Checking a Fluorescent Ink Display

Base your answers on the information provided and your knowledge of chemistry. Use the 2025 Chemistry Reference Tables as needed.

A museum class tests an ink that can glow under a lamp. The lamp sends out light at 365 nm only. The instrument records light coming from the test paper, which may include scattered lamp light or light emitted by the paper and ink. Students test blank paper and then the same kind of paper with ink.

Sample	**365 nm recorded?**	**470 nm recorded?**
Blank paper	Yes	No
Paper with ink	Yes	Yes

1 Which result is evidence that the ink sample emits light at a wavelength the lamp does not supply?

(1) Blank paper gives a 365 nm reading.

(2) Both samples give a 365 nm reading.

(3) Only paper with ink gives a 470 nm reading.

(4) Neither sample gives a 470 nm reading.

2 Compare the energy of one 470 nm photon with that of one 365 nm photon. Explain using wavelength and frequency. [1]

Answer and work

The class tries a viewing filter that blocks 365 nm light and lets 470 nm light pass. It places the filter between the paper and the detector, leaving the lamp’s path to the paper open.

3 Predict which sample should still give a detector reading through that filter. Explain. [1]

Answer and work

4 A student moves that filter between the lamp and the ink. What would happen to the 470 nm signal in this model? Explain why the filter’s position matters. [1]

Answer and work