Welcome to our CHEM 4 lecture

- Go to LearningCatalytics.com **Session ID =**
- While we wait, please start on the review question below.

Clicker question: Review from last class

1) Calculate the formula mass of iron(III) hydrogen phosphate with the correct number of significant figures. *[Be sure to use the periodic table from our website.]*

A) 151.83 amu
B) 151.8 amu
C) 343.78 amu
D) 343.8 amu
E) 399.63 amu
F) 399.6 amu

Answer: $Fe_2(HPO_4)_3$

100ths place *1000ths place* *100ths place*

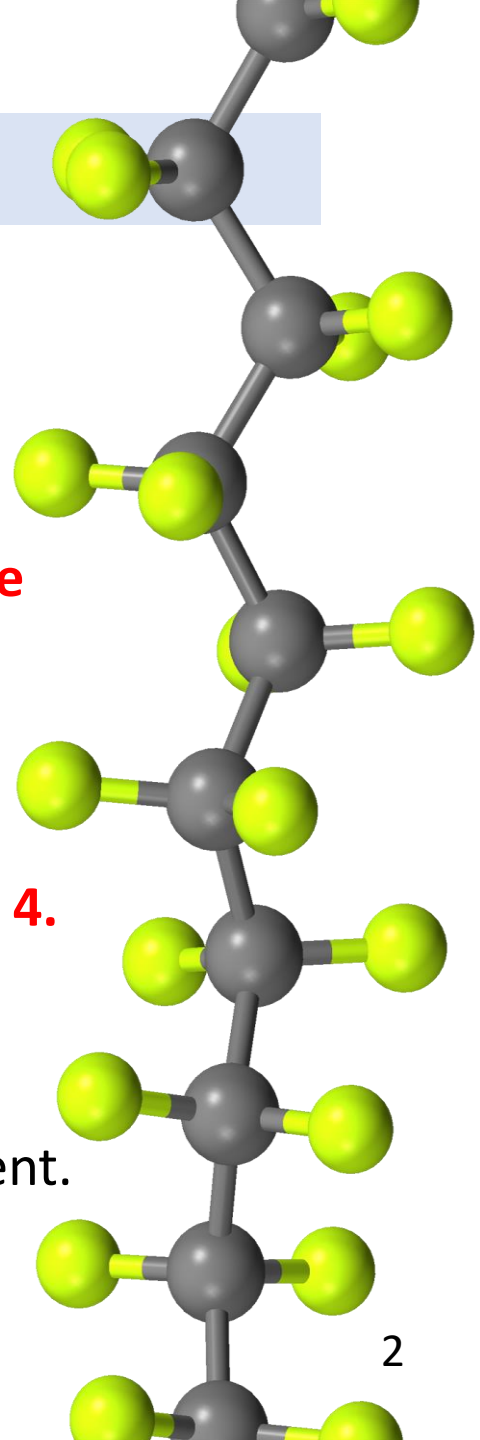
Formula mass = 2(55.85 amu) + 3(1.008 amu) + 3(30.97 amu) + 12(16.00 amu)

= 399.634 amu

= 399.63 amu *(keep 100th place)*

Key to Success in CHEM 4

- ✓ Visit our CHEM 4 website regularly: tinyurl.com/SacStateChem4
- ✓ Attend every lecture having completed the assigned reading.
- ✓ Review our PowerPoint slides and/or lecture recordings after each class.
- ✓ Keep up with daily homework. **However, all students will automatically receive full credit for all late homework this semester.**
- ✓ Complete all of the practice exams.
- ✓ Start formal studying for exams 1 week early.
- ✓ **Talk to your Commit to Study peer mentor about how you are doing in CHEM 4.**
- ✓ Get help when needed:
  - ✓ Put together a weekly study group.
  - ✓ Jeff's office hours: MWF 9 – 9:30 am and 11 – 11:30 am; and by appointment.
  - ✓ PAL office hours: link is on our CHEM 4 website.



CHEM 4 lecture

Friday – October 9, 2020

Sec 2.4 cont.

Calculations with mixed +/- and x/÷

Background: Determining answers for calculations with mixed x/÷ and +/-

Reminders:

- Don't round off too early! Keep at least one extra sig fig for each step.
- Do math in parenthesis first.
- Complete the entire calculation and then go back and determine how many digits to keep.
- Be careful when switch from +/- (decimal points) to x/÷ (sig figs)

Example: Perform the following calculation and report the answer with the correct number of digits.

$$\frac{(0.307 - 14.2)}{(1.22 - 0.2)(0.752)} = \frac{(-13.893)}{(1.02)(0.752)} = -18.11248436 = -18$$

1000ths *10ths* *100ths* *10ths* *3sf* *2sf* *3sf* *(keep 2sf)*

Can't look at original numbers and predict correct answer!

1) We used all these digits in our calculation, but not all of them are significant.
2) Go back to previous step and use it to identify which of these digits are significant.
3) **In the previous step, we were +/-, so check the decimal places.**

4) In this step we are x/÷, so now we switch our focus to sig figs.
5) Label the number of sig figs for the portions that are highlighted (in blue).
6) Use the smallest # of sig figs to determine the answer.

Progress clicker question (covers material we are learning now)

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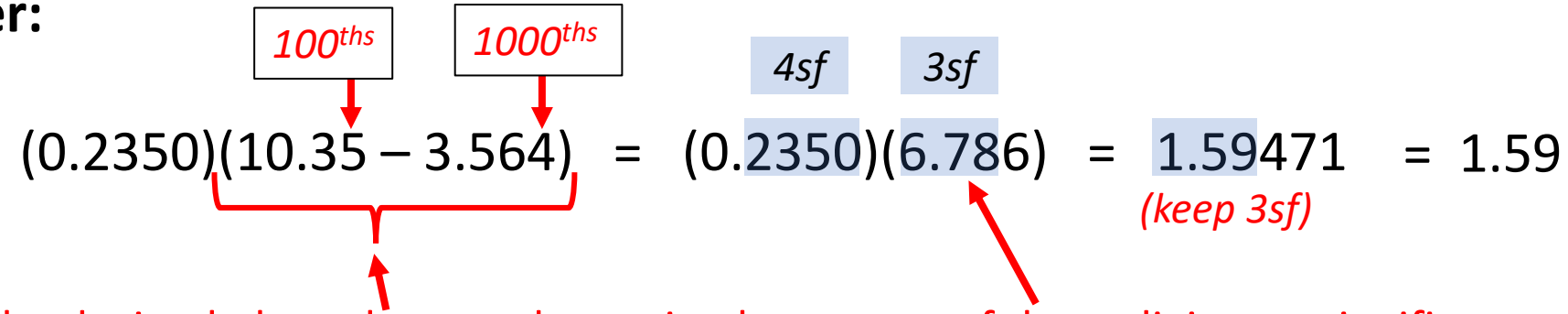
2) Report the answer to this calculation with the correct significant figures:

$$(0.2350)(10.35 - 3.564)$$

A) -1.182 C) 1.594 E) 1.59471 G) 1.60

B) 1.59 D) 1.596 F) 1.59565 H) 1.6×10^2

Answer:



- Use the decimal places here to determine how many of these digits are significant.
- Don't round off too early or get 1.60!

Progress clicker question (covers material we are learning now)

Go to LearningCatalytics.com Session ID =

3) Europium has two naturally occurring isotopes. The lighter isotope, Eu-151 has a mass of 150.92 amu and a 46.0% abundance. The other isotope, Eu-153, has a mass of 152.92 amu. Based on these values, what atomic mass, with correct significant figures, should be written on the periodic table for europium?

A) 1.5×10^2 amu
B) 152 amu
C) 152.0 amu
D) 152.00 amu
E) 152.000 amu
F) 152.0000 amu

Answer:

3sf *5sf* *3sf* *5sf*

atomic mass = (0.460)(150.92) + (0.540)(152.92)

10^{ths} *10^{ths}*

= 69.4232 + 82.5768

= 152

= 152.0 amu

Calculator gives 152 amu, but need 10^{ths} place

Note: 100% - 46.0% = 54.0%

Exact number so it doesn't limit our answer

Progress clicker question (covers material we are learning now)

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4) Report the answer to this calculation with the correct significant figures:

$$\frac{(284.2 - 275.8)}{(6.23 \times 10^{-2})}$$

A) 1 x 10^2

B) 1.3 x 10^2

C) 130

D) 135

E) 134.8

F) 1.35 x 10^{-2}

Answer:

$$\frac{(284.2 - 275.8)}{(6.23 \times 10^{-2})} = \frac{8.4}{(6.23 \times 10^{-2})}$$

10^{ths} *10^{ths}* — *2sf* — *3sf*

(keep 2sf)

= 134.8314607

= 130

= 1.3 x 10^2

Use scientific notation to avoid ambiguous zeros.

Progress clicker question (covers material we are learning now)

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5) Report the answer to this calculation with the correct significant figures:

$$\left(\frac{75.0\ \text{m}}{605\ \text{s}}\right) + 2.096\ \text{m/s}$$

A) 2.21997 m/s

B) 2.2200 m/s

C) 2.2199 m/s

D) 2.219 m/s

E) 2.220 m/s

F) 2.22 m/s

Answer:

$$\underset{3sf}{\left(\frac{75.0\ \text{m}}{605\ \text{s}}\right)} + 2.096\ \text{m/s} = 0.123966942 + 2.096 = 2.219966942 = 2.220\ \text{m/s}$$

$\underset{3sf}{\left(\frac{75.0\ \text{m}}{605\ \text{s}}\right)}$

1000ths *1000ths* *(keep 1000ths)*