PC131 Lab Test Problem Questions

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Explanation

These are all questions which most people answered *incorrectly* on past lab tests. It's important to know *why* the right answer is right, and why the others aren't. An answer in red is a wrong answer which was the most popular answer for the question, even though it was wrong.

1. Which is correct?

   (a) "It's a beautiful day in the neighbourhood."

   (b) "The leopard cannot change it's spots."

   (c) both a and b

   (d) neither a nor b

2. Which of the following pairs of numbers agree with one another?

   (a) 1.23±0.04 m and 1.13±0.07 m

   (b) 0.8±0.9 s and -0.1±0.2 s

   (c) both a and b

   (d) neither a nor b

   (e) not enough information is given

3. Which of the following values is expressed in the most correct form?

    (a) $1.021 \times 10^3 \pm 30$

    (b) $1.021 \times 10^3 \pm 3 \times 10^1$

    (c) $(1.02 \pm 0.03) \times 10^3$

    (d) $(1.021 \pm 0.03) \times 10^3$

    (e) 1021 ± 30

4. Plagiarism is

    (a) copying someone else's work without that person's permission

    (b) allowing someone else's work to appear to be your own

    (c) both a and b

    (d) neither a nor b

5. Given that

$$T = 2\pi\sqrt{\frac{\ell}{g}}$$

with T, ℓ, and g all positive quantities, then then uncertainty in T is given by $\Delta T \approx$

    (a) $2\pi\sqrt{\frac{\ell + \Delta\ell}{g - \Delta g}} - 2\pi\sqrt{\frac{\ell}{g}}$

    (b) $\frac{1}{2}T\left(\frac{\Delta\ell}{\ell} + \frac{\Delta g}{g}\right)$

    (c) both a and b

    (d) neither a nor b

6. Given that
$$g = \frac{2h}{t^2}$$

then the proportion of the total uncertainty which comes from the uncertainty in t is

(a) $\frac{2(h+\Delta h)}{t^2} - \frac{2h}{t^2}$

(b) $\frac{2h}{(t+\Delta t)^2} - \frac{2h}{t^2}$

(c) both a and b

(d) neither a nor b

7. Consider the following definitions:

- allowing someone else's work to appear to be your own
- copying someone else's work without that person's permission

Which of the following is correct?

(a) The first definition is for plagiarism and the second is for copyright violation.

(b) The first definition is for copyright violation and the second is for plagiarism.

(c) Both definitions are for copyright violation.

(d) Both definitions are for plagiarism.

(e) Plagiarism and copyright violation are the same thing.

8. Which of the following values is expressed in the standard form?

(a) 0.00476 ± 0.0002

(b) 0.00476 ± 0.00020

(c) $4.76 \times 10^{-3} \pm 2 \times 10^{-4}$

(d) $(4.76 \pm 0.20) \times 10^{-3}$
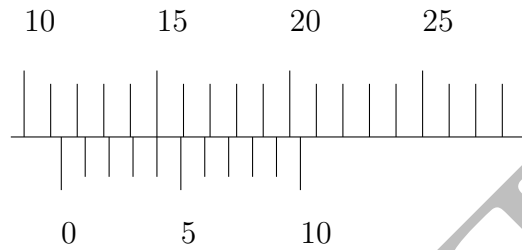
(e) $(4.8 \pm 0.2) \times 10^{-3}$

Figure 1: For Question 9

9. Which of the following is valid for the precision measure of the vernier scale in Figure 1?

   (a) 1 unit

   (b) 0.5 unit

   (c) 0.1 unit

   (d) 0.05 unit

   (e) 0.005 unit

10. Given that

$$E = \frac{1}{2}mv^2$$

with m and v positive quantities, then then uncertainty in E is given by $\Delta E \approx$

   (a) $\frac{1}{2}\left(m + \Delta m\right)\left(v + \Delta v\right)^2 - \frac{1}{2}mv^2$

   (b) $\frac{1}{2}mv^2\left(\frac{\Delta m}{m} + \frac{\Delta v}{v}\right)$

   (c) both a and b

   (d) neither a nor b

For problem 11, consider the data in Table 1. (The precision measure of the balance used was 0.1g.)

Ball #	Mass (g)
1	2.7
2	3.1
3	2.5
4	3.0
5	3.1
6	2.6
7	2.9
8	2.8
$\bar{m}$	2.8375
σ	0.2264

Table 1: Masses of Ping Pong Balls

11. The number of additional measurements which should be taken to get the most precise result is

    (a) 805
    (b) 17
    (c) 8
    (d) 5
    (e) 0

12. If a value for the speed of sound is calculated to be $v = 297.24$ m/s with an uncertainty of $\Delta v = 2.3954$ m/s then it should be written as

    (a) $v = 297.2400 \pm 2.3954$ m/s
    (b) $v = 297.24 \pm 2.39$ m/s
    (c) $v = 297.24 \pm 2.40$ m/s
    (d) $v = 297.2 \pm 2.4$ m/s
    (e) $v = 297 \pm 2$ m/s

13. The numbers 17, 13, 15, and 10 have a mean of 13.75 and a sample standard deviation of 3. If the uncertainty in each of the numbers is 1, what is the uncertainty in the average?

    (a) 1

    (b) 2

    (c) 3

    (d) 4
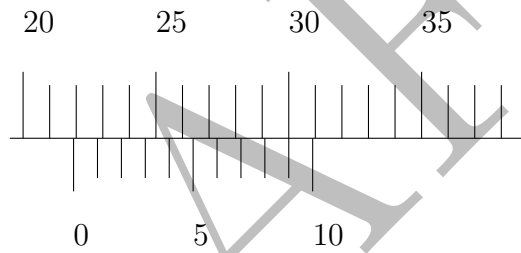

Figure 2: For Question 14

14. Which of the following is valid for the precision measure of the vernier scale in Figure 1?

    (a) 1 unit

    (b) 0.5 unit

    (c) 0.1 unit

    (d) 0.05 unit

    (e) 0.005 unit

15. Which of the following values is expressed in the standard form?

   (a) 8746249.4 ± 23.56

   (b) 8746249.4 ± 23.6

   (c) 8746249 ± 24

   (d) $8.746249 \times 10^6 \pm 2.4 \times 10^1$

   (e) $(8.74625 \pm 0.00002) \times 10^6$

   (f) $(874625 \pm 2) \times 10^1$