H = -981.1$ kJ

$CH_4(g) + 2\ O_2(g) \rightarrow CO_2(g) + 2\ H_2O(g)$ $\quad \Delta H = -802.3$ kJ

Find the enthalpy change for:

$2\ CH_4(g) + 2\ O_2(g) \rightarrow CH_2CO(g) + 3\ H_2O(g)$

A. −623.5 kJ
B. −1783.6 kJ
C. 178.8 kJ
D. 1293.0 kJ

Question #: 7

How much heat is released when 13.2 kg of propane is completely combusted according to the following chemical equation?

$$C_3H_8(g) + 5\ O_2(g) \rightarrow 3\ CO_2(g) + 4\ H_2O(g) \qquad \Delta H^\circ_{rxn} = -2044\ kJ$$

1 kJ

Enter scientific notation in this format: 9.99E-9 for 9.99×10^{-9}

1. _____

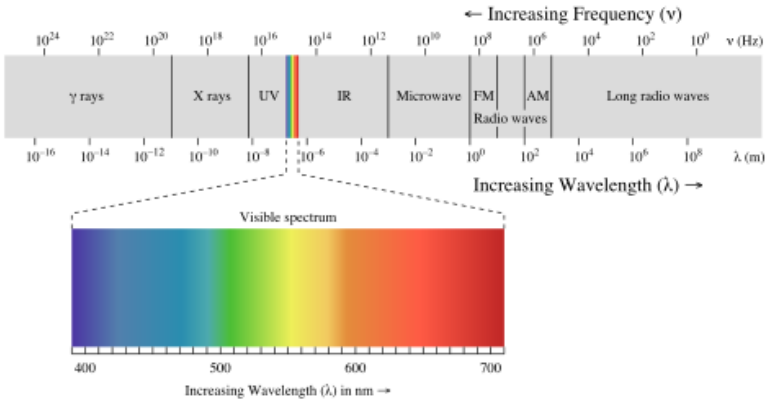
Question #: 8

For which of the following chemical equations does $\Delta H^\circ_{rxn} = \Delta H^\circ_f$?

A. $Na^+(aq) + Cl^-(aq) \rightarrow NaCl(s)$
B. $2\ H(aq) + O(aq) \rightarrow H_2O(l)$
C. $Mg(s) + Cl_2(g) \rightarrow MgCl_2(s)$
D. $HCl(aq) + NaOH(aq) \rightarrow NaCl(aq) + H_2O(l)$

Question #: 9

Which type of electromagnetic radiation has **higher** energy: X-rays or microwaves?



1

1. _____

Question #: 10

What is the energy of a photon of orange light (λ = 623 nm)?

A. 3.19×10^{-19} J
B. 4.82×10^{-14} J
C. 187 J
D. 3.75×10^{-26} J

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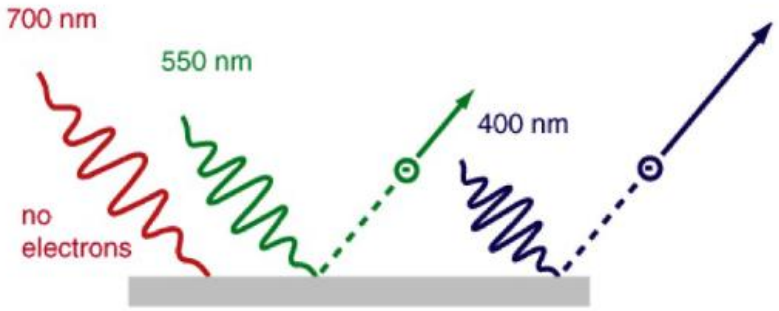
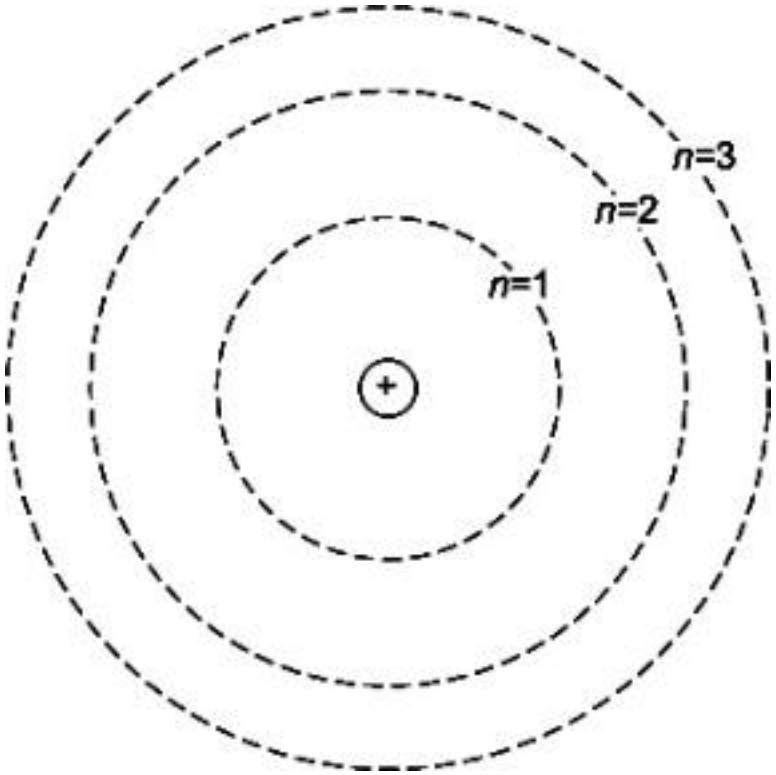
Three photons, as shown in the figure below, strike a metal surface. Which photon has an energy **lower** than the metal's binding energy?



A. 700 nm
B. 550 nm
C. 400 nm
D. none of the photons shown

Question #: 12

In the figure of a Bohr atom shown below, which stationary state has the **highest** energy?



A. 1
B. 2
C. 3
D. All stationary states are degenerate.

Question #: 13

An electron has a mass of 9.11×10^{-31} kg and a velocity of 5.70×10^{3} m/s.
What is the de Broglie wavelength of this electron?

1 m
Enter scientific notation in this form: 9.99E−9 for 9.99×10^{-9}

1. _____

Question #: 14

The concept of complementary properties is central to Heisenberg's uncertainty principle.

Which of the following is a **true** statement?

A. The position and velocity of an electron are unrelated.
B. The **more** precisely we know the position of an electron, the **less** precisely we know its momentum.
C. The **more** precisely we know the position of an electron, the **more** precisely we know its velocity.
D. We cannot precisely know the mass of an electron.

Question #: 15

Which of the following statements about quantum numbers and probability distributions is **true** ?

A. The size of the probability distribution decreases with increasing principal quantum number, n.
B. The shape of the probability distribution is determined by the angular momentum quantum number, l.
C. The probability distribution is independent of the magnetic quantum number, m_l.
D. The direction in which the probability distribution rotates is determined by the spin quantum number, m_s.

Question #: 16

An electron has quantum numbers $n = 2$, $l = 1$, $m_l = -1$, $m_s = -½$
Which type of orbital (sublevel or subshell) is this electron in? 1
(Your answer should consist of one number and one letter.)

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Question #: 17

What wavelength of light is emitted when an electron drops from the $n = 4$ state to the $n = 3$ state, using the Bohr model of the hydrogen atom?

1 nm

1. _____

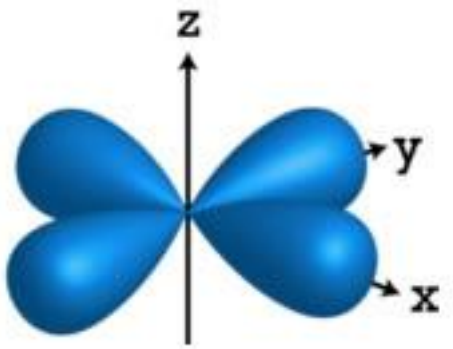
Question #: 18

Which of the following sets of quantum numbers, [n, l, m_l, m_s], is/are allowed for an electron in an atom?
Answer **all** allowed sets.

A. [1, 0, 0, −½]
B. [3, 4, −4, ½]
C. [3, 2, −2, −½]
D. [1, 1, 2, ½]

Question #: 19

This illustration represents which type of atomic orbital?



A. s
B. p
C. d
D. f

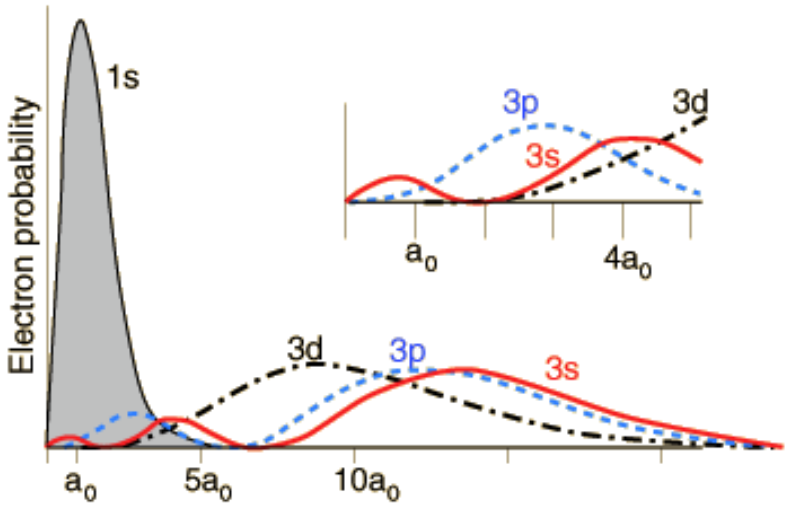
Question #: 20

What is the ground-state electron configuration of arsenic?

A. $1s^2 2s^2 2p^3$
B. $[Ar]4s^2 3d^{10} 4p^3$
C. $[Ar]4s^2 4p^3$
D. $[Ar]4s^1 3d^{10} 4p^5$

Question #: 21

Based on the figure below, which subshell will experience the **greatest** amount of shielding?



A. 3*s*
B. 3*p*
C. 3*d*
D. The 3*s*, 3*p* and 3*d* subshells experience the same amount of shielding.

Question #: 22

How many valence electrons does carbon have? 1

1. _____

Question #: 23

What is the noble gas core of zinc?

A. [Ne]
B. [Ar]
C. [Kr]
D. [Xe]

Question #: 24

Which group has an ns^2np^5 electron configuration?

A. alkali metals
B. transition metals
C. halogens
D. noble gases

Question #: 25

Which element's 4+ ion has a [Kr]$4d^{10}$ electron configuration?

1

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1 °C

1. 37|37C|37 C|37 oC|37.3|37oC|

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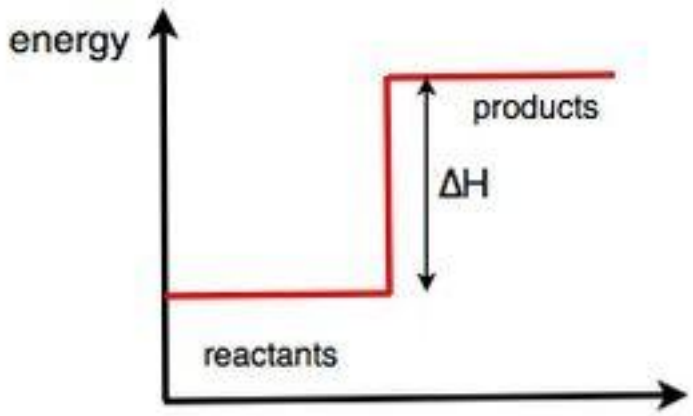

1. endothermic|endo|endotherm|

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1. 6.12 x 10^5|6.12x10^5|6.12 x10^5|6.12x 10^5|6.12 x 10^5 kJ|6.12x10^5 kJ|6.12 x10^5 kJ|6.12x 10^5 kJ|6.12E5|6.12E5kJ|6.12E5 kJ|

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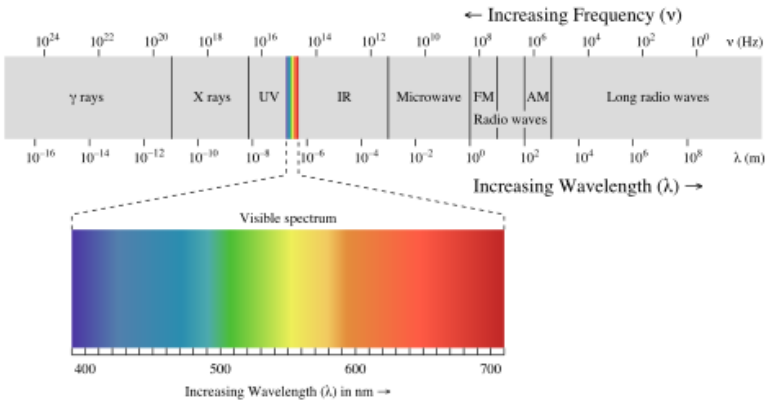

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1. x-rays|X-rays|xrays|Xrays|

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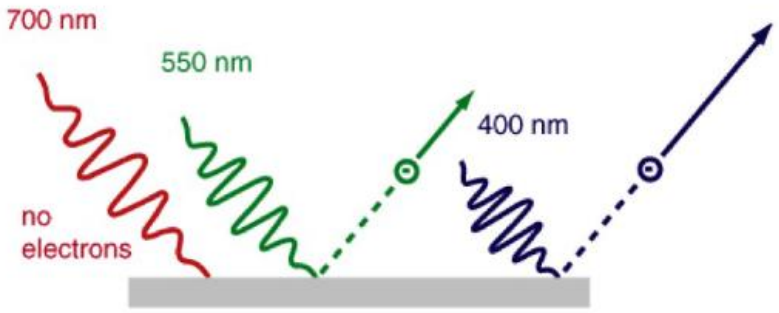

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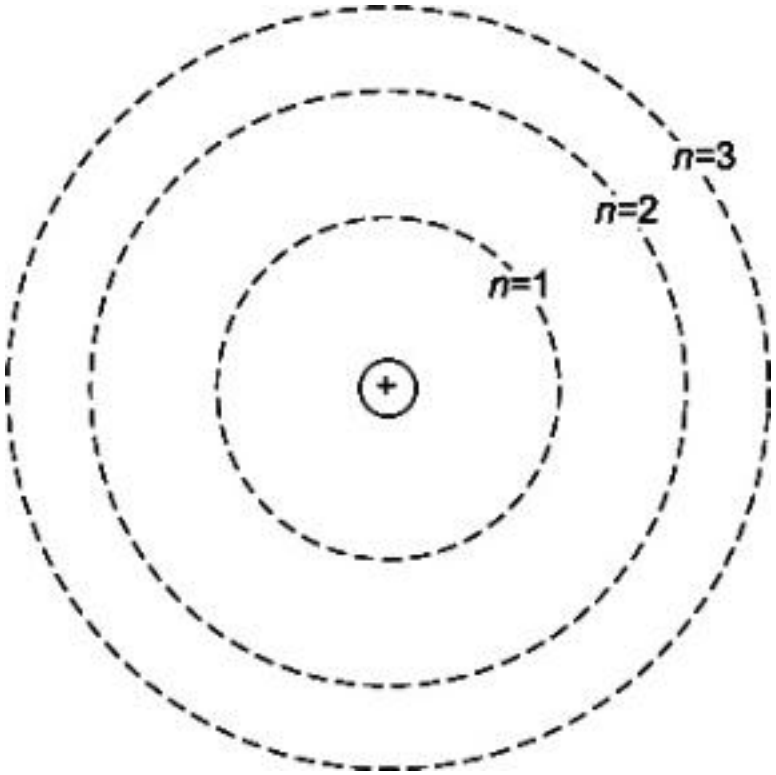

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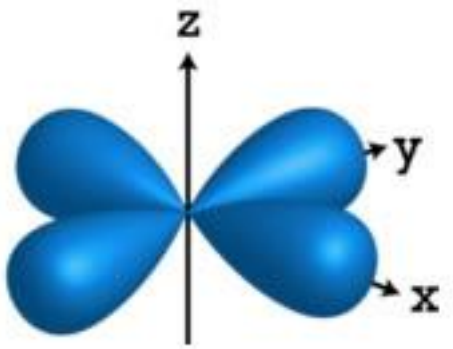

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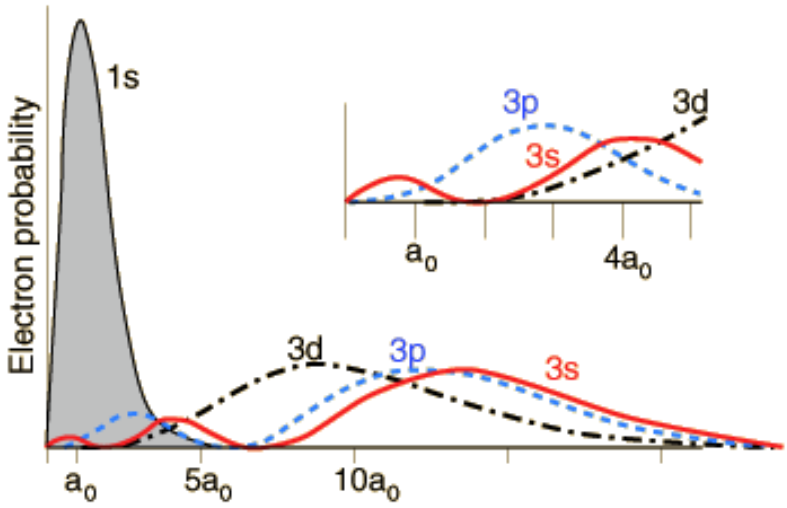

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1. Sn|tin|Tin|