



# OAT<sup>Q&As</sup>

Optometry Admission

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### QUESTION 1

A lens forms an upright image 19 cm from a lens of an object 49 cm from the lens. The object and image are on the same side of the lens. What is the magnification of the image?

- A. 0.39
- B. 2.6
- C. 13.7
- D. 31.2

Correct Answer: A

The magnification of a lens can be calculated from its image distance,  $i$ , and its object distance,  $o$ .  $M = i /$

$o$ . Here  $M = 19/49 = 0.39$ .

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### QUESTION 2

Given the following reaction, how might one shift the equilibrium to the left?  $N_2(g) + 3H_2(g) \rightleftharpoons 2NH_3(g)$

- A. Add  $N_2(g)$
- B. Add helium
- C. Decrease the pressure
- D. Remove  $NH_3(g)$
- E. Decrease the volume

Correct Answer: C

Decreasing the pressure shifts the equilibrium towards the side with more moles of gas. The left side has 4 moles of gas whereas the products has 2 moles of gas, thus the equilibrium will shift to the left. Adding an inert gas will not affect the equilibrium. The other options will shift the equilibrium to the right.

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### QUESTION 3

Which of the following gives the correct order of electromagnetic radiation from the lowest frequency to the highest frequency?

- A. microwaves, UHF radio waves, x-rays, visible light
- B. UHF radio waves, microwaves, visible light, x-rays
- C. microwaves, visible light, x-rays, UHF radio waves
- D. microwaves, x-rays, visible light, UHF radio waves



Correct Answer: B

Radio waves have the lowest frequency and the longest wavelength. Microwaves also have low frequencies and long wavelengths compared to visible light. X-rays are highly energetic and have higher frequencies and smaller wavelengths than visible light.

#### QUESTION 4

Which of the following molecules is thought to have acted as the first enzyme in early life on earth?

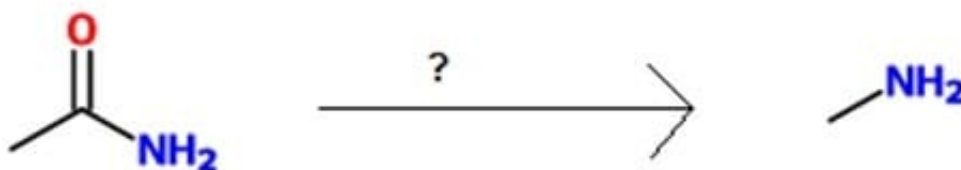
- A. Protein
- B. RNA
- C. Triglycerides
- D. Phospholipids
- E. DNA

Correct Answer: B

Some RNA molecules in extant organisms have enzymatic activity; for example, the formation of peptide bonds on ribosomes is catalyzed by an RNA molecule. This and other information have led scientists to believe that the most likely molecules to first demonstrate enzymatic activity were RNA molecules.

#### QUESTION 5

For the following reaction, which is a possible reagent that can be used to attain this product?



- A. 1)  $\text{H}_4\text{N}_2$  /  $\text{H}_2\text{O}$  2)  $\text{KOH}$  /  $\text{N}_2$
- B.  $\text{Zn}$  ( $\text{Hg}$ ) /  $\text{HCl}$ , heat
- C.  $\text{Br}_2$ ,  $\text{NaOH}$ ,  $\text{H}_2\text{O}$  / heat
- D.  $\text{H}_2$  /  $\text{Pt}$
- E. None of the above

Correct Answer: C

This is a Hofmann rearrangement reaction which converts a primary amide to a primary amine. Note the loss of the



carbon.

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