LABORATORY INSTRUCTION

Chemistry Practical

Department of Chemistry
Guru Ghasidas Vishwavidyalaya
Bilaspur-495 009, C.G., BHARAT

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Bilaspur-495 009, C.G., INDIA

FIRST AID MEASURES

POISONS

Accidents	Treatments
Acids or Acidic Compounds	Drink plenty of water,followed by milk of magnesia or ant-acids/Tricaine. Eat Banana
Caustic Alkalies or Basic Compounds	Drink plenty of water followed by lemon juice. Eat Banana.
Salts of Heavy Metals	Give milk or white of an egg. Powder the charcoal tablet and give orally with water.
Arsenic or Mercury Compoun-ds	Give emetic immediately (common salt in a glass of water). Powder the charcoal tablet and give orally with water.
Inhalation of Gases	Remove the victim to air,loosen clothing at neck. Inhale dilute vapours of ammonia or gargle with sodium bicarbonate solution.

CUTS / BLEEDING

Accidents	Treatments
Minor	Let it bleed for few seconds. Wash with soap and water. Pat dry. Apply a disinfectant and bandage
Major	Wash with disinfectant, try to stop bleeding by appliying pressure to close the wound. consult doctor immediately.

CHEMICAL SPILLS ON SKIN

Accidents	Treatments
Acidic Compounds	Wash with ice-cold water, then with saturated sodium bicabonate solution and then again with ice-cold water. Apply disinfectant, dry, apply antiseptic cream.
Basic Compounds	Wash with ice-cold water, then with acetic acid (1%) solution and then again with ice-cold water. Apply disinfectant, dry, apply antiseptic cream.
Bromine Burn	Wash liberally with ammonia solution (2%), and then with ice-cold water. Apply glycerine and then antiseptic cream.

Note: If you are not sure whether the compound is acidic or basic,use ethanol to clean and then apply antiseptic cream.

FIRE

Accidents	Treatments
Clothes Catch Fire	Drop to the floor and roll. Use blanket or similar cloth to cut off the air supply.
Minor Fire	Switch off the burner and try to put the fire off by cutting off the air supply (try to cover with wire gauge or a big utensil having lid or put sand or water). Remove igniting materials. Extinguish small fire by covering the opening of the vessel with a damp cloth or duster.
Major Fire	Leave the lab immediately. Stay low while evacuating if room is filled with smoke. Call fire brigade.

BURNS

Accidents	Treatments
Minor Burn	Wash with tap water followed by ice-cold water and apply antiseptic cream like betadine / silversulphadiazine / soframycin/ burnol etc. Or Apply sodium chloride past and then apply wet cloth gauze.
Major Burn	Keep it dipped in ice- cold water. Consult doctor immediately.
Direct Heat Burn	Use ice-pack and apply suitable antiseptic cream.
Stream Burn	Wash with ice water or use ice-pack Apply suitable antiseptic cream.

EYE ACCIDENTS

Accidents	Treatments
Acid in Eye	Wash thoroughly with water and then with sodium bicarbonate solution.
Alkali in Eye	Wash thoroughly with water and then with boric acid solution.
Glass in Eye	Remove glass gently. Do not rub eyes.
Irritation in Eye	Wash thoroughly with water. Use chloromycetin capsules

DISTILLED WATER AMPULES should be preferred for cleaning eye or else ensure that while washing eyes with water, the hands must be clean.
USE EYE WASHING STATION

EMERGENCY NUMBERS

Ambulance	102	Fire Brigade	101
Local Health Centre		Nearest Hospital	

ANY OTHER NO. Prof. G. K. Patra (HoD) – 75873 12992, Prof. K. Dewangan (9691012090)

Designed and Developed by Dr. Vimal Rarh

Coordinator, National Resource Centre of Chemistry of MHRD
Project Head & Joint Director, GAD-TLC of MHRD, SGTB Khalsa College, DU

E-mail: mhrdnrc.chemistry@gmail.com

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HARMFUL / IRRITANT

Chemicals that can cause inflammation (redness, pain, swelling) of living tissues and therefore they must be used in appropriate amounts.

LOW HAZARD

Chemicals that are relatively easy to handle but excess of every chemical can be hazardous to life.

FLAMMABLE

Chemicals that catch fire easily under a given set of conditions and must therefore be used with utmost care.

TOXIC

Chemicals that can damage an exposed part of the body.

NARCOTIC

Psychoactive chemicals that induce sleep and therefore their excessive usage can cause tremors or seizures.

OXIDISING

Chemicals that may lead to highly exothermic reactions when they are in contact with other chemicals particularly flammable ones.They should be stored in a cool place away from flammable chemicals / objects.

LACHRYMATORY

Tear causing chemicals. Wear safety glasses and maintain a suitable distance from the chemical.

CARCINOGENIC

Cancer causing chemical that can readily enter human tisssues and seriously disturb the body's complex processes.

DANGEROUS WHEN WET

Chemicals that react violently with water (or any other liquid). Use them under anhydrous conditions.

RADIOACTIVE

Highly reactive chemicals that can be fatal to life even if used in minute quantities depending on their half life.

GASES UNDER PRESSURE

Chemicals which are gases and stored under high pressure.

CORROSIVE

Highly reactive chemicals that damage human tissue. Wear gloves while handling them.

DANGEROUS TO ENVIRONMENT

Chemicals that pose danger to life. They should not be thrown in the laboratory sinks and bins without the permission of the laboratory personnel.

EXPLOSIVE

Chemicals that can cause an explosion as they contain great amount of stored energy and should therefore be handled carefully.

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Coordinator, National Resource Centre of Chemistry of MHRD
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Introduction to the Chemistry Laboratory

General Guidelines

- First and foremost, attendance is mandatory. Absence is only permitted for medical reasons. You will be docked 25% of the total marks for every experiment that you are absent. No repeat turn is granted for an experiment missed due to absence.
- You are expected to be in the lab on time.
- Wearing a lab coat, safety goggles, and shoes is MANDATORY.
- It is your responsibility to bring a scale, pencil, calculator, etc., everyday in the laboratory. You may need those sometime.
- Completed lab notebooks are due before class the following week (except during Minors).
- Always work honestly and confidently in the laboratory and do not consult your neighbors.
- Read the experimental procedure and be aware of any dangers with any of the materials. Unscheduled experiments should not be performed unless specific permission is given by Instructor/In-charge.
- Do not touch any chemicals or smell gases. It is possible that different people might react differently on exposure to the same chemical. Therefore, it is best to handle them with appropriate protection.
- Do not pipette strong acids or bases or organic solvents by mouth (e.g. Chloroform, Benzene, toluene, etc.). Use a rubber bulb.
- Touch things with care. They may be hot.
- When diluting an acid with water always pour the acid slowly into the water. Do not pour the water into the acid.
- Read reagent bottle labels carefully before using the contents and do not change the glass stoppers of reagent bottles.
- Never use a larger amount of chemical substances than the maximum suggested.
- All students must respect the equipment which they use. This means understanding how to use it safely and correctly before starting to use it. This also means that every precaution should be taken to prevent damage to laboratory equipment. Quality equipment used to make accurate and precise measurements is very expensive. You are required to immediately inform the instructor of any equipment malfunction or damage.
- The computer laboratory should only be used for work related to the laboratory.
- All students are expected to maintain a professional attitude in the laboratory. All students must treat others in the laboratory with civility and respect. They must conduct themselves in a way that does not interfere with the opportunity of others to learn. This includes keeping unnecessary noise to a minimum.
- Also, no one is allowed to leave the laboratory without permission from the instructor/lab-in-charge.
- An important part of the laboratory is the oral examination of the objective, the theoretical basis, the experimental method, the expected results, or, in other words, anything even remotely related to the experiment. You will be examined at random on the experiments that are being performed or may have performed earlier. Background reading from a chemistry textbook in addition to reading the handout is definitely required. In addition, knowledge about the chemistry and instruments related to the analysis is extremely beneficial.
- You will be graded for your pre-lab preparation, your effort, your laboratory skills, and your laboratory report.

Your conduct and safety practices in the laboratory will be graded continuously during the course of each experiment, and the overall grades will be included in the final marks in the laboratory to be used for grading. In addition, poor behavior in the laboratory may lead to expulsion from the laboratory.

Unlike what you may think, it is actually a lot of fun to practice safety and think about the possible dangers lurking in each experiment. You may even come up with suggestions for doing the experiments in more safe ways. Once this becomes a habit, it will not leave you for the rest of your life.

Laboratory Neatness

Neatness is essential for safety and for efficient work in the laboratory.

- If you spill anything anywhere in the laboratory, clean it up immediately and leave a clean space for your neighbor. This applies particularly to the balances and melting point apparatus.
- If problems arise, then each week specific students will be given responsibility foreseeing that certain areas will be clean and orderly at the end of the period. Please cooperate.
- If you spill acids, bases, or other corrosive chemicals, inform the instructor, wash contaminated surfaces with copious amounts of water, and then neutralize them as directed by the instructor.
- For reasons of safety and obtaining dependable results, all glassware must be thoroughly clean. After disposing of contents responsibly (see waste disposal instructions for each experiment), wash glassware with hot soapy water and a test tube brush. In some cases, organic compounds may not be removed by detergent and require a small acetone rinse.

Laboratory Reagents

- Most of the reagents used in this laboratory are irritants and/or toxic. Be careful handling reagents. Gloves are available should you wish to use them but remember that gloves do not give you 100% protection from all lab reagents. If reagents come in contact with your skin or gloves, wash them off immediately with soap and water. It is also a good practice to wash your hands periodically to remove any material that may have been left on your hands by incidental contact. Finally, be sure to wash your hands with soap and hot water before leaving the laboratory.
- Use reagent bottles only in the areas where they are provided. Solid reagents for this course will be set out on benches at the side of the lab near the balances, and occasionally under the hood. Volatile or corrosive liquid reagents will be under the hood.
- Try to take no more of the reagents than you need.
- If by accident you take an excess amount of a reagent, share it with a fellow student or dispose of the excess properly. Never pour anything back into a reagent bottle!
- Always dispose of chemicals properly.
- In general, organic wastes are divided into two classes: "halogenated", compounds containing one or more atoms of F, Cl, Br, or I, and "non-halogenated". Halogenated compounds require special disposal because of their particular ability to harm the environment.

Laboratory Equipment

- Keep all metal apparatus in a dry place. Water tends to rust equipment and cause drawers to swell so that they become difficult to open. Consequently, if you spill water in a drawer, immediately take time to dry it carefully.

- Materials used in this laboratory are expensive so try to be careful. Also, excessive loss or breakage can be an indication of poor organization, technique, or lack of preparation and can adversely affect your lab grade.

Laboratory Safety Regulations

- You may never under any circumstances work in the laboratory outside of your assigned laboratory period without permission from the course instructor.
- Your eyes must be protected by goggles at all times. If chemicals come in contact with your eyes, flush your eyes copiously with water for at least five minutes (The eye wash station will be demonstrated during the safety lecture).
- Report all accidents to an instructor immediately. First aid is essential. Flush all chemical splashes with plenty of water. Use the eye wash station for chemicals in your eyes. Use the spray attached to the eye wash sink to wash spills from your clothing immediately and wash them out liberally with water after the laboratory period
- No food or drinks are allowed anywhere in the laboratory. If you bring a lunch, snack, or drink, it must be kept in the hall outside the lab. No food consumption or gum chewing is allowed in the laboratory. Also, no make-up or lip balm is to be applied in the lab.
- Dispose of any broken glass in the glass disposal box at the back of the laboratory.
- Inform an instructor immediately if a thermometer is broken. Any spilled mercury must be recovered properly.
- The solvents used in the laboratory (alcohols, ether, petroleum ether, etc.) are highly flammable. To minimize the danger of fire, no flames are allowed in the laboratory without specific authorization**.**
- In case of fire, remain calm. Most fires are contained in beakers or flasks and can be easily smothered by being covered with a watch glass. More extensive fires should be smothered using a carbon dioxide extinguisher. Since water does not dissolve many organic solvents, it will not extinguish most fires but will cause them to spread. So use a laboratory fire extinguisher rather than water on a fire.

General Safety

- Appropriate clothing must be worn to protect your body from chemical spills. Clothing must have sleeves and cover you from your neck to your knees. If not suitably covered, you must wear a lab coat. Failure to do so will lower your lab grade. Closed-toed shoes are required; you will not be allowed in the lab without them.
- Keep long hair tied back out of the way of chemicals and equipment.
- Beware of hot glassware. Do not touch it until it has had time to cool.
- Avoid contact between laboratory reagents and your skin. Gloves are available in the laboratory. Wash any affected skin areas immediately with soap and water.

Before you leave check the following

- **Are water taps closed?**
- **Are electric switches off?**
- **Is the gas burner off?**
- **Lab table/Apparatus cleaned?**
- **Chemical/solvent bottle closed and kept in its respective place?**