



Laboratory Manual: BSc Chemistry (Complementary Course)

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VIMALA COLLEGE (AUTONOMOUS), THRISSUR- 680009
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3.5 CGPA ON A 4 POINT SCALE

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To our beloved students

Preface

Post Graduate Department of Chemistry, Vimala College is honoured to introduce a lab manual for chemistry complementary programme. This is a collection of both qualitative and quantitative analysis in a simplified manner. The manual is organized in a way to incorporate relevant theory, procedure, and calculation part of different volumetric experiments. Quantitative analysis includes different types of volumetric estimations like, neutralisation titration, Permanganometry, Dichrometry, Iodometry and Complexometry. Also this manual includes a systematic procedure for the analysis of inorganic mixture with relevant equations. In addition to this, the manual also contains main laboratory safety rules, basic first aid measurements, the standard operating procedures (SOP) to be adopted while in laboratory.

We wish that the book reveals the joy of experimentation to the chemistry students at the under graduate level.

*Post Graduate Department of Chemistry
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Post Graduate Department of Chemistry

Vimala College (Autonomous) Thrissur

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SOP for the Safety measures to be followed in the lab

1. Students must be alert and attentive at all times in the lab. Follow all written and verbal instructions. Never hesitate to ask your doubts.
2. Report all accidents, injuries or breakage to the teacher in- charge or lab attendant immediately. Also, report any equipment that you suspect is malfunctioning.
3. Avoid wearing overly-bulky or loose-fitting clothing, or dangling jewellery that may become entangled in your experimental apparatus. Pin or tie back long hair.
4. Use goggles:
 - a. when heating anything.
 - b. when instructed to do so.
5. No cell phone or ear phone usage in the active portion of the laboratories, or during experimental operations.
6. Do not eat, drink or smoke in the laboratory.
7. Try to be fully aware of what is going on elsewhere or around you in the same laboratory.
8. Know the location of all exits for the laboratory and the building.
9. Know the location of the alarm and fire extinguishers and how to operate them.
10. Know the location of safety showers and where eye-washes and safety aid boxes are kept.
11. Know the location of the nearest telephone that can be used during an emergency.
12. Never work alone in the laboratory. If you must work alone, make someone aware of your location and arrange him/her to call or check on you periodically.

13. Perform only those experiments which have been assigned to you by your teacher/guide. Do not perform unauthorized experiments. Get the permission of teacher in charge before you try something original.
14. Do not use cracked or broken glassware, check glassware before using it.
15. Wear protective clothing (coat) in the laboratory. Do not use these coats out of the laboratory because this clothing may have become contaminated.
16. Be careful when working with apparatus that may be hot. If you must pick it up, use tongs, a wet paper towel, or other appropriate holder.
17. If a thermometer breaks, inform the teacher/lab attendant immediately. Do not touch either the broken glass or the mercury with your bare skin.
18. Know the potential hazards of the materials and equipment with which you work with.
19. Protect your eyes from all types of fumes and chemicals. Wear safety glasses or goggles at all times. Minimize all chemical exposures. Never leave containers of chemicals open.
20. Handle all chemicals with care and read labels before attempting to get them.
21. Do not touch any of the chemicals with your hand. Use a spatula to get solid chemicals. Use gloves whenever necessary.
22. While heating a test tube, ensure that its mouth points away from yourself or anyone else.
23. Never look directly into the mouth of a flask containing a reaction mixture.
24. Avoid inhalations of gases or fumes. Gases like H_2 , S are highly poisonous. If the odour of any gas is to be noted as a part of the experiment, gently waft (fan) a little of it towards your nose with your

hand, keeping your face at a safe distance; do not stick your nose in the container to inhale.

25. Do not ever taste any chemical. Remember that many chemicals are poisonous. Never consume and/or store food or beverages or apply cosmetics in areas where hazardous chemicals are used or stored.
26. Handle the reagent bottles with extreme caution. Reagents like conc. H_2SO_4 , are extremely dangerous chemicals and can cause serious burns and injuries to any part of your body with which they come into contact.
27. Do not add water to conc. H_2SO_4 . For diluting H_2SO_4 add the acid slowly to water with stirring.
28. Carry out all experiments involving toxic solvents and reagents in a fume cupboard provided with an exhaust system.
29. Report all accidents and injuries, however small, immediately to the Teacher-in charge so that first aid can be applied immediately. [A description of the first aids that should be given for burns, cuts, inhalation of gas, eye-accidents and poisoning is given in the next section.]
30. Turn off burners or electrical equipment when not in use.
31. Clean your work area and equipment before you leave the laboratory.
32. After your work is over, store away your apparatus carefully either in a cupboard or in the storeroom.
33. Wash exposed areas of the skin prior to leaving the laboratory.