

A SCUBA diver produces a spherical air bubble with bulk modulus = 1.2×10^5 Pa and radius = 2.9 mm while exploring a shipwreck below the surface of the ocean. The air bubble rises to the surface of the ocean and expands to a radius = 3.8 mm. What is the difference in pressure between the surface and at the SCUBA diver's depth, ()?

Answer:

$$\Delta P = 0.497 \times 10^5 \text{ Pa}$$

Explanation:

All materials are elastic, so they deform for the pressures applied, in bulk module is the deformation spreads for a given pressure, it is defined by

$$B = -P / (\Delta V/V)$$

Where the negative sign is for the module to be positive, P is the pressure and $\Delta V/V$ is the unit volume reduction

Let's apply that equation to our case, let's look at the volumes of the bubbles

In the water

$$r_1 = 2.9 \text{ mm} = 2.9 \times 10^{-3} \text{ m}$$

$$V = \frac{4}{3} \pi R^3$$

$$V_1 = \frac{4}{3} \pi (2.9 \times 10^{-3})^3$$

$$V_1 = 102.2 \times 10^{-9} \text{ m}^3$$

On the surface

$$r = 3.8 \text{ mm} = 3.8 \cdot 10^{-3} \text{ m}$$

$$V = \frac{4}{3} \pi (3.8 \cdot 10^{-3})^3$$

$$V = 229.8 \cdot 10^{-9} \text{ m}^3$$

$$\Delta V = V_2 - V_1$$

$$\Delta V = (102.2 - 229.8) \cdot 10^{-9} \text{ m}^3$$

$$\Delta V = -127.6 \cdot 10^{-9} \text{ m}^3$$

Let's calculate the pressure

$$B = -P / (\Delta V / V)$$

$$P = -B \Delta V / V$$

$$P = -1.2 \cdot 10^5 \cdot (-127.6 \cdot 10^{-9} / 102.2 \cdot 10^{-9})$$

$$P = 1,498 \cdot 10^2 \text{ Pa}$$

The pressure difference between this depth and the surface is the difference with the atmospheric pressure ($1.01 \cdot 10^5 \text{ Pa}$)

$$\Delta P = P_2 - P_{\text{atm}}$$

$$\Delta P = (1,498 - 1.01) \cdot 10^5$$

$$\Delta P = 0.497 \cdot 10^5 \text{ Pa}$$

How many presidents has there been since 1900?

How much does this fish weigh? How much does this fish weigh if its tail weighs 4kg, its head weighs as much as its tail and half its body, and its body weighs as much as its head and tail together?

To save words, make liberal use of references such as "the latter," "the former," "the aforementioned," and "as mentioned above." Group of answer choices True
False

Why does rape and transactional sex take place?

9, A well-developed paragraph consists of a topic sentence, supporting details, and a A. summary of the points discussed in the paragraph.

B. restatement of the thesis statement.

C. concluding or transitional sentence.

D. restatement of the topic sentence

A man who can row in still water at 3 mph heads directly across a river flowing at 7 mph.

It is plausible to regard a collection of letters spanning youth and old age as (i)_____ of autobiography: the precession of characters who inhabit a life and a chronology of incidents turn up reliably in either form. yet autobiography, even when ostensibly steeped in candor, tends toward (ii)_____ through later perspectives, afterwords, and second thoughts, whereas letters have an undeniable (iii)_____, offering select glimpses of the fought and living moment.

Most Latin American countries were against _____. a. religion b. primitivism c. imperialism d. spiritualism Please select the best answer from the choices provided A B C D

Justin is redoing his bathroom floor with tiles measuring 6 in. By 13 in. The floor has an area of 8500 in.². What is the least number of tiles he will need

An electron microscope would be the best choice for viewing

Determine if the answers to the following questions are correct: 1. What is the best method to learn CPR?

A: You should take an accredited first-aid training course that includes CPR and also how to use an AED.

2. Identify the CAB's of CPR, AND describe the meaning of each letter below in a complete sentence.

C – C stands for circulation; to restore blood circulation with chest compressions.

A – Airway is what A stands for and it means to clear the airway.

B – B stands for breathing for the person.

3. Identify 4 differences in administering CPR to a child (ages 1-8 years) rather than for an adult.

a. You only use one hand when performing heart compressions on a child.

b. When you perform CPR on a child, you have to breathe gently.

c. Before calling 911 or using and AED, you must first perform five cycles of breathing and compressions for about two minutes.

d. If after five cycles of CPR the child doesn't respond, apply and follow the prompts of an AED.

4. The most common cause of cardiac arrest in infants is due to the lack of oxygen. What are the two most common causes of lack of oxygen in infants?

a. Drowning

b. Choking

5. How do the rescue efforts differ when rescuing a baby if you are the only rescuer or if there is an additional rescuer?

- A. If you are the only rescuer, do five cycles of CPR, and then call 911.
- B. Have the other person who is with you call for help while you attend to the baby.

6. How does breathing for a baby differ from that of an adult or child?

Instead of using deep breaths from your lungs, you use the strength of your cheeks to give them gentle puffs of air, in order to slowly breathe into the baby's mouth one time, and then take a breath and continue.

Often students are asked to explain how certain conditions or events are related to the occurrence of other conditions or events. When a student argues that 'one thing leads to another,' he or she is making A) a cause and effect argument.

- B) a narrative essay
- C) a compare and contrast argument.
- D) a chronological persuasive argument.

Ethanol is a common laboratory solvent and has a density of 0.789 g/ml. what is the mass, in grams, of 117 ml of ethanol?

If $JK=20-x^2$, $KL=2-x$, and $JL=10$ find x

A regular hexagon with a perimeter of 24 meters is dilated by a scale factor of 52 to create a new hexagon. What is the perimeter of the new hexagon?

The net of a square pyramid is shown: A square is shown having each side equal to 0.25 inch. Each side of the square has a triangle on it. The height of the triangle is labeled as 1.2 inches. What is the surface area of the figure?

Amelia bought roast beef for \$6.85 per pound. Find the total cost if amelia bought 4 pounds of roast beef. Justify your answer by using the distribute property.

The Excretory System (Unit 4 Lessons 6) The Excretory System removes excess...

W _____ T ___ A _____ - _ I _____

?Name the organs that are part of the Excretory System

K _____ I _____ D _____ N

? Name the organs below?

_____ : These filter waste products from the blood to keep it clean and balanced.

_____ : Tubes from the kidneys that deliver urine to the bladder.

_____ : Stores urine until excretion.

? Describe these structures found within the kidneys?

The Nervous System (Unit 4 Lessons 7-8)

? What body systems are used to pick up a pencil and write down a few sentences in the space below? Fingers, Hand and arms is not what I'm looking for.

? Name a few important body functions that your nervous system controls on its own without you having to think about it much?

? What are the three types of neurons?

? Label some of the parts of neuron below

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