

CLS 332 -midterm exam

Name:..... Univ. No#.....

**Question 1: Choose the best answer from the options underneath each question below:
(10 marks)**

1- Which of the following instruments uses hallow cathode lamps as its energy source

- A. Spectrophotometer
- B Atomic absorption spectrophotometer
- C Nephelometer
- D Turbidimeter

2- Which of the following best describes the process of absorbance

- A. Molecules emit a photon at higher energy when excited e⁻ return to the ground state
- B. Molecules emit a photon at similar energy when excited e⁻ return to the ground state
- C. Molecules emit a photon at lower energy when excited e⁻ return to the ground state
- D. Atoms take up a photon when its e⁻ are excited

3- Which of the following techniques has the highest sensitivity

- A. Nephelometry
- B. Chemiluminescence
- C. Spectrophotometry
- D. Fluorescence

4- Expanding Beer's law, the relation between absorbance and transmittance of energy is

- A. Directly proportional
- B. Inversely proportional
- C. linear
- D. constant

5- Which of the following lists correctly ranks electromagnetic radiation (EMR) from low to high λ

- A. Gamma, x-rays, ultra-violet (UV), visible, infra-red (IR), microwaves
- B. UV, visible, IR, gamma, microwaves, x-rays
- C. Visible, UV, IR, gamma, x-rays, microwaves
- D. Microwaves, IR, visible, UV, x-rays, gamma

6- A spectrophotometer that is designed so that the instrument can compare the light intensity passing the test sample to the light intensity passing a reference on the same detector is

- A. colorimeter
- B. double beam spectrometer
- C. single beam spectrometer
- D. array spectrometer

7- Which instrumentation is no need of an external energy source:

- A. Flame photometry
- B. Spectrophotometry
- C. Fluorimetry
- D. Chemiluminescence

8- The photomultiplier can be used in spectrophotometry as a:

- A. source that generate energy beams
- B. filter
- C. detector
- D. monochromator

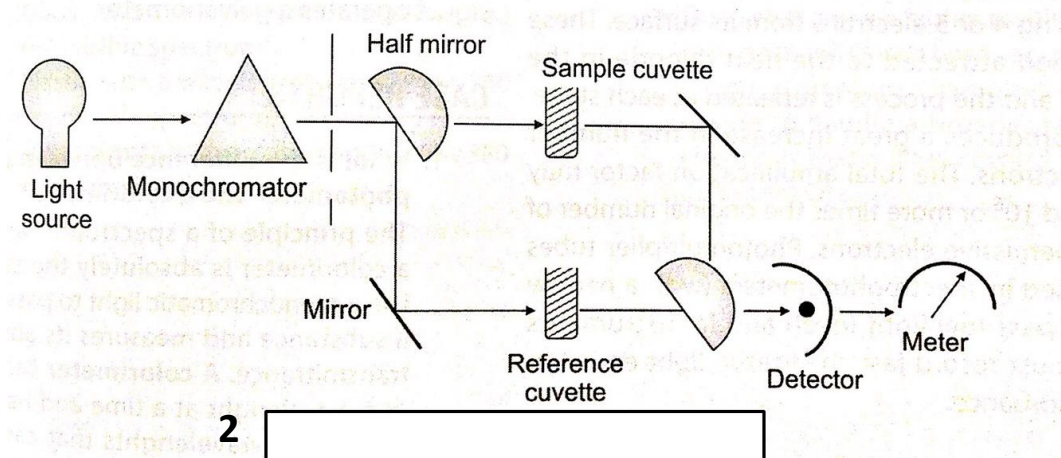
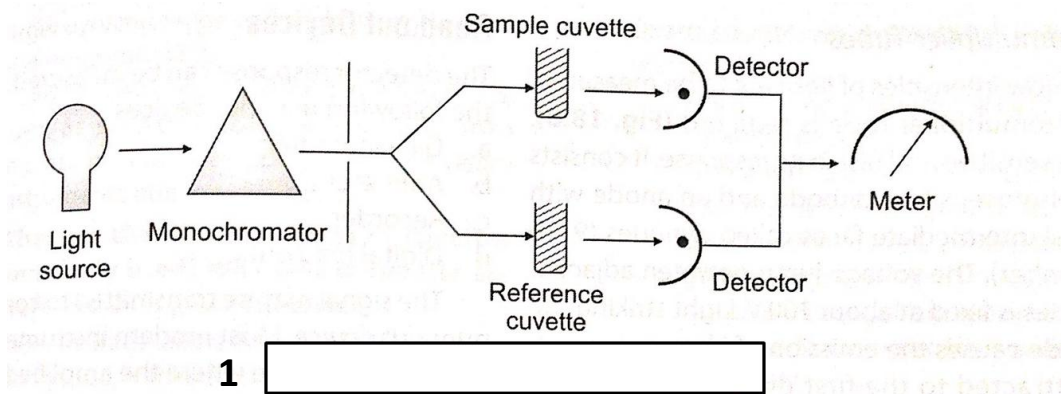
9- Nephelometry estimates the concentration of a test sample based on the measurement of

- A. Light absorbance
- B. Light transmittance
- C. Light emission
- D. Light scatter

10- In the classification of instruments that studies interactions between electromagnetic radiation and matter (atoms and molecules), **fluorescence** is classified under which group of techniques:

- A. Absorption spectroscopy
- B. Emission spectroscopy
- C. Mass spectroscopy
- D. None of the above

Question 2: Write the name of each instrument in the box below it (4 marks)



Question 3: Complete the statements below with appropriate answers (12 marks):

- 1- Flame photometry is a technique that may be used to determine _____, whereas atomic absorption spectrometry is often used for measurement of _____.
- 2- In regard to photometric techniques, a flame photometer uses _____ as an energy source, whereas visible/UV spectrophotometers use _____.
- 3- _____ is an example of an instrument that principally obeys Beer's law, with concentration determinations via this technique based on the measurement of light emission. Detectors in such instruments are placed at an angle from the incident beam, e.g. _____°.
- 4- Although the use of nephelometers in clinical chemistry labs is in decline, it is still very useful in other clinical labs (e.g. _____), as it has several clinical applications like _____.
- 5- The _____ test is an example of a _____ reaction, where reactants will form an excited intermediate [\diamond] before light is emitted.
- 6- The focus in enzyme tests in the lab is on measuring _____ rather than enzyme concentration which is rather too low to be detected by the _____.

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