University of Derna
Faculty of medicine

Practical Notebook

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Course

Student's name

Roll number

Group

Session 1

Laboratory Safety Rules

1. General Conduct - Every individual that enters the laboratory has a duty of care to other users, and is expected to behave in a manner that does not compromise the safety of others.
2. Laboratory smoking, eating and drinking are absolutely prohibited at any time in the laboratory.
3. Only closed-toe shoes should be worn in the lab. Due to the constant risk of cuts and infections from broken glass found on the laboratory floors and the possibility of chemical spills, sandals or open-toed or canvas shoes are not allowed.
4. Keep your face, nose, eyes, ears and mouth away from your hands and other objects. In the laboratory, the use of cosmetics in the laboratory is prohibited.
5. Before and after use, work areas or surfaces must be disinfected.
6. While in the laboratory, laboratory coats must be worn and buttoned. Outside of the laboratory, laboratory coats should not be worn.
7. When conducting any procedure in the laboratory, protective eyewear must be worn.
8. To minimize the fire hazard or contamination of experiments, long hair should be secured behind your head.
9. Prior to leaving the laboratory, hands must be washed.
10. Coats, books and other paraphernalia, such as purses, briefcases, etc., should be placed in specified locations when entering the laboratory and never on bench tops (except for your lab manual).
11. Never mouth-pipet anything (including water). Always use appliances for pipetting.
12. Label all materials with your name, date and any other information applicable (e.g., media,organism, etc.).
13. Waste disposal in its proper containers (see Biohazard Waste Disposal below).
14. Note the hazard code on the bottle when handling chemicals and take the appropriate precautions indicated.
15. Do not pour down the sink with chemicals.
16. Return to their appropriate places all chemicals, reagents, cultures, and glassware.
17. Do not pour fluids that are biohazardous down the sink.
18. It is necessary to wash the glassware with soap and water, then rinse it with distilled water.
19. Flame transfer loops, wires, or needles for transferring biological material before and immediately after use.

20. Do not walk around the laboratory with infectious matter containing transfer loops, wires, needles, or pipettes.
21. Around Bunsen burners, be careful. It is not always possible to see flames.
22. Turn off the incinerators before the laboratory leaves.
23. Report any broken equipment, report any broken glass, in particular those containing infectious materials immediately.
24. Contact your course instructor or TA immediately if you are injured in the laboratory.
25. In the event of further treatment being required, spills, cuts and other accidents should be reported to the instructor or TA.
26. Familiarize yourself with safety equipment and emergency escape routes in the laboratory.
27. Before putting it away, always wipe and clean your microscope's lenses. To this end, use the relevant tissue paper and cleaning solution.
28. With all biological fluids, apply appropriate universal precautions.
29. Without the written permission of the course instructor or TA, do not remove any materials from the laboratory

Session 1

Date:

Name the following equipment

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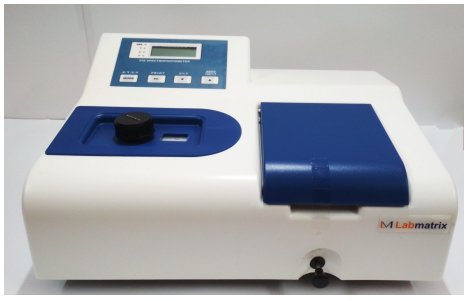

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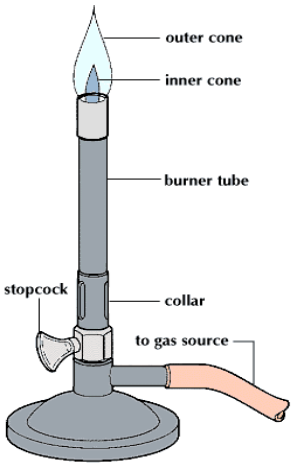

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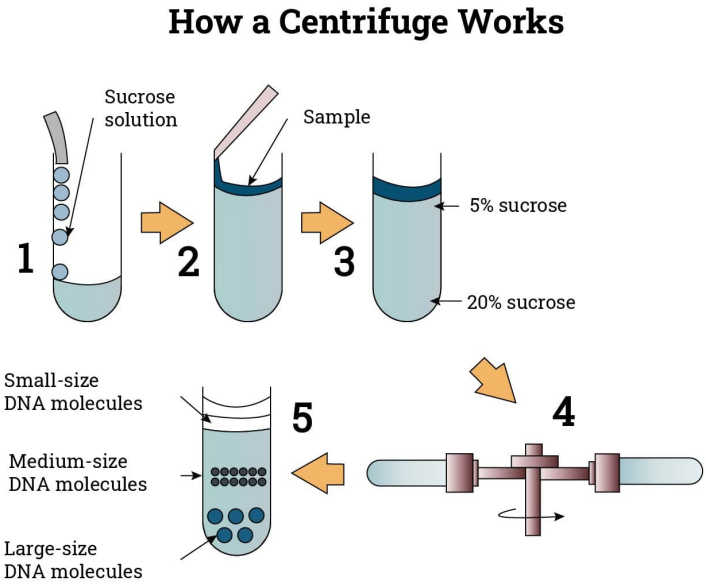
Centrifuge

- It is a device that uses centrifugal force to subject a specimen to a specified constant force, for example to separate various components of a fluid.

Principle: A centrifuge works by using the principle of sedimentation: Under the influence of gravitational force (g-force), substances separate according to their density.



Application:

- Centrifuges are used in various laboratories to separate fluids, gases, or liquids based on density.
- In research and clinical laboratories, centrifuges are often used for cell collection, organelle purification, virus purification, protein purification, and nucleic acid purification.

Colorimeter

- A **colorimeter** is a tool that detects how different liquids absorb specific colors of light. It measures how much light gets absorbed and how much passes through the liquid. Basically, when you shine a specific color of light through a colored liquid, the colorimeter tells you how much of that light gets absorbed.

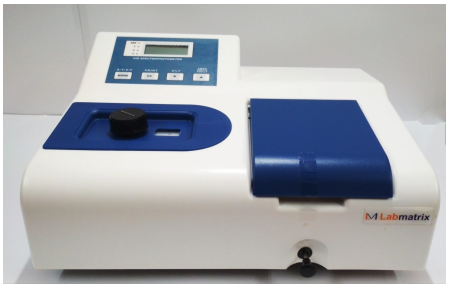
Principle: Photometry is a method used to measure light. When light beams pass through a liquid solution

Application:

The Colorimeter serves various purposes across different industries:

1. **Medical Industry:** Colorimeters estimate colors in blood, urine, spinal fluid, plasma, and serum for medical analysis.
2. **Visual Technology:** They analyze color and brightness in screens like mobiles, computers, and TVs to enhance user viewing experience.
3. **Paints and Textiles:** Used in these industries for color analysis.
4. **Food Industry:** Employed to assess food and its processing.
5. **Printing Industry:** Measures print paper and ink quality.
6. **Water Quality Testing:** Colorimeters help in checking water quality and detecting substances like chlorine, fluorine, cyanide, iron, and molybdenum.
7. **Jewelry:** Utilized for measuring diamond quality.
8. **Healthcare:** Measures haemoglobin concentration in blood samples.
9. **Agriculture:** Assists in monitoring soil nutrient concentration for better plant growth.
10. **Pharmaceuticals:** Identifies substandard products and drugs.

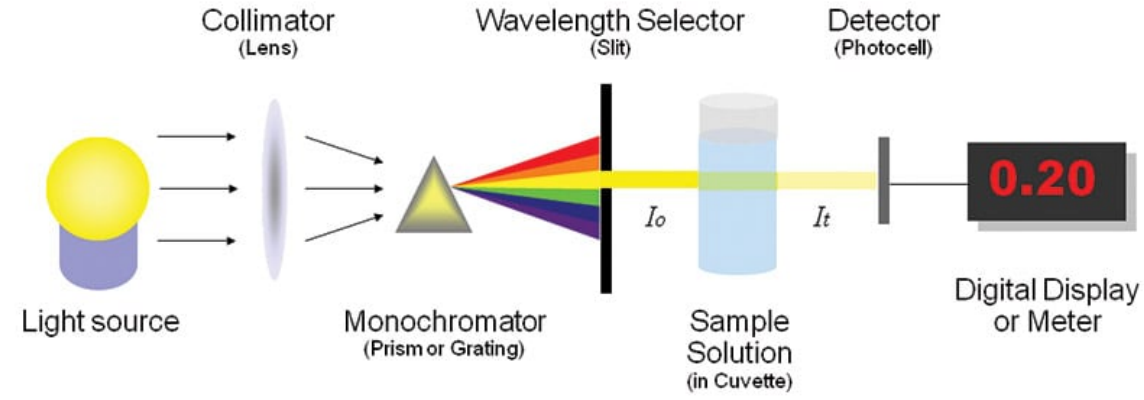
Spectrophotometer



A spectrophotometer is an instrument that measures the amount of light absorbed by a sample. Spectrophotometer techniques are mostly used to measure the concentration of solutes in solution by measuring the amount of the light that is absorbed by the solution in a cuvette placed in the spectrophotometer.

Principle of Spectrophotometer: The spectrophotometer technique is to measure light intensity as a function of wavelength. It does this by diffracting the light beam into a spectrum of wavelengths, detecting the intensities with a charge-coupled device, and displaying the results as a graph on the detector and then on the display device.

In the spectrophotometer, a prism (or) grating is used to split the incident beam into different wavelengths. By suitable mechanisms, waves of specific wavelengths can be manipulated to fall on the test solution. The range of the wavelengths of the incident light can be as low as 1 to 2nm.
The spectrophotometer is useful for measuring the absorption spectrum of a compound, that is, the absorption of light by a solution at each wavelength.



Applications
Some of the major applications of spectrophotometers include the following:

- Detection of concentration of substances
- Detection of impurities
- Structure elucidation of organic compounds
- Monitoring dissolved oxygen content in freshwater and marine ecosystems
- Characterization of proteins
- Detection of functional groups
- Respiratory gas analysis in hospitals
- Molecular weight determination of compounds
- The visible and UV spectrophotometer may be used to identify classes of compounds in both the pure state and in biological preparations.

Instructor's signature:

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Lecturer:

Name of experiment:

Required materials:

Methods:

Result:

Supervisor's signature

Session: **Date:**

Lecturer:

Name of experiment:

Required materials:

Methods:

Result:

Supervisor's signature

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