Dr. Vithalrao Vikhe Patil Foundation
Ahmednagar

DR. VITHALRAO VIKHE PATIL FOUNDATION'S

MEDICAL COLLEGE & HOSPITAL

DEPARTMENT OF BIOCHEMISTRY

DEPARTMENT SOP BOOKLET

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INTRODUCTION

The Department of Biochemistry was established in year 2004, with the goal to offer graduate study on Biochemistry. Since its inception it has been engaged in Teaching, Research, and patient care by offering Clinical Lab services. The Department has ambient location on the Ground floor of the DR VITHAL RAO VIKHE PATIL FOUNDATIONS MEDICAL COLLEGE. Faculty members are involved in teaching basic and clinical Biochemistry to undergraduate students, conducting research and maintaining quality clinical diagnostic services as per the national and international standards. Undergraduate programs include MBBS, BPTH, BSc Nursing, The Department of Biochemistry actively participates in design and implementation of the competence based undergraduate Medical curriculum and also plays a leading role in coordinating of Phase-I program for medical students. The aim of the department is to enable the students to comprehend the relevance of biochemistry in their fields. This will facilitate to apply the knowledge in achieving their professional goals.

Key Features

- To foster healthy academic exchange between the teacher and the taught.
- To devise and implement state-of-the-art teaching/research among undergraduate students

Vision

To create health care professionals capable of applying their biochemical knowledge into clinical practice thus helping the society.

Mission

Department of Biochemistry has an excellent history for training UG students in laboratory as well as in classroom.

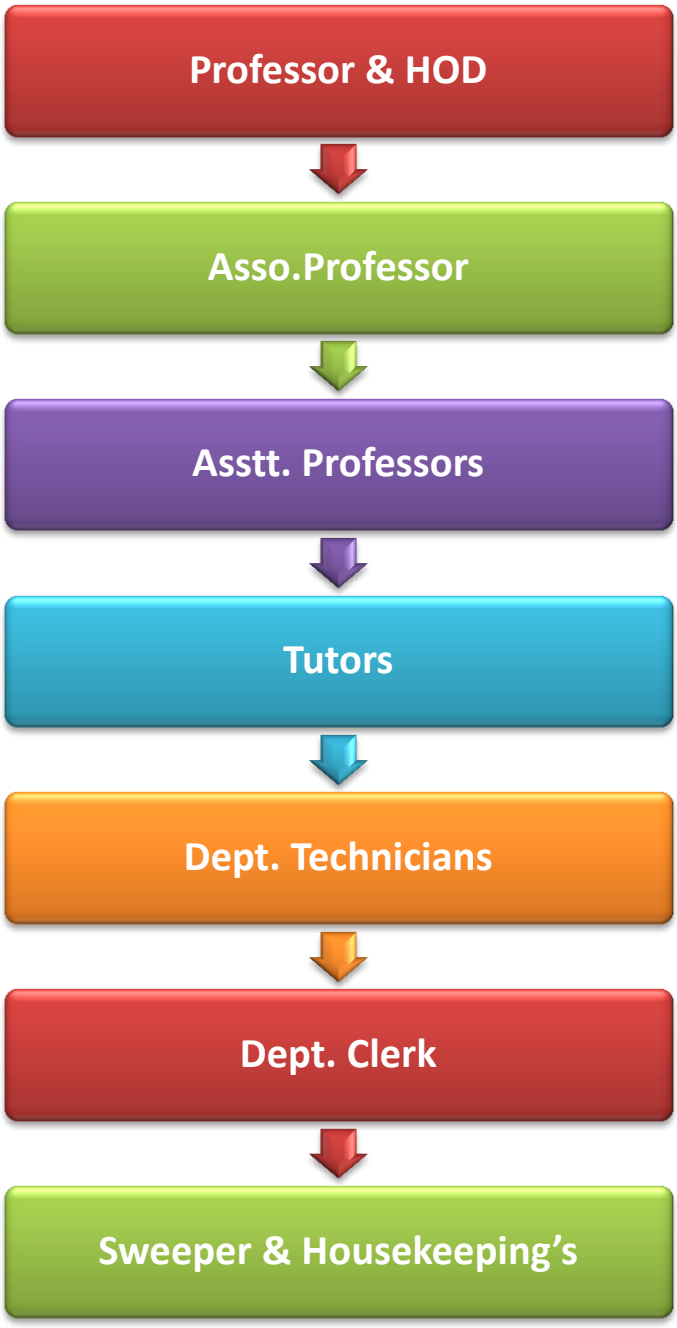
- To generate new tools and knowledge that will advance our understanding of the living world and enhance the quality of life through better medical care, disease prevention measures and nutrition as well.
- To provide opportunities for carrier development of students and staff. Contribute to the public understanding for the life sciences and molecular medicine.
- To translate our discoveries into meaningful applications for better health care and economic development through community outreach programme.
- The mission of Ph.D. program is to provide platform to researcher and translation of new knowledge concerning molecular basis of life.

OBJECTIVES

By the end of the course, students should be able to:

1. Demonstrate knowledge and understanding of the molecular machinery of living cells;
2. Demonstrate knowledge and understanding of the principles that govern the structures of macromolecules and their participation in molecular recognition;
3. Demonstrate knowledge and understanding of the principles and basic mechanisms of metabolic control and molecular signaling;
4. Use basic laboratory skills and apparatus to obtain reproducible data from biochemical experiments;
5. Implement experimental protocols, and adapt them to plan and carry out simple investigations;
6. Analyse, interpret, and participate in reporting to their peers on the results of their laboratory experiments;
7. Participate in and report orally on team work investigations of problem-based assignments;
8. Build on their knowledge and understanding in tackling more advanced and specialized courses, and more widely to pursue independent, self-directed and critical learning.

HIERACHY OF THE DEPARTMENT



JOB DESCRIPTION OF THE DEPARTMENT

DUTIES OF PROFESSOR & HOD

Professor is the senior-most faculty member in a department in hierarchy. The duties of professor include providing laboratory services depending upon his area of specialty, teaching to the undergraduates and the research work. In addition, senior most Professors are designated as Head of the Department where he lead the department to ensure adequate provision of health care services by the staff working under them and look after the day to day administrative work of their department. Further, HOD/Professor also performs administrative duties as assigned by higher authority from time to time for being Chairman/Member of various administrative committees. He is involved in to maintain and continually improve the desired standard of Medical education, Research and Hospital services with reference to NAAC, NABH and other accreditation authorities. Organize and implement an instructional program. Identify, choose and implement different teaching methods for all students with various educational backgrounds. Transfer to student's theoretical information, practical skills, methods and techniques. Provide a positive and honest environment for students during class hours, Use media equipment to sustain your course, Establish and maintain good relationships with the college staff, students and their parents, Stimulate analytical and rational thinking, Supervise student's projects, Examine and give students a feedback about their academic activity Develop and implement a research strategy in a certain field, Participate and coordinate research activities.

DUTIES OF ASSOCIATE PROFESSOR

Associate Professor is second in rank in hierarchy in the department. The duties of Associate Professor include providing laboratory services, teaching to the undergraduates and the research work. Associate Professor (wherever applicable) also carries out administrative duties of heading a unit and thus providing leadership to the staff working under his/her unit. Further, Associate Professor also performs the administrative duties as assigned from time to time like making of duty roster, procurement of equipment and guiding the research in the absence of HOD etc. Identify, choose and implement different teaching methods for all students with various educational backgrounds. Transfer to

student's theoretical information, practical skills, methods and techniques. Provide a positive and honest environment for students during class hours, Use media equipment to sustain your course, Establish and maintain good relationships with the college staff, students and their parents, Stimulate analytical and rational thinking, Supervise student's projects, Examine and give students a feedback about their academic activity Develop and implement a research strategy in a certain field, Participate and coordinate research activities, Handle student's problems.

DUTIES OF ASSISTANT PROFESSOR

Assistant Professor is the second entry into the hierarchy of faculty and ranks 3 in the hierarchy. The duties of Assistant Professor include providing laboratory services, teaching to the undergraduates and the research work. Further, Assistant Professor is also performs the duties as assigned from time to time like making of duty roster, procurement of equipment and guiding the research etc. Identify, choose and implement different teaching methods for all students with various educational backgrounds. Transfer to students theoretical information, practical skills, methods and techniques. Provide a positive and honest environment for students during class hours, Use media equipment to sustain your course, Establish and maintain good relationships with the college staff, students and their parents, Stimulate analytical and rational thinking, Supervise student's projects, Examine and give students a feedback about their academic activity Develop and implement a research strategy in a certain field, Participate and coordinate research activities, Handle student's problems.

DUTIES OF TUTOR

Tutor is the first entry into the hierarchy of faculty and ranks 4 in the hierarchy. The duties of Tutor include providing laboratory services, teaching to the undergraduates and the research work. Further, tutor is also performs, procurement of equipment and guiding the research etc. Identify, choose and implement different teaching methods for all students with various educational backgrounds. Transfer to students theoretical information, practical skills, methods and techniques. Provide a positive and honest environment for students during class hours, Use media equipment to sustain your course, Establish and

maintain good relationships with the college staff, students and their parents, Stimulate analytical and rational thinking, Supervise student's projects, Examine and give students a feedback about their academic activity, Participate and coordinate research activities, Handle student's problems. Tutor is also involved in checking and assessing gas connection safety of chemistry laboratory.

RESPONSIBILITES OF LABORATORY TECHNICIAN:

- Receive, label and analyse samples (Biological fluids and tissue etc.)
- Design and execute laboratory testing according standard procedures, make observations and interpret findings.
- Conduct experiments under defined conditions to verify/reject various types of hypotheses using refined scientific methods.
- Organize and store all chemicals substances according to safety instructions.
- Record all data and results in specified forms (paper and electronic) with accuracy and responsibility.
- Maintain equipment and assist in ordering laboratory supplies.
- Preparation student's practical experiments under the supervision of teaching faculties.
- Assisting teaching faculties during practical hours.
- Ensure that all safety guidelines are followed strictly at all times and maintain a clean and orderly environment.
- They are also involved in maintaining department clean and tidy.
- Maintain and follow all safety precautions.

RESPONSIBILITIES OF CLERK

- Maintain files and records so they remain updated and easily accessible.
- Sort and distribute incoming mail and prepare outgoing mail.
- Answer the phone to take messages or redirect calls to appropriate colleagues.
- Utilize office appliances such as printers and computers etc for word processing, spreadsheet creation etc.
- Undertake basic bookkeeping tasks and issue invoices etc.
- Take minutes of meetings and dictations

- Assist in office management and organization procedures
- Monitor stocks of office supplies (paper clips, stationery etc.) and report when there are shortages.
- Circulate official circulars to all teaching and non-teaching staff.
- Perform other office duties as assigned.

RESPONSIBILITIES OF MESSENGER, SWEEPER AND ATTENDERS

- To maintain department clean and tidy.
- Follow the instructions of given by higher hierarchy person.
- Washing and cleaning department every day.

INFRASTRUCTURE OF DEPARTMENT

Sr.No.	Room No.	Specification	Area as per NMC norm
1	G1	Professor & HOD	21.00 Sq. Meters
2	G2	Associate Professor	15.00 Sq. Meters
3	G20	Associate Professor	12.00 Sq. Meters
4	G3	Assistant Professor	12.00 Sq. Meters
5	G4	Assistant Professor	12.00 Sq. Meters
6	G5	Assistant Professor	16.00 Sq. Meters
7	G7	Tutors-1	11.00 Sq. Meters
8	G8	Tutors-2	11.00 Sq. Meters
9	G14	Tutors-3	12.00 Sq. Meters
10	G15	Tutors-4	12.00 Sq. Meters
11	G17	Research Laboratory	55.00 Sq. Meters
12	G9	Demonstration rooms- 1	75.00Sq. Meters
13	G10	Demonstration rooms- 2	75.00Sq. Meters
14	G6	Seminar room/Library	31.00 Sq. Meters
15	G18	Practical hall	207.00 Sq. Meters
16	G16	Non-Teaching staff	10.00 Sq. Meters
17	G19	Department Office	15.52Sq. Meters
18	G11	Store Room	23.97 Sq. Meters

DEPARTMENTAL FLOOR PLAN

SOP For Professor & HOD Room

Room No - G1

Introduction:

One separate room is there for the working purpose of HOD.

In charge:

- Head of the Department.
- Dean of the institution.

Plan : Area 21.00 sq. m.

Objective: To elaborate the procedure for maintaining Head of the Department room.

Responsibility:

- House Keepers
- All the teaching / non –teaching staff members.
- Furniture in charge of the respective departments.
- Institution technician / System Administrator of respective department.
- Heads of the respective department.

Procedure:

- **Daily maintenance:**

Sr. No.	Activities	Responsibility	Duration
1.	Routine services or maintenance	House Keepers	Daily
2.	Keeping the rooms clean & tidy	House keepers	Daily
3.	Rooms security with lock system	Supervisor	Daily

- **Electrical & Furniture maintenance**:

Sr. No	Activities	Responsibility	Duration
1.	Allotment rooms	HOD	As per requirement
2.	Arrangement / Repair of Cupboards, chairs, tables, stools	Department furniture in charge	As per requirement
3.	Repair of existing electrical outlet – light bulbs, tube lights & fans	Department Electrical in charge	As per requirement
4.	Computer in HOD's Room	Electrical in charge	As per requirement

❖ **Annual maintenance**:

Sr. No	Activities	Responsibility	Duration
1.	Arrangement / Repair of Cupboards, chairs, tables, stools	Department furniture in charge	Yearly
2.	Repair of existing electrical outlet- light bulbs, tube lights & fans replacement	Administrator of respective	Yearly
3.	Paints, Cracks, white wash	Administrators of respective department	Yearly

Head of the Department Room

Checklists for the housekeepers

- Housekeeper will open the HOD Room around 8.AM in the morning, on all working days.
- He /She open the curtains and windows as per requirement to have proper aeration and ventilation.
- He/she should have to wipe and remove the dusts daily.
- Remove spider webs from wall and roofs once in a week.
- In the evening during closing the housekeepers should have to close all the windows, curtains and switch off all the electrical appliances.
- At the end He/She should have to lock the room and collects the key and drop the key in the office room at 5.00PM daily, on all working days.

Prepared by,

Incharge,

Dept. of Biochemistry

Approved by,

Prof and Head,

Dept. of Biochemistry

SOP For Associate Professor Rooms

Room no .G2, G20

Introduction:

Three separate rooms are there for working purpose of associate professor.

In charge:

- Respective Faculty.
- Heads of the Department.
- Dean of the institution.

Plan : Area 15 sq. m.

Objective : To elaborate the procedure for maintaining Associate Professor rooms.

Responsibility:

- House Keepers
- All the teaching / non –teaching staff members.
- Furniture in charge of the respective departments.
- Institution technician / System Administrator of respective department.
- Heads of the respective department.

Procedure:

- **Daily maintenance:**

Sr. No	Activities	Responsibility	Duration
1.	Routine services or maintenance	House Keepers	Daily
2.	Keeping the rooms clean & tidy	House keepers	Daily
3.	Rooms security with lock system	Supervisor	Daily

- **Electrical & Furniture maintenance**:

Sr. No	Activities	Responsibility	Duration
1.	Allotment rooms	HOD	As per requirement
2.	Arrangement / Repair of Cupboards, chairs, tables, stools	Department furniture in charge	As per requirement
3.	Repair of existing electrical outlet – light bulbs, tube lights & fans	Department Electrical in charge	As per requirement

❖ **Annual maintenance**:

Sr. No	Activities	Responsibility	Duration
1.	Arrangement / Repair of Cupboards, chairs, tables, stools	Department furniture in charge	Yearly
2.	Repair of existing electrical outlet-light bulbs, tube lights & fans replacement	Administrator of respective	Yearly
3.	Paints, Cracks, white wash	Administrators of respective department	Yearly

Associate Professor Room

Checklists for the housekeepers

A. Housekeeper will open the **Associate Professor Rooms** around 8.AM in the morning, on all working days

B. He /She open the curtains and windows as per requirement to have proper aeration and ventilation.

C. He/She should have to wipe and remove the dusts daily.

D. He/She removes spider webs from wall and roofs once in a week.

E. In the evening during closing the housekeepers should have to close all the windows, curtains and switch off all the electrical appliances.

F. At the end He/She should have to lock the room and collects the key and drop the key in the office room at 5.00PM daily, on all working days.

Prepared by,

Incharge ,

Dept. of Biochemistry

Approved by,

Prof and Head,

Dept. of Biochemistry

SOP For Assistant Professors Rooms

Room No – G3, G4 & G5

Introduction:

There are three separate rooms are there for working purpose of assistant professors.

In charge:

- Heads of the Departments.
- Respective Faculties.
- Dean of the institution.

Plan: Area 12, 12, & 16 sq. m.

Objective: To elaborate the procedure for maintaining Assistant Professors rooms.

Responsibility:

- House Keepers
- All the teaching / non –teaching staff members.
- Furniture in charge of the respective departments.
- Institution technician / System Administrator of respective department.
- Heads of the respective department.

Procedure:

- **Daily maintenance:**

Sr. No	Activities	Responsibility	Duration
1.	Routine services or maintenance	House Keepers	Daily
2.	Keeping the rooms clean & tidy	House keepers	Daily
3.	Rooms security with lock system	Supervisor	Daily

- **Electrical & Furniture maintenance**:

Sr. No	Activities	Responsibility	Duration
1.	Allotment rooms	HOD	As per requirement
2.	Arrangement / Repair of Cupboards, chairs, tables, stools	Department furniture in charge	As per requirement
3.	Repair of existing electrical outlet – light bulbs, tube lights & fans	Department Electrical in charge	As per requirement

❖ **Annual maintenance**:

Sr. No	Activities	Responsibility	Duration
1.	Arrangement / Repair of Cupboards, chairs, tables, stools	Department furniture in charge	Yearly
2.	Repair of existing electrical outlet-light bulbs, tube lights & fans replacement	Administrator of respective	Yearly
3.	Paints, Cracks, white wash	Administrators of respective department	Yearly

Assistant Professor Rooms

Checklists for the housekeepers

- Housekeeper will open the Rooms around 8.AM in the morning, on all working days.
- He /She open the curtains and windows as per requirement to have proper aeration and ventilation.
- He/she should have to wipe and remove the dusts daily.
- Remove spider webs from wall and roofs once in a week.
- In the evening during closing the housekeepers should have to close all the windows, curtains and switch off all the electrical appliances.
- At the end He/She should have to lock the room and collects the key and drop the key in the office room at 5.00PM daily, on all working days.

Prepared by,

Incharge,
Dept. of Biochemistry

Approved by,

Prof and Head,
Dept. of Biochemistry

SOP For Library Room

Room No – G6

The library provides access to an extensive range of informative resources like books, journals, and access to wide range of resources to improve the knowledge and thought process of the academic fraternity.

Procedure:

- The HODs of the department raise the requirement for books based on the curriculum. and send to the central store.
- Depending on the requisitions raised, vendors are selected.
- Books are procured and entry is done inthe accession register in central library.
- After the stock entry the books are send to the department.

Roles and Responsibilities of the departmental library Incharge.

- It is mandatory to maintain silence in the library.
- Faculty and students should not be allowed to take their personal belongings into the library
- To maintain a register for outgoing books. (Issue register)
- To collect the issued books in time.
- To see to that the issued books will be returned in proper condition otherwise action will be taken
- Cleanness and maintenance of the cupboard and books.

Processing Of the Books

- The books are stamped with library stamp for identification as library property.
- The books are placed in the appropriate shelves in the Library.
- Books will be issued for a period of seven (7) days at a time to the students and for one semester to the faculty.

- Re- issue of books will be done for the stud. The faculty should renew the books at the end of each term to avoid any fine.
- For re-issue after the last date for return of the book, the book has to be physically brought to the library.
- Stock verification of library books id done at the end of academic year by checking the accession no.

Dealing with Losses

- Loss of a book of irrespective of value shall invariably be investigated and appropriate action taken.

Prepared by,	Approved by,
Incharge, Dept. of Biochemistry	Prof and Head, Dept. of Biochemistry

SOP For Tutor Rooms

Room No – G7, G8, G14 & G15

Introduction:

There are four separate rooms for working purpose of Tutors.

In charge:

- Heads of the Departments.
- Respective Faculties,
- Dean of the institution.

Plan: Area 11,11 & 12, 12 sq. m.

Objective: To elaborate the procedure for maintaining Tutor rooms.

Responsibility:

- House Keepers
- All the teaching / non –teaching staff members.
- Furniture in charge of the respective departments.
- Institution technician / System Administrator of respective department.
- Heads of the respective department.

Procedure:

- **Daily maintenance:**

Sr. No	Activities	Responsibility	Duration
1.	Routine services or maintenance	House Keepers	Daily
2.	Keeping the rooms clean & tidy	House keepers	Daily
3.	Rooms security with lock system	Supervisor	Daily

- **Electrical & Furniture maintenance**:

Sr. No	Activities	Responsibility	Duration
1.	Allotment rooms	HOD	As per requirement
2.	Arrangement / Repair of Cupboards, chairs, tables, stools	Department furniture in charge	As per requirement
3.	Repair of existing electrical outlet – light bulbs, tube lights & fans	Department Electrical in charge	As per requirement

❖ **Annual maintenance**:

Sr. No	Activities	Responsibility	Duration
1.	Arrangement / Repair of Cupboards, chairs, tables, stools	Department furniture in charge	Yearly
2.	Repair of existing electrical outlet- light bulbs, tube lights & fans replacement	Administrator of respective	Yearly
3.	Paints, Cracks, white wash	Administrators of respective department	Yearly

Tutor Rooms

Checklists for the housekeepers

- Housekeeper will open the Rooms around 8.AM in the morning, on all working days.
- He /She open the curtains and windows as per requirement to have proper aeration and ventilation.
- He/she should have to wipe and remove the dusts daily.
- Remove spider webs from wall and roofs once in a week.
- In the evening during closing the housekeepers should have to close all the windows, curtains and switch off all the electrical appliances.
- At the end He/She should have to lock the room and collects the key and drop the key in the office room at 5.00PM daily, on all working days.

Prepared by,

Incharge,

Dept. of Biochemistry

Approved by,

Prof and Head,

Dept. of Biochemistry

SOP For Demonstration Rooms (Teaching Rooms)

Room No – G9 & G10

Introduction:

The site where sufficient number of desks, essential teaching aids, overhead projector, slide projector etc are properly placed for teaching purpose of medical students.

In charge:

- Heads of the Departments.
- Respective faculties
- Dean of the institution.

Plan : Area 75 sq. meter, seating capacity 80.

Objective: To elaborate the procedure for maintaining the demonstration rooms.

Responsibility:

- House Keepers
- All the teaching / non –teaching staff members.
- Furniture in charge of the respective departments.
- Institution technician / System Administrator of respective department.
- Heads of the respective department.

Procedure:

- **Daily maintenance:**

Sr. No	Activities	Responsibility	Duration
1.	Routine services or maintenance	House Keepers	Daily
2.	Keeping the classroom clean & tidy	House keepers	Daily
3.	Classroom security with lock system	Supervisor	Daily

❖ **Electrical & Furniture maintenance**:

Sr. No	Activities	Responsibility	Duration
1.	Allotment of year wise classroom	Dean	Yearly
2.	Arrangement / Repair of student's desk & teacher's desk /tables	Department furniture in charge	As per requirement
3.	Repair of existing electrical outlet – light bulb. replacement & AC maintenance.	Administrator of respective	As per requirement
4.	Projector Screens in classrooms.	System Administrator	As per requirement
5.	Ventilation / window treatments	Institution technician.	As per requirement.

❖ **Annual maintenance**:

Sr. No	Activities	Responsibility	Duration
1.	Arrangement / Repair of student's desk & teacher's Desk/tables	Department furniture in charge	Yearly
2.	Repair of existing electrical outlet-light bulb replacement & AC maintenance	Administrator of respective	Yearly
3.	Projector Screens in classrooms	System Administrator	Yearly
4	Ventilation / window treatments	Institution technician.	Yearly
5.	Paints, Cracks, white wash	Administrators of respective department	Yearly

Demonstration Rooms

Checklists for the housekeepers

- Housekeeper will open the Demonstration Rooms at around 8.AM in the morning, on all working days.
- He /She open the curtains and windows as per requirement to have proper aeration and ventilation.
- He/she should have to wipe desks and all and remove the dusts daily.
- Remove spider webs from wall and roofs once in a week.
- In the evening during closing the housekeepers should have to close all the windows, curtains and switch off all the electrical appliances.
- At the end He/She should have to lock the room and collects the key and drop the key in the office room at 5.00PM daily, on all working days.

Prepared by, **Approved by,**

Incharge, **Prof and Head,**

Dept. of Biochemistry **Dept. of Biochemistry**

SOP for Store Room

Room No – G11

Chemical Storage Guidelines

1. PURPOSE:

Proper storage is needed to minimize the hazards associated with accidentally mixing incompatible chemicals. Due to the diverse individual properties of chemicals that may be located in a chemical use area, proper storage may be complicated. This SOP provides general safety procedures for chemical storage Specific instructions on chemical storage may be obtained from the Material Safety Data Sheet (MSDS).

2. SCOPE:

This procedure applies to safe handling and its use of chemicals. It is the intent of this guideline to provide information on the safe storage of chemicals and afford employee protection from potential health and physical hazards associated with accidentally mixing incompatible chemicals.

3. RESPONSIBILITIES:

Only trained and qualified personnel shall be allowed to handle hazardous materials. Experts are responsible for ensuring that personnel are trained to handle chemicals and that all chemical are store in a safe manner. The chemical incompatibilities discussed below are by no means exhaustive. As a result, it is important for laboratory personnel to thoroughly research the properties of the chemicals they are using. Material Safety Data Sheets (MSDSs)have sections on chemical incompatibility. The container's label should also provide storage guidelines.

4. DEFINITIONS:

Pyrophoric Substance - Materials which will react with the air to ignite when exposed, e.g., white phosphorus.

Oxidizing Agent – Reactive material that oxidizes another substance and is reduced.

Acid – Corrosive material that produces $H+$ (aq) ions in aqueous solution. Strong acids ionize completely or almost completely in dilute aqueous solution. Weak acids ionize only slightly.

Base – Corrosive material that produces OH (aq) ions in aqueous solution. Strong basesare soluble in water and are completely dissociated. Weak Bases ionize only slightly. **Flammable** - A liquid as defined by NFPD and DOT as having a flash point below 37.8°C (100°F).

5. MATERIALS and EQUIPMENT: Personal Protective Equipment

PROCEDURES:

1. Know the properties of the chemicals used.
2. In general, chemicals should be separated according to the following categories:
3. Solvents, which include flammable/combustible liquids and halogenated hydrocarbons (e.g., acetone, benzene, ethers, alcohols) Note: Store glacial acetic acid as a flammable liquid
4. Inorganic mineral acids (e.g., nitric, sulfuric, hydrochloric, and perchloric acids).
5. Bases (e.g., sodium hydroxide, ammonium hydroxide) Oxidizers Poisons Explosives or unstable reactives, such as picric acid. Store separately outdoorsin flammable storage cabinets. An inventory of all chemicals must be maintained.
6. Inventories must include the full chemical name, location of storage, and associated hazard (e.g. corrosive or flammable Inventories must be updated annually and signed by the person performing the update.
7. Chemicals purchased throughout the year must be added to the inventory as soon as they are brought into the work area. Post chemical inventories inside the room with a hazard summary posting on the door for emergency response purposes.
8. Ensure that all containers are in good condition, properly capped, and labeled. If you are using short hand names or acronyms on any solutions, reagents, or aliquots of chemicals, you must maintain a cross-reference sheet that defines the short hand name or acronym in use such as EtOH = ethanol or PBS=phosphate buffered saline.
9. Review this list annually to ensure that all short hand names or acronyms in use are recorded.
10. Store all hazardous liquid chemicals in drip trays that are chemically resistant. trays provide good containment and are widely used at the Lab. Install Plexiglas lips or use equivalent means to prevent materials from falling off storage shelves.

11. Avoid storing chemicals on countertops or in fume hoods except for those being currently used.
12. Avoid storing chemicals above eye level. Select low shelves or cabinets for heavy containers. Never store chemicals or any other item closer than 18" to the ceiling. Storing an item close to the ceiling will impede the effectiveness of automatic fire suppression systems.
13. Do not store chemicals on the floor. Chemical containers could present a tripping hazard or could be knocked over causing a spill.
14. Label all containers (squeeze bottles and Nalgene bottles) to which hazardous materialsare transferred with the identity of the substance and its hazards. Be aware that squeeze bottles and Nalgene bottles have varying resistances to different chemicals.
15. Limit the amount of chemicals stored to the minimum required.
16. Avoid exposure of chemicals to heat or direct sunlight. This may lead to the deteriorationof storage containers as well as the degradation of the chemicals.
17. Use approved corrosive storage cabinets (constructed of chemically resistant components) for storing acids and bases.
18. Use flammable storage cabinets to store flammable liquids.
19. Refrigerators used for storing chemicals, samples or media must be labeled with words to the effect as follows: "Caution – Do Not Store Food or Beverages in This Refrigerator". Refrigerators used for food and beverage which are located in lunch rooms and office buildings, where there is no shop or lab type chemical usage do not require any posting.
20. Refrigerators and freezers for storing flammable liquids (including ethanol) must be designed, constructed and approved for that purpose. Domestic refrigerator/freezers as well as units that have been modified to remove spark sources are not acceptable alternatives.
21. Avoid mixing incompatible waste materials. A number of serious laboratory accidents have occurred when people have poured incompatible waste materials into hazardous waste containers. Use separate waste containers for each type of waste.

STORAGE ACCORDING TO HAZARD CLASSES

The following guidelines are provided for the safe storage of hazardous materials in accordancewith their hazard classes:

Acids

- Segregate acids from reactive metals such as sodium, potassium, magnesium.
- Segregate oxidizing acids from organic acids, flammable and combustiblematerials.
- Segregate acids from chemicals which could generate toxic or flammable gases upon contact, such as sodium cyanide, iron sulfide, calcium carbide
- Segregate acids from bases.

Bases

- Segregate bases from acids, metals, explosives, organic peroxides and easily ignitable materials.

Solvents (Flammable and Halogenated Solvents)

- Store in approved safety cans or cabinets.
- Segregate from oxidizing acids and oxidizers.
- Keep away from any source of ignition: heat, sparks, or open flames.

Oxidizers

- Store in a cool, dry place.
- Keep away from combustible and flammable materials.
- Keep away from reducing agents such as zinc, alkali metals, and formic acid.

Cyanides

- Segregate from acids and oxidizers.

Water Reactive Chemicals

- Store in a cool, dry place away from any water source.
- Make certain that a Class D fire extinguisher is available in case of fire.

Pyrophoric

- Store in a cool, dry place making provisions for an airtight seal.
- **Light Sensitive Chemicals**
- Store in amber bottles in a cool, dry, dark place.

Peroxide Forming Chemicals

- Store in airtight containers in a dark, cool, and dry place.
- Label containers with receiving, opening, and disposal dates.
- Periodically test for the presence of peroxides.

Toxic Chemicals

- Store according to the nature of the chemical, using appropriate security where necessary.

7. CONTINGENCIES:

- In case of a fire, explosion, or gas leak evacuate individuals from the area and call the emergency response. Notify supervision and adjacent personnel as quickly as possible. Observe appropriate procedures for personal injury or fire as provided in EHSWeb site.
- In case of a chemical spill, alert others in the immediate vicinity and notify your supervisor. If possible to do so safely (without risk of over- exposure), take action to stop the release. Ensure that extraneous personnel remain at a safe distance until the spill is completely cleaned-up.

8. REVIEWS AND REVISIONS:

This procedure shall be reviewed for compliance and effectiveness and revised as necessary onan annual basis.

9. ATTACHMENTS AND REFERENCE FORMS:

The following incompatibility matrix and table contains examples of incompatible chemicals:

Chemical Incompatibility Matrix

	Acids, Inorganic	Acids, Oxidizing	Acids, Organic	Alkalis (Bases)	Oxidizers	Poisons, inorganic	Poisons, organic	Water reactives	Organic solvents
Acids, Inorganic			X	X		X	X	X	X
Acids, Oxidizing			X	X		X	X	X	X
Acids, Organic	X	X		X	X	X	X	X	
Alkalis (Bases)	X	X	X				X	X	X
Oxidizers			X				X	X	X
Poisons, inorganic	X	X	X				X	X	X
Poisons, organic	X	X	X	X	X	X			
Water reactives	X	X	X	X	X	X			
Organic solvents	X	X		X	X	X			

X = Not compatible – do not store together

CHEMICAL	KEEP OUT OF CONTACT WITH
Acetic Acid	Chromic acid, nitric acid, hydroxyl compounds, ethylene glycol, perchloric acid, peroxides,permanganates
Acetone	Concentrated nitric and sulfuric acid mixtures, and strong bases
Acetylene	Chlorine, bromine, copper,fluorine, silver, mercury
Alkali Metals	Water, carbon tetrachloride or other chlorinated hydrocarbons, carbon dioxide, the halogens
Ammonia, anhydrous	Mercury, chlorine, calcium hypochlorite, iodine, bromine,hydrofluoric acid
Ammonium Nitrate	Acids, metal powders, flammable liquids, chlorates, nitrites, sulfur, finely divided organic or combustible materials
Aniline	Nitric acid, hydrogen peroxide
Arsenic materials	Any reducing agent
Azides	Acids
Bromine	Same as chlorine

Calcium Oxide	Water
Carbon (activated).	Calcium hypochlorite, alloxidizing agents
Carbon tetrachloride	Sodium
CHEMICAL	KEEP OUT OF CONTACT WITH
Chlorates	Ammonium salts, acids, metal powders, sulfur, finely divided organic or combustible materials
Chromic Acid and Chromium trioxide	Acetic acid, naphthalene, camphor, glycerol, glycerin, turpentine, alcohol, flammableliquids in general
Chlorine	Ammonia, acetylene, butadiene,butane, methane, propane (or other petroleum gases), hydrogen, sodium carbide, turpentine, benzene, finely divided metals
Chlorine Dioxide	Ammonia, methane, phosphine,hydrogen sulfide
Copper	Acetylene, hydrogen peroxide
Cumene Hydroperoxide	Acids, organic or inorganic
Cyanides	Acids
Flammable Liquids	Ammonium nitrate, chromic acid, hydrogen peroxide, nitric acid, sodium peroxide, halogens
Hydrocarbons	Fluorine, chlorine, bromine, chromic acid, sodium peroxide
Hydrocyanic Acid	Nitric acid, alkali
Hydrofluoric Acid	Ammonia, aqueous or anhydrous
CHEMICAL	KEEP OUT OF CONTACT WITH
Hydrogen Peroxide	Copper, chromium, iron, most metals or their salts, alcohols, acetone, organic materials, aniline, nitromethane, flammableliquids
Hydrogen Sulfide	Fuming nitric acid, other acids,oxidizing gases, acetylene, ammonia (aqueous or anhydrous), hydrogen
Hypochlorites	Acids, activated carbon
Iodine	Acetylene, ammonia (aqueous oranhydrous), hydrogen
Mercury	Acetylene, fulminic acid,ammonia
Nitrates	Sulfuric acid
Nitric Acid (concentrated)	Acetic acid, aniline, chromic acid,hydrocyanic acid, hydrogen sulfide, flammable liquids, flammable gases, copper, brass,any heavy metals
Nitrites	Acids
Nitroparaffins	Inorganic bases, amines

Oxalic Acid	Silver, mercury
Oxygen	Oils, grease, hydrogen; flammable liquids, solids, orgases
Perchloric Acid	Acetic anhydride, bismuth and its alloys, alcohol, paper, wood, grease and oils
CHEMICAL	KEEP OUT OF CONTACT WITH
Peroxides, organic	Acids (organic or mineral), avoidfriction, store cold
Phosphorus (white)	Air, oxygen, alkalis, reducingagents
Potassium	Carbon tetrachloride, carbondioxide, water
Potassium chlorate and perchlorate	Sulfuric and other acids
Potassium Permanganate	Glycerin, ethylene glycol, benzaldehyde, sulfuric acid
Selenides	Reducing agents
Silver	Acetylene, oxalic acid, tartaricacid, ammonium compounds, fulminic acid
Sodium	Carbon tetrachloride, carbondioxide, water
Sodium nitrite	Ammonium nitrate and otherammonium salts
Sodium Peroxide	Ethyl or methyl alcohol, glacial acetic acid, acetic anhydride, benzaldehyde, carbon disulfide, glycerin, ethylene glycol, ethyl acetate, methyl acetate, furfural
Sulfides	Acids
Sulfuric Acid	Potassium chlorate, potassium perchlorate, potassium permanganate (or compounds with similar light metals, such as sodium, lithium, etc.)
Tellurides	Reducing agents

Prepared by,

Incharge,

Dept. of Biochemistry

Approved by,

Prof and Head,

Dept. of Biochemistry

SOP For Non - Teaching Room

Room No – G16

Introduction: The separate room are there working purpose.

In charge:

- Heads of the Department.
- Dean of the institution.

Plan: Area 15 sq. m.

Objective: To elaborate the procedure for maintaining Non- teaching room.

Responsibility:

- House Keepers
- All the teaching / non –teaching staff members.
- Furniture in charge of the respective departments.
- Institution technician / System Administrator of respective department.
- Heads of the respective department.

Procedure:

- **Daily maintenance:**

Sr. No	Activities	Responsibility	Duration
1.	Routine services or maintenance	House Keepers	Daily
2.	Keeping the rooms clean & tidy	House keepers	Daily
3.	Rooms security with lock system	Supervisor	Daily

- **Electrical & Furniture maintenance**:

Sr. No	Activities	Responsibility	Duration
1.	Allotment rooms	HOD	As per requirement
2.	Arrangement / Repair of Cupboards, chairs, tables, stools	Department furniture in charge	As per requirement
3.	Repair of existing electrical outlet – light bulbs, tube lights & fans	Department Electrical in charge	As per requirement

❖ **Annual maintenance**:

Sr. No	Activities	Responsibility	Duration
1.	Arrangement / Repair of Cupboards, chairs, tables, stools	Department furniture in charge	Yearly
2.	Repair of existing electrical outlet-light bulbs, tube lights & fans replacement	Administrator of respective	Yearly
3.	Paints, Cracks, white wash	Administrators of respective department	Yearly

Non- teaching Rooms

Checklists for the housekeepers

- Housekeeper will open the Room around 8.AM in the morning, on all working days.
- He /She open the curtains and windows as per requirement to have proper aeration and ventilation.
- He/she should have to wipe and remove the dusts daily.
- Remove spider webs from wall and roofs once in a week.
- In the evening during closing the housekeepers should have to close all the windows, curtains and switch off all the electrical appliances.
- At the end He/She should have to lock the room and collects the key and drop the key in the office room at 5.00PM daily, on all working days.

Prepared by,

Incharge,

Dept. of Biochemistry

Approved by,

Prof and Head,

Dept. of Biochemistry

SOP for Departmental Research laboratory

Room No – G17

Introduction:

Departmental research laboratory

Departmental research laboratory is well equipped with UV-spectrometer, centrifuges, balances, hot air oven, electrophoresis apparatus, flame photometer etc. for research work in the department. The faculty members and undergraduate students are involved in research, pursuing core knowledge in subject Biochemistry and Biochemistry research.

In charge:

- Heads of the respective Departments.
- Dean of the institution.

Plan : Area 55.00 Sq. Meters

Objective : To elaborate the procedure for maintaining Research Laboratory.

Responsibility:

- House Keepers
- All the teaching / non –teaching staff members.
- Instruments incharge of the respective departments.
- Institution technician / System Administrator of respective department.
- Heads of the respective department.
- Dean of the institution.

Procedure:

- **Daily maintenance:**

Sr. No	Activities	Responsibility	Duration
1.	Routine services or maintenance	House Keepers	Daily
2.	Keeping the rooms clean & tidy	House keepers	Daily
3.	Rooms security with lock system	Supervisor	Daily
4.	Routine cleaning of equipments	House Keepers	Daily

❖ **Electrical & Furniture maintenance**:

Sr. No	Activities	Responsibility	Duration
1.	Arrangement / Repair of Cupboards, chairs, tables, stools	Department furniture incharge	As per requirement
2.	Repair of existing electrical outlet – light bulbs, tube lights & fans	Department Electrical in charge	As per requirement

❖ **Annual maintenance**:

Sr. No	Activities	Responsibility	Duration
1.	Arrangement / Repair of Cupboards, chairs, tables, stools	Department furniture in charge	Yearly
2.	Repair of existing electrical outlet-light bulbs, tube lights & fans replacement	Administrator of respective	Yearly
3.	Paints, Cracks, white wash	Administrators of respective department	Yearly

Prepared by,

Incharge,

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Approved by,

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SOP of Practical hall

Room No – G18

Introduction:

Practical hall of biochemistry is the area where actually students do the various biochemical estimation like qualititative and quantitative that is generally concerned with analysis of body fluids. The discipline originated in the late 19th century with the use of simple chemical tests for various components of blood and urine. Subsequently other techniques were applied including the use and measurement of enzyme activities, spectrophotometry, electrophoresis etc.

AIM:

This SOP provides standard operating procedures for the safe handling, storage, and disposal of chemical, handing of glassware, handling of gas burners and water supply.

Objective: To intricate the procedure for maintaining the practical hall.

Responsibility:

- House Keepers
- All the teaching / non –teaching staff members.
- Institution technician / System Administrator of respective department.
- Heads of the respective department.
- Dean of the institution.

Infrastructure of Practical hall:

Size: 207 Sq.Meter with well ventilator, capacity 50 students

Sr. No	Name of Item	Number of quantity
1	Student working table: 5	5
2	Stool: 80	80
3	Ceiling fan:8	8
4	Exhaust fan:6	6
5	Tubelight: 11	11
6	Office table:04	04

7	Chair: 06	06
8	Side rack:05	05
9	Fire extinguisher:01	01
10	Water Tab: 42	42
11	Wash Basin: 21	21
12	Blackboard:01	01
13	Pipette rack: 5	05
14	Test tube stand: 50	50
15	Side rack:05	05
16	Fire extinguisher:01	01
17	Dust bin: 10	10
18	Biowaste container : 3	03
19	Blackboard:01	01
20	Pipette rack: 5	05
21	Test tube stand: 50	50
22	Water bottle (D. W.):	50
23	Gas burner: 80	80

Instruments available in practical hall:

SR. No.	Name of instrument	Quantity
1	Colorimeter	02
2	Water bath thermostatic	01
3	Fume cupboard	01
4	Centrifuge	03
5	Incubator	03

All Instruments is always wipe down the exterior each day and do a thorough, detailed cleaning at least once a week. Some types of equipment will need to be cleaned using a specific cleaning process.

POWER, GAS AND WATER SUPPLY

POWER SUPPLY:

Availability of constant and reliable power supply should be considered. The power requirements of the equipment in relation to the availability of electricity to the practical hall a voltage stabilizer/uninterrupted power supply should be arranged with the

equipment if need. If the equipment is battery powered, the type of battery, rechargeable/ non- rechargeable and replacement should be considered.

GAS SUPPLY:

Type of gas: pipe borne or cylinders (capacity of cylinders): hazardous nature of the gas: flammable gas should be stored outside the building:

WATER SUPPLY:

Type of water available (hard/soft): Special requirements of water for the instrument (Type 1, 2 reagent grade water): The additional equipment like distillation plant, double glass distillation plant, etc required to produce the specified type of water should be considered.

STUDENT RESPONSIBILITY:

All students working in a chemical laboratory are responsible for:

(a) Developing and demonstrating their competence to perform laboratory tasks.

(b) Adhering to procedures, instructions, and guidance in this SOP in order to carry out their tasks in a safe and efficient manner.

(c) Proper use of the required safety equipment (gloves, goggles, lab coat, hoods, shields).

(d) Knowing emergency procedures.

(e) Seeking advice from the instructor when in doubt.

(f) Reporting all incidents immediately.

(g) Participating in safety training and departmental safety meetings, when offered.

RESPONSIBILITIES OF SUPERVISORS (concern staff):

All research supervisors are responsible for:

(a) Providing guidance on the safe handling and storage of chemicals.

(b) Periodically reviewing safety procedures for adequacy.

(c) Ensuring that students have read and do understand all responsibilities.

(d) Reporting any safety violation to the proper authority.

(e) Ensuring that all students comply with safety rules

(f) Reporting any major laboratory incident to the proper authority.

HOUSEKEEPING:

Good housekeeping must be practiced at all times.

The following is the list of suggestions enabling the practical hall to become a neat and pleasant place to work for all students. Remember, you are not the only one using the room and associated equipment. You would like to find it clean, so leave it tidy for the next person.

(a) The laboratory must be kept neat and orderly at all times.

(b) Keep the work area free from unnecessary apparatus, paper, chemicals, waste.

(c) All spills must be cleaned up before continuing work or other tasks.

(d) All paths to exits must be kept clear and unobstructed.

(e) All paths to emergency shower and eyewash areas must remain unobstructed.

(f) Label clearly all chemical containers for easy identification by all.

(g) Rinse broken glassware before disposal into the "Glass Waste" container.

(h) Safely transfer "organic waste" into the proper waste container.

(i) Transfer waste paper, gloves, packing material, wood into the regular waste container.

(j) Clean all your equipment and put it away before leaving.

(k) Clean your work area completely before leaving.

(l) Return all unused chemicals to their proper storage places.

OTHER LABORATORY PRACTICES:

(a) Do not store food in the practical hall refrigerator. It is for chemicals only.

(b)) Do not eat in the practical hall\

(c) Do not drink in the practical hall.

(d) Do not smoke in the practical hall.

(e) Do not fun in the practical hall

(f) Do not bring visitors in the practical hall.

(g) Do not wear shorts while working in the practical hall

(h) Do not wear sandals while working in the practical hall

(i) Do not bring or play a radio in the practical hall

ACCIDENT AND INJURY PREVENTION:

The first rule of self-protection is to be alert at all times to potential hazards in the lab. Make a conscious effort to prevent accidents. Do not that others will watch out for you.

(a) Wear your eye protection when working with chemicals.

(b) Handle all chemicals with respect.

(c) Do not allow chemicals to come in contact with your skin or clothing.

(d) Do not breathe or taste chemicals.

(e) Always recheck labels.

(f) Do precaution while working with chemicals on safe handling and storage tips.

(g) Do not mix chemicals.

(h) Use your hood to prevent inhaling chemicals.

(i) Do not tamper with safety devices such as fire alarms.

(j) Do not attempt to repair equipment that you are not qualified to repair.

(k) Store left-over chemicals in their original container.

(l) Always be prepared to leave the building when the alarm sounds.

(m) Keep ready the fire extinguisher

(n) Be ready first aids box for emergency

CLOSE OUT PROCEDURE:

According to check list check everything during closing department.

1.Check either all gas burners on/off
2.Check all electrical switch on/off
3.Check all water tap on/ off
4.Check instrument either on/off
5.Check windows close/open
6.Check all the chemical bottles properly keep yes/not
7.Check all students leave the practical hall yes/ not

Maintenance of practical hall:

G. Daily Maintenance:

Sr. No.	Activities	Responsibility	Duration
1.	Routine services or maintenance	House Keepers	Daily
2.	Keeping the practical hall clean & tidy	House keepers	Daily
3.	Practical hall security with lock system	Supervisor	Daily

B Furniture Maintenance:

Sr. No	Activities	Responsibility	Duration
1.	Tables , stool, Chairs, repairs, Rack etc	Department furniture in charge	As per requirement

C. Gas Burner Maintenance:

Sr. No	Activities	Responsibility	Duration
1.	Gas burner checking	Department gas operator incharge	Weekly

D) Annual maintenance:

Sr. No	Activities	Responsibility	Duration
1	Ventilation / window treatments	Institution technician.	Yearly
2.	Paints, Cracks, white wash	Administrators of respective department	Yearly

Practical Hall

Checklists for the housekeepers

- Housekeeper will open the Practical Hall at around 8.AM in the morning, on all working days.
- He /She open the curtains and windows as per requirement to have proper aeration and ventilation.
- He/she should have to wipe and remove the dusts daily.
- Remove spider webs from wall and roofs once in a week.
- In the evening during closing the housekeepers should have to close all the windows, curtains and switch off all the electrical appliances.
- At the end He/She should have to lock the room and collects the key and drop the key in the office room at 5.00PM daily, on all working days.

Prepared by, **Approved by,**

Incharge, **Prof and Head,**

Dept. of Biochemistry **Dept. of Biochemistry**

SOP For Office Room

Room No – G19

Introduction:

One separate room is there for departmental official work purpose.

In charge:

- Heads of the Departments.
- Dean of the institution.

Plan: Area 15 sq. m.

Objective: 'To elaborate the procedure for maintaining Office room.

Responsibility:

- House Keepers
- All the teaching / non –teaching staff members.
- Furniture in charge of the respective departments.
- Institution technician / System Administrator of respective department.
- Heads of the respective department.

Procedure:

Daily maintenance:

Sr. No	Activities	Responsibility	Duration
1.	Routine services or maintenance	House Keepers	Daily
2.	Keeping the rooms clean & tidy	House keepers	Daily
3.	Rooms security with lock system	Supervisor	Daily

Electrical & Furniture maintenance:

Sr. No	Activities	Responsibility	Duration
1.	Allotment rooms	HOD	As per requirement
2.	Arrangement / Repair of Cupboards, chairs, tables, stools	Department furniture in charge	As per requirement
3.	Repair of existing electrical outlet – light bulbs, tube lights & fans	Department Electrical in charge	As per requirement
4.	Departmental computer	Department/ Electrical incharge	As per requirement
5.	Departmental Printer	Department/ Electrical incharge	As per requirement

❖ **Annual maintenance**:

Sr. No	Activities	Responsibility	Duration
1.	Arrangement / Repair of Cupboards, chairs, tables, stools	Department furniture in charge	Yearly
2.	Repair of existing electrical outlet-light bulbs, tube lights & fans replacement	Administrator of respective	Yearly
3.	Paints, Cracks, white wash	Administrators of respective department	Yearly

File Maintenance

*Files for NAAC, NMC should have to be Maintained and Updated with the help of teaching faculties /files should have to be updated weekly

* Make sure all the files had been Kept safely and Locked

Departmental Office Room

Checklists for the housekeepers

Housekeeper will open the **Departmental office Room** around 8.AM in the morning, on all working days

He /She open the curtains and windows as per requirement to have proper aeration and ventilation.

He/she should have to wipe and remove the dusts and spider webs from wall and roofs once in a week.

In the evening during closing the housekeepers should have to close all the windows, curtains and switch off all the electrical appliances.

At the end He/She should have to lock the room and collects the key and drop the key in the office room at 5.00PM daily ,on all working days

Checklists for the Clerk

1. Clerk will switch on the **Departmental office computer** around 9.10.AM in the morning, on all working days
2. He /She should have to Sort out the mails, whether it had been delivered to the concerned person or not
3. He /She should have to Sort out the received mails, and he /she should have to forward it to the concerned person through HOD
4. He/ She should have to Type, format, or edit routine memos or other reports (Marks entry,Students Attendance ,Faculty Monthly attendance)

Prepared by,

Incharge,
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Approved by,

Prof and Head,
Dept. of Biochemistry

Dr. Vithalrao Vikhe Patil Foundation
Ahmednagar

DEPARTMENT SOP BOOKLET

DR. VITHALRAO VIKHE PATIL FOUNDATION'S

MEDICAL COLLEGE & HOSPITAL

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MEDICAL COLLEGE & HOSPITAL

DEPARTMENT OF BIOCHEMISTRY

INSTRUMENT & EQUIPMENT SOP BOOKLET

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INSTRUMENTS AND EQUIPMENTS SOP

Name of the Instrument : ELECTROPHORETIC APPARATUS

Company : Systronics

Model : 606

Year of purchase : 2006

Principle:

Electrophoresis is a technique used to separate a mixture of Particles. The migration of charged particles in liquid medium occurs under the influence of an electric field. Many important biological molecules like peptides, proteins, nucleotides, nucleoproteins etc. possess invisible groups, due to which they can act as cations or anions at a given pH & migrate towards oppositely charged electrodes.

Apparatus:

Two buffer bases with bottle plates containing buffer are used in the process. Each buffer contains an electrode of either platinum or carbon, the polarity of which is fixed by the mode of connection to the power supply. The electrophoretic support on which separation takes place may contact the buffer directly, or by means of wicks. The entire apparatus is covered to minimize evaporation & protect the system & is powered by a direct current power supply. A power pack is used to supply either constant current or constant voltage.

Procedure for operation:

General procedure: Procedure divided into two steps:1. Separation 2. Detection & quantification.

Separation:

A hydrated support material, such as freshly prepared agarose gel or previously wetted cellulose acetate is blotted to remove excess buffer & then placed into the electrophoretic chamber. Care should be taken to avoid no excess liquid or bubbles on it. The sample is added to the support, which is placed in the contact with the buffer previously added to the electrode chamber. Electrophoresis is conducted for a determined length of time under condition of either constant voltage or constant current.

After completion of electrophoresis, the supporting medium is placed in a fixative (7% acetic acid) to present diffusion of separated fractions. The separated fractions are then visualized by using appropriate stains, e.g. Bromophenol blue for plasma proteins & Sudan black for lipoproteins. After excess dye is washed out, the support is dried or placed in a cleaning agent.

Detection or Quantification of each fraction is done by following methods:

a. Densitometry: In this instrumental method the electrophoretic strip (electrophoregram) is moved past a measuring optical system & the absorbance of each fraction displayed on a recorder chart or cathode ray tube (CRT). In most cases the area under each speak is integrated automatically.

b. Elution: Followed by dissolving bands in N/10 NaOH & optical density of each fraction measured by colorimetrically or spectrophotometrically.

Applications

Separation of peptides, serum proteins, Nucleic acids, nucleotides & charged Carbohydrates derivatives. Separation of glycoproteins, lipopro- teins, & haemoglobin variants.

Prepared by,

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Name of the Instrument: DIGITAL COLORIMETER

Company : Kanad Vidyut

Model : HANS 556

Year of purchase : 2012

Principle:-

The colorimetry is a technique by which concentration of a substance in a biological material is estimated by developing colour with suitable reagent.

Substance to be analysed in biological material + Reagent ⟶ Coloured complex

Procedure for operation:

1. Switch on the power button
2. Select the filter according the requirement of test
3. Set zero optical density with water by adjusting course adjustment knob
4. Take the test sample in cuvette
5. Read the Optical density

Calculatons

$$\text{Conc. of unknown} = \frac{\text{O.D. of unknown}}{\text{O.D. of Std.}} \times \text{conc. of Std.(mg/ml)} \times \text{volume of Std.} \times \frac{100}{\text{Vol. of sample}}$$

Conc. of unknown solution is also measured by plotting a graph of standard conc. against optical density (O.D.)

Applications

Colorimetry is used for the estimation of various biochemical compounds in various biological samples like blood, plasma serum, CSF, urine & other body fluids.

Colorimetry technique is routinely used for biochemical estimations, such as glucose urea, creatinine, uric acid, bilirubin, total protein etc.

Prepared by,

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Name of the Instrument : pH METER

Company : Lab Junction

Year of purchase : 2012

Principle: -

When the pair of electrode or a combined electrode (is glass & calomel electrode) is dipped in aqueous solution a potential is developed across the thin glass of the bulb. The e.m.f. of complete cell (E) formed by the Linking of these two electrodes at a given solution (temp. is there). Ref. is the potential of stable calomel electrode at normal room temp. is +0.250V E glass- is the potential of the glass electrode, which depends on the pH of the solution under test.

The resultant small e.m.f. can be recorded potentiometrically by using vacuum tube amplifier. Variation of pH with E may be recorded directly on the potentiometer scale graduated to read pH directly. Composition of pH meter: pH meter is composed of a reference electrode glass electrode & electrometer or potentiometer.

Procedure for operation:

1. The test solution whose pH is determined is kept in a beaker.
2. Glass & calomel electrodes are dipped in it.
3. The care should be taken that glass bulb should dip completely.
4. First adjusting zero & Standardizing the instrument by using buffer of pH 7.
5. The pH of unknown solution can be measured or displayed directly on pH meter.

Applications

1. To measure the pH of various biological fluids.
2. To adjust the pH of buffer solution which are used in enzyme assays.
3. To adjust the pH of various reagents used in biochemical assays.
4. Clinical application is to measure the pH of blood gases, CO_2 & O_2 & bicarbonate using blood gas analyser.

Prepared by,

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Name of the Instrument: FLAMEPHOTOMETER

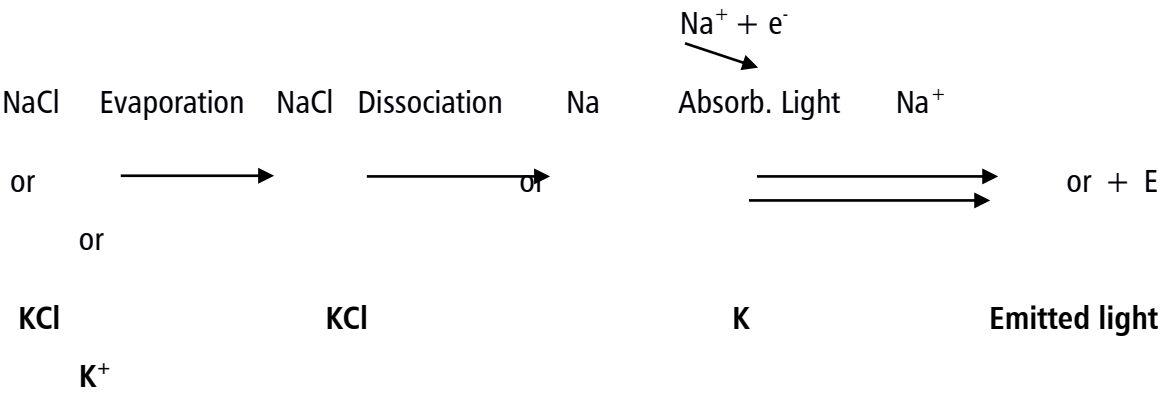
Company : CHEMI LINE

Mode : CL412

Year of purchase : 2012

Principle:-

Atoms of alkali metals like Na^+, K^+, Ca^+ and Li^+ become excited relatively easily when given sufficient heat energy as supplied by a hot flame. In other words, the electrons at the ground state of such atoms when excited attain a higher energy state. There electrons while coming back to their original ground state, they emit energy in the form of photons of light of characteristics wavelength unique to each alkali metal. The intensity of radiant energy of characteristic wavelength produced by the atoms in the flame is directly proportional to the no. of atoms excited in the flame, which in turn is directly proportional to the concentration of the alkali metal in the sample.



It is also called as photosensitive detector used to sense the emitted light. It converts light energy into electric energy.

Procedure for operation:

- Dilute the sample 1 to 100 in double distilled water (Electrolyte Free).
- Insert the proper filter.
- Start the machine (from main switch).

- Regulate the required air pressure (0.3 to 0.6 Kg /cm^2) to convert sample into steady fine spray of droplets.
- Place a cap containing double D/W under the aspirator & adjust the flame with double D/W (Blue flame).
- Adjust the galvanometer to "Zero."
- Feed appropriate standard using appropriate knob. For e.g. Na^+/K^+ 120/2.0 (lower standard).
- Then feed successively 140/4.0 or 160/6.0 standard (higher Standard).
- Aspirate double D/W & then feed diluted sample & note the reading.

Applications

It is an instrument used to measure the concentration of metal ion such as Na^+, K^+, Ca^+, and Li^+ in biological fluids such as Blood, Urine, CSF etc.,

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Name of the Instrument: SPECTROPHOTOMETER

Company : CHMILINE

Model : CL/310

Year of purchase : 2012

Principle:-

The spectrophotometer is a technique by which concentration of a substance in a biological material is estimated by developing colour with suitable reagent.

It is similar to colorimeter; however the monochromater is not a filter but prisms and grating which produces very small band of light wave length and having more accuracy.

Substance to be analysed in biological material + Reagent ⟶ Coloured complex

Procedure for operation:

1. Switch on power button on back side
2. Switch on the instrument after 30minutes of warm up time the instrument is ready for further operation
3. Switch on the lamp on which you have work (i.e. For 200nm to 360nm UV and 360 nm to1100mm vis)
4. Select the lamp selector to particular lamp
5. Select the wavelength according the requirement of test (UV or visible wave length)
6. Select the filter according to the requirement (UV or visible range)
7. Set Zero absorbance or 100% T with water by adjusting course and fine adjustments knob
8. The instrument is ready for use.
9. Put the sample and select the desired range through mode switch
10. Read the optical density

Applications

A spectrophotometer as important uses, mainly being in the sciences i.e., Chemistry, Biochemistry, Biology and medical field and the purpose being research.

In the medical fields, the spectrophotometer holds a tremendous amount of importance as the measurement of coloured as well as colourless solutions.

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Name of the Instrument: DISTILLATION PLANT

Company : J-Sic

Year of purchase : 2005

Purpose

Distilled water is used in the preparation of reagents and also in the analysis of specimen because of its neutral pH(7.0) & it should be free from interfering ions. Tap H_2O is not suitable as it contains various interfering ions like Na, Cl, Mg etc..,

Procedure for operation:

1. The inlet is connected to tap by rubber tube & tap water is introduced into the instrument. The tap water level is checked by the over flow pipe. This ensures the sufficient water over the heating coil.
2. By putting on the electrical connection the coils are heated.
3. The water boils, the vapours are collected in the condensers and distilled water trickles through the outlet and collected in a flask

Application

Distillation plant is used to prepare distilled water, the from tap H_2O

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Name of the Instrument: HOT AIR OVEN

Company : LABIN

Model : LI-THO-02

Year of purchase : 2006

Principle: -

Dry heat, as the name indicates, utilizes hot air that is either free from water vapour, or has very little of it, and where this moisture plays a minimal or no role in the process of sterilization

Purpose : Sterilization

Temperature used for hot air oven

160°C – 45 min

170°C – 18 min

180°C – 7.5 min

Procedure for operation:

1. Switch on hot air oven
2. All material to be sterilized should be properly rapped
3. Insure enough space is available for air circulation
4. Close the hot air oven properly.
5. After sterilization let the instrument cool for latest 1hour. Then only open the door, because material inside may crack if come in contact with cool air & inside hot air may burn the person who immediately opens it.

Applications

For sterilization of glass wares, metal instruments used in Operation Theater/ Hospital OPD for dressing purpose.

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Name of the Instrument: INCUBATOR

Company : LABIN

Model : L1-B1-0-0255

Year of purchase : 2005

Principle: -

Incubator depends on the principle of thermoelectricity. It has thermostat which maintains a constant temperature by creating a thermal gradient.

Procedure for operation:

1. Switch on the machine
2. Set the temperature at 37 c generally by digital course & fine adjustment
3. Keep the media inside for required time and temperature range
4. After the use switch it off
5. Temperature should be kept to check regularly inside temperature by thermometer or digital temperature should be checked daily

Applications:

Used for various estimation of biological constituents in biological fluids for reactions carried out at specific temperature eg. Estimation of ALP, AST/ALT, Amylase, DNA isolation etc.

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Name of the Instrument: VORTEX MIXTURE /CYCLOMIXER

Company : REMI

Model : cm-101

Year of purchase : 2012

General Operating & Safety Instructions

1 Platform Installation or changing

- ✓ Turn power to the "OFF" (O) mid position
- ✓ Remove the installed attachment by pulling straight up while holding the base
- ✓ Place alternate attachment on the post and rotate until "flats" align
- ✓ Press the attachment down firmly until it snaps into place

2 For Intermittent Operation

Push the switch to the "TOUCH" or fully down position

3 For continuous operation

- ✓ Push toggle switch to the fully up on "ON" position
- ✓ Turn the speed knob to the "3" position,the mixer will not run below this setting
- ✓ If in continuous or "ON" mode, motion will start immediately
- ✓ If in intermittent or touch mode, the vessel must come in contact with the attachment before motion will start
- ✓ Vary the speed on the dial and/or the angle of contact and pressure in "Touch" mode to achieve the desired mixing
- ✓ Turn the switch to the "OFF" or center position when finished

4 Safety:

- ✓ DO NOT lift the Vortex mixer by the attachment, the base can drop violently
- ✓ Unplug before cleaning, never immerse the base component
- ✓ Attachments can be cleaned with normal soap and water

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Name of the Instrument : CENTRIFUGE

Company : REMI

Model : R-8C

Year of purchase : 2006

Introduction

The purpose of this Standard Operating Procedure (SOP) is to provide guidance for the safe operation of centrifuges and rotors in the laboratory. Centrifuges are a commonly used piece of laboratory equipment. Centrifuges spin at high speeds to separate substances with different particle sizes or densities. All centrifuges, including microcentrifuges, can be hazardous if used or maintained improperly.

Handling Procedures

To avoid accidents and injury, always follow the manufacturer's operating instructions for the centrifuge being used. Make sure rotors are used in the proper centrifuge. (e.g. Beckman rotors should be used only in Beckman centrifuges equipped to handle the specific rotor in question.)

Inspect centrifuge:

Look over the centrifuge and rotor prior to use.

1. If visible, ensure centrifuge spindle is clean.
2. For ultracentrifuges, make sure the classification decal on the centrifuge and rotor match.
3. Check that rotor, safety cups and/or buckets do not have signs of corrosion, cracks or deformities.
4. Ensure centrifuge and rotor are dry.
5. Make sure the rotor is properly seated on the drive shaft.
6. Ensure rotors are properly attached
7. Check that safety cups/buckets are properly seated and able to move freely.

Prepare samples:

1. Select appropriate tubes or containers for rotor, sample and speed.

- Tube/container and rotor bottoms must match. E.g. conical bottom rotors need conical bottom tubes.
- Sample must be compatible with tube/container material.
- Tube/container must be rated for speed being used

2. Inspect tubes and containers for cracks or flaws before using.
3. Avoid overfilling or underfilling tubes and containers, make sure to follow manufacturer limits when given.
4. Make sure lids are tightly secured.
5. Balance tubes, see the Balance rotor and containers section below
6. Make sure the exterior of the tubes and/or containers are clean and dry prior to centrifugation.

Balance rotor and containers

The most common cause of centrifuge accidents is user error, especially involving imbalanced rotors. All centrifuge runs must have at least two samples and cannot have only one open space in the rotor.

When balancing rotors remember:

- Both the weight and the density of the materials being centrifuged must be balanced.
- When running a balance tube make sure the contents of the balance is the same as (or as close as possible to) the one inside the sample tube(s).
- Always weigh your containers, with caps on, to ensure they are balanced prior to centrifuging.
- Consult the operator's manual for the centrifuge to determine the amount of imbalance it can withstand.

Centrifuges are most easily balanced with containers in pairs, placed directly opposite each other. Three containers can be balanced in circular centrifuges by forming an equilateral triangle.

Run centrifuge

- Ensure lid of centrifuge is properly closed.
- Set run speed and time, never exceed the rotor's maximum run speed.
- Do not leave the centrifuge until full operating speed is reached and the machine appears to be running safely.
- Stop the centrifuge immediately if you notice any unusual noises or shaking.
    - Confirm rotor is properly seated and balanced.
    - If problems persist, discontinue use and contact supervisor.
    - Do not use centrifuge until it has be serviced by a qualified technician.

Make sure the rotor has come to a complete stop before opening the lid.

Cleaning reusable centrifuge tubes and bottles

Appropriate cleaning of reusable tubes and bottles is necessary to prolong their life and avoid having them break or collapse during centrifugation To clean centrifuge tubes and bottles:

- Wash with mild detergent in warm water, rinse them thoroughly with clean water and allow them to air dry.
- Avoid cleaning plastic containers in automated dishwashers or glassware washes because they are frequently too hot.
- Autoclave tubes only if absolutely necessary, keep the temperature at or below 100ºC and autoclave for 15 minutes.

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Name of the Instrument: WATER BATH

Company : KUMAR

Model : KI-31-02

Year of purchase : 2004

Aim: To lay down the procedure for operation of water bath.

Procedure:

1. Connect the power supply.
2. Ensure the water level in water bath is sufficient to pour the heating element.
3. Switch "ON" the main power supply and instrument mains.
4. Temperature setting
5. Press SET key to set the required temperature. press ↑ to increase the temperature and ↓ to reduce the temperature
6. The temp. Sensor will maintain the set temp. During use of water bath.
7. Switch "OFF" the instrument mains & main power supply after use.

Attention

1. DO NOT add too much water, so as not to overflow during water is boiling.
2. After used the water bath, you should drain away water in time, clean the working chamber, so as to extend life span of instrument

Instructions:

Glowing of Red lamp indicate mains "ON" & Glowing of yellow lamp indicate heater "ON"

3. Always ensure platform & surrounding are dry.
4. Use only Purified water to fill water bath.
5. Always. Switch "OFF" the mains on completion of water bath use.
6. Do not disturb the capillary (Temp. Sensor) located near the heater.

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Name of the Instrument: CHROMATOGRPHY

Company : ACCO

Model : AC-095-01

Year of purchase : 2006

Principle

Chromatography is a physical method of separation of the components of a mixture during their passage through a porous media by a virtue of their differential distribution & migration rates in two immiscible phases – the stationary phase– the mobile phase

The distribution of a substance in a given biophasic solvent system. It is given by the ratio of its concentration in two phases & is called distribution co-efficient or partition coefficient (kd)

$$kd = \frac{\text{Concentration of the substance in solvent A}}{\text{Concentration of the substance in solvent B}}$$

Due to this difference in kd values of the various component of a mixture, their mobility intwo ohase differ. A measure of this mobility is called Rf value i.e. relative fraction value. It is calculated as

$$Rf = \frac{\text{Distance travelled by substance}}{\text{Distance travelled by solvent}}$$

Apparatus

1. Chromatography chamber

2. Support Medium

A sheet of Whatman Filter papper No -3, its size 15 X 30 cm, which soaked in aqueous solvent

i.e. Butanol, Acetic Acid, & Water in the ratio of 12: 3: 5 respectivly of which poloar solvent is absorbed by paper & acts as the moblie phase.

3. Glass Capillaries Or Autopipette

4. Ninhydrin solution

5. Dryer

Procedure for operation:

A cut the Whatman Filter paper No- 3 in rectangular shape & appropriate size i.e. 15 X30 cm . From lower end of paper (3cm) draw a line, every 2cm on line mark circle, apply the mixture to be separatedis spotted in the circle with the help of glass capillaries or autopipette. This paper allowed to dip into the solvent mixture in tray which is filled with solvent mixture in the chromatography chamber.

The solvent moves up the filter paper. The component are also carried along with solvent. The components migrate at different rate depending upon their solubility in the solvent to certain distances on the filter paper. Afterwards they stop migrating. But solvent rises up leaving behind components if the mixture.

The migration is stopped as the solvent reavhes near upper edge of filter paper. The filter paper is remived & allowed to dry or dry it with help of dryer. Position of solvent called solvent front is marked on the filter paper. When paper is dried then stained with ninhydrin (in case proteins & a.a.) Then the positions of different spots are observed.

The individual components are identified by their Rf values.

Applications:

1. Paper chromatography is used for detection of amino acids, sugars, pigments etc.

2. Clinically paper chromatography is used for identification of types of amino-aciduria like cystinuria, phenylketonuria etc.

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Name of the Instrument: Digital Balance

Company : Citizen

Model : CY220

Year of purchase : 2005

SETTING UP THE BALANCE

Assembly of elements for scale with precision with 10mg:

- Put pan scale on gum mandrels
- Put cover on scale using pins in back part of balance cover
- After assembly check if scale touches gum mandrels
- Turn power supply on plug in feeder to socket at back of balance casing
- Display shows digits and then display shows 0.00g
- If indication is not zero press tare key

Assembly of elements for scale with precision with 1mg:

- Put pan scale on gum mandrels
- Put glass shield on scale using masking frame which is on balance cover ,
- Put upper cover on cover of scale
- After assembly check if scale touches gum mandrels
- Turn power supply on plug in feeder to socket at back of balance casing
- Display shows digits and then display shows 0.000g
- If display doesn't show zero press tare key

CONDITION OF APPROPRIATE USING

- Scales should be used and stored in rooms without vibrations and shakes, without drafts and dust
- Temperature of air should be + 15°C ÷ + 35°C
- During using balances changes of temperature shouldn't be higher than 0.5 °C per one hour
- Scales should be replaced on wall console or stable table, far from sources of hearing
- Strong magness is installed inside of balance- so it's important to be carefull during weighing magnetic material. Use hang loads if it's possible not to expose magnetic load to magness influence. Suspension is replaced on basic of the balance.
- If static electricity has influence on scale annunciators it's necessary to connect ot to earth. Earth screw is replaced in back part of balance base
- Scale should be replaced in horizontal level to assure precision of weighing.

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Name of the Instrument: MAGNETIC STIRRER

Company : REMI

Model : RR- 127A

Year of purchase : 2002

Objective:

To lay down the procedure for Operation, Cleaning and Maintenance of magnetic stirrer

Scope:

This SOP is applicable for Operation, Cleaning and Maintenance of manestic stirrer of Laboratory of biochemistry dept.

Maintenance and Usage Recommendations

1. Magnetic stirrer should be used on level surfaces.
2. If hazardous vapours will not be produced, hot plates should be in an area free of drafts to ensure heating efficiency.
3. Keep the top surface of the magnetic stirrer clean. Use a non-abrasive cleaner to clean the surface and the outside of the unit.
4. Replace the top surface if damage.
5. Maintain the instrument logbook, containing this SOP, temperature control record and/or maintenance repair logs, and associated instruction manuals in the immediate vicinity of the instrument.

Magnetic Stirrer Operation

1. Stir bar should be placed in the sample vessel prior to mixing.
2. Place the vessel on the stirrer so that it is centred. For stirrers with multiple stirring blocks, centre the sample vessel over a stirring block.
3. Turn the instrument on (refer to instruction manual for instrument-specific procedures).
4. Set the stirring speed (refer to instruction manual for instrument-specific procedures).
5. Note that the stirring speed will be affected by liquid viscosity, the size of the stir bar, vessel size, and thickness of vessel bottom.
6. When stirring is complete, turn magnetic stirrer off and remove sample.

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Name of the Instrument: Microscope

Company : Olympus

Model : HSA

Year of purchase : 2012

Objective:

To lay down the procedure for Operation, Cleaning and Maintenance of Microscope

Scope:

This SOP is applicable for Operation, Cleaning and Maintenance of Microscope in biochemistry Laboratory of pharmaceutical formulation Unit.

Procedure:

1) Operation

- ✓ Ensure that the microscope and its surrounding area is clean.
- ✓ Plug the microscope power cord in to electrical out let.
- ✓ Turn on the microscope by rotating the illumination control knob on the bottom left side of the instrument.
- ✓ Set the intensity of light to the lowest setting using illumination control knob.
- ✓ Fully open the aperture diaphragm of the condenser by rotating the ring to the extreme right.
- ✓ Using the sub stage condenser focusing knob, raise the condenser to the top of its excursion.
- ✓ Critical illumination only: If the condenser travel is excessive, limit the travel with the thumbscrew under the sub stage until the top lens of it is just below the stage surface (0.35mm)
- ✓ Place the specimen slide on the stage.
- ✓ Rotate the nosepiece to move the objective (40 X for dry mount and 10 X for wet mount) into working position.

- ✓ Raise the stage by rotating the coarse adjustment knob to its positive stop. Using the fine adjustment knob, bring the specimen into sharp focus.
- ✓ Adjust the eye tubes for inter pupillary distance and eye difference. The left eyepiece tube is focusable to compensate for refractive differences of the eyes.
- ✓ To correctly set the eye tubes, focus on the specimen through the right eyepiece tube only. Use the fine adjustment knob while covering the left eyepiece or closing the left eye.
- ✓ Next, focus the specimen through the left eyepiece by turning the eye tube. Cover the right eyepiece while doing this and be sure to focus with the left eye tube only, without using the focusing knob.
- ✓ Remove an eyepiece and view the back aperture of the objective. Close the condenser aperture diaphragm and then, to obtain the full resolving power of the microscope, reopen until the diaphragm leaves just disappear from view. Replace the eyepiece. The aperture diaphragm can be adjusted to enhance contrast and/or increase the depth of focus.
- ✓ When changing to higher power objectives, the positions of the aperture diaphragm must be reset.
- ✓ As magnification increases, the aperture diaphragm must be opened as required.

2. Cleaning and Maintenance

- ✓ Whenever lack of contrast, cloudiness or poor definition is encountered, Clean the lower magnification objectives and optical surfaces with a lint free cloth or lens tissue moistened (not wet) with methanol.
- ✓ Clean the front lens with a toothpick covered with a cotton tip wetted with methanol.
- ✓ Avoid excessive use of solvent for cleaning.
- ✓ Cover the microscope always with dust cover, whenever the microscope is not in use.
- ✓ Wipe the bottom of Oil immersion lens of a fast absorbing tissue paper before and after using the lens.

✓ Use Xylene to clean the lens surfaces.

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Name of the Instrument: Homogenizer

Company : INCO

Year of purchase : 2012

Standard operating procedure of Homogenizer

Objective: These instructions describes the usage, maintenance and calibration of homogenizer system which is kept in biochemistry Dept .laboratory.

Scope: This apparatus is applicable for homogenizing solutions and should not be used for irrelevant cases.

Operation:

1. Connect the plug into the socket.
2. Fix the homogenizer apparatus on its special bars via its specific clamps.
3. Turn on the apparatus by the power button which is located in the back of the apparatus
4. Adjust the speed rate (RPM) by bottom and top arrows which is located in front of the apparatus.
5. Enter the specific probe into the first hole on the beam of the probe into the liquid which requires to be homogenized. Note that the minimum mentioned item must be followed.
6. Thorough cleaning is necessary after each use, rinse the probe at 5000 rpm (every one 5minute) with chloroform, methanol, and ethanol (70 %), respectively.
7. At the end don't forget to turn off the apparatus.

Warning and safety precautions: The homogenizing procedure should not be carried out over than 18,000 RPM. Turn off the apparatus as soon as possible if an abnormal sound is heard. Avoid putting not closed volatile and toxic substances on the table.

Maintenance: After completing the procedure, turn off the apparatus and rinse the probe, respectively, by chloroform, methanol, and ethanol (70 %).

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Name of the Instrument: Refrigerator

Ccompany : LG

Model : GL 85 BEG5

Year of purchase : 2012

Operation and Cleaning of Refrigerator

OBJECTIVE: To lay down the procedure for operation and cleaning of Refrigerator.

SCOPE : This SOP shall be applicable to the Quality Control Dept.

PROCEDURE:

1 Operation:

a) Connect the power plug to the main power sockets and switch on the power supply.
b) Put thermometers in the refrigerator compartment and freezer.
c) Set the thermostat control knob to 'NORMAL' position
d) Load the refrigerator with the items to be stored between 2-6°C.
e) In case the temperature (2-6°C for the chamber) is not achieved increase cooling by setting the thermostat to 'MAX' position.
f) To take out the articles, open the door of refrigerator & take out the articles and close the door again
g) g. Monitor the temperature once a day in the format. Limit: Deep freezer: 3° C ± 2° C Refrigerator: 4° C ± 2° C 5.2

2. Cleaning:

a) Once in a week, Put off the Refrigerator. Remove all the items from the refrigerator and clean the inside surfaces and shelves with a clean duster dipped in the disinfectant solution.(3 % v/v Dettol Solution)
b) Record the cleaning in the "Equipment Cleaning Register"

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Name of the Instrument: Fume cupboard

Model : Wooden

Standard Operating Procedures for Safe Operation of Chemical Fume Hoods

Purpose:

To provide instruction on the proper use of chemical fume hoods to control exposure to hazardous materials. All users of fume hoods shall be familiar with the procedures described below.

Fume hoods should be used for all activities/experiments that may create hazardous airborne contaminants, with the exception of biological agents.

Safety Precautions:

All operators must receive training on the safe operation of the fume hood prior to using the equipment. Training may be delegated to a qualified individual, but it remains the responsibility of the PI to ensure their personnel are adequately trained.

o Don the required PPE, including lab coat, gloves and eye/face protection.

o Substitute toxic chemicals with less hazardous materials whenever possible.

o Ensure work area is unobstructed. If materials must be stored in the hood (e.g., in-use waste containers) place items adjacent to a side wall. To ensure proper function, the baffles at the lower rear of the hood and the airflow through the front opening must not be obstructed.

- ✓ Do not store chemicals in fume hood unless storage is the sole use of the hood.
- ✓ Always work at least 6" (15 cm) in from the front lip of the hood.
- ✓ Keep sashes as low as possible when working in the hood.
- ✓ -Do not extend your head inside of the hood while experiments are being performed.
- ✓ Perchloric acid at concentrations >70% must not be used in standard fume hoods. Heated or concentrated perchloric acid must be handled in specially designed hoods with wash down features to prevent formation of explosive perchlorates.

Other Considerations:

- ✓ If a fume hood is malfunctioning, do not attempt to use it. Post a sign indicating the hood is out of service and report the equipment problem to the appropriate departmental contact or create an on- line work request.
- ✓ Fume hoods use a large amount of energy, but closing the sash when not in use brings consumption down drastically. Always close the sash on the hoods in your lab when they are noting use.
- ✓ Keep fume hoods clean. Clean up any minor spills as they occur, and periodically clean inside of The hood
- ✓ If an experiment is left unattended in a hood, post a sign indicating what the experiment is and who to contact.

Procedure:

Preparation

- ✓ If it is your first time working with a material, or if you are unfamiliar with the hazards, review the applicable MSDSs. required PPE, including lab coat, gloves and eye/face protection.
- ✓ Plan your work so that you know what items and chemicals you need in the hood and the order which materials are to be dispensed and mixed.
- ✓ Ensure the fume hood is on and that the airflow is adequate (visually check flow alarm or use tissue wipe to see if flow exists).
- ✓ Retrieve chemicals and required items and place in the hood.

Operation

- ✓ Lower sash to a reasonable working height. (Maximum height is level mark on certification tag.)
- ✓ Uncap/open containers one at a time and dispense required amounts.
- ✓ When possible, use pipetting devices to avoid the need to pour liquids.
- ✓ When diluting, always add acids or base to water to avoid splashes of concentrated hazardous materials.
- ✓ If heating is required to dissolve a hazardous material, all heating must be done inside the hood in an uncapped container. Heating a sealed container may cause an explosion. Do not heat solutions which contain flammable solvents as diluents.
- ✓ Recap all containers and return chemicals to appropriate storage locations.

- ✓ Close sash completely.
- ✓ Should a spill occur, attempt to contain the spill at the source, assess the situation and evacuate the lab if necessary.

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INTRODUCTION TO CLINICAL BIOCHEMISTRY TO SPECIMEN COLLECTION

Clinical biochemistry is an area that concerned with biochemical changes in the body such as imbalances in the composition of blood, cerebral spinal fluid (CSF) and urine. Determine the contents of the abnormal sample by testing it in the laboratories. The result can aid doctors in making diagnosis, prognosis etc.

Discussion:

1. The most common samples that can be collected are blood, urine, stool, and CSF. The blood sample which includes serum and plasma can be obtained from the patient through phlebotomy. Phlebotomy is a process of blood drawing by piercing the vein and the process of piercing the vein known as venepuncture.

The procedure of phlebotomy consist of:

- ✓ Position the patient in a proper and comfortable way. Then, ask the patient to extend his/her arm
- ✓ Apply the tourniquet three to four inches above the puncture site. But do not place the tourniquet too tightly or too long (not > 2 minutes) to prevent haemo concentration from happening.
- ✓ Request the patient to make a fist without pumping the hand.
- ✓ Select the suitable venepuncture site. The available puncture site for venipuncture is the Median cubital vein, Cephalic vein, etc.
- ✓ Clean the patient's arm by using alcohol swab and allow it to air dry before puncture.
- ✓ Grasp the patient's arm and palpate or feel for the vein.
- ✓ The needle should insert through the skin into the vein in the form of 15 to 30-degree angle.
- ✓ Filling the blood into the vacuum blood collection tubes and remove the tourniquet during the filling of the last tube.
- ✓ Remove the needle from the patient's arm carefully and immediately press down on the gauze once the needle is removed from the arm. Adequate pressure is required to press down to avoid the formation of a hematoma.
- ✓ Dispose of the contaminated materials in the designated containers.

- Mix and label all the blood filled tubes

✓ For the size of needles that suitable for venipuncture are usually needles that range from 21 to 25 gauge. The smaller the needles gauze, the larger the diameter of the needle pore. Thus, The 21 gauze needles considered as the standard venipuncture needle for patients with normal veins and used primarily for large antecubital veins.

✓ The available size of the syringe is 1, 3, 5, 10, 15 and 20 milliliter (ml). The size one and three ml is the most typical type of syringe that used for venipuncture.

✓ Besides that, when a small amount of blood is required, capillary puncture which also called a finger stick or heel stick test can be carried out. This can be carried out by poking the skin with a lancet (a sharp needle) and collecting the blood drop onto a slide, test strip or capillary tube. The best site for capillary puncture is the center of the third (middle) finger pad.

✓ A urine sample can be collected in the variety of ways according to the type of specimen required. The most common three type of urine specimen is 24 hours urine, mid-stream urine and fresh urine.

✓ The 24 hours urine sample is used to determine the number of solutes in the urine, for example like proteins to prevent the solute diurnal variation which might affect the result. All the samples have to collect in a sterile, large, opaque container that capable of holding four liters of the sample until 24 hours are completed. 24 hours urine specimen are used to measure the amount of creatinine, urobilinogen, protein, and calcium.

✓ Cerebral spinal fluid (CSF) is the fluid that surrounds the brain and spinal cord. CSF is a very precious sample due to it only can obtain a very small amount at one time and the process of obtaining it is extremely painful. This painful process carries out on the fully awake patient by experienced clinicians through lumbar puncture.

✓ The common sample that required for the diagnostic test is blood, urine, stool and cerebral spinal fluid. Each of them has different collection method and container to place the sample. Furthermore, a proper sample labeling is very important for specimen identification.

Name of the Instrument : FULLY AUTOANALYZER (AGAPPE)
Company : AGAPPE

PURPOSE

To describe instruction for the operation and general maintenance of **Fully Autoanalyzer (Agappe)**.

SCOPE

To ensure that the instrument is used and maintained as per the manufacturer's specifications, instructions and requirements

OPERATING PROCEDURES

1 Empty waste container, check and fill diluents and wash solution (if needed).

2 Switch on the machine with the switch at the side of the instrument.

3 Starting the Operating Software.

4 Entering username and password let the instrument initialized.

5 Load control in the sample disc at position as instructed by instrument. Load the necessary reagent in the reagent positions. Check if all results are within range.

6 The machine can hold calibration data for two lots of reagents. Make sure that the reagents being used are already calibrated. If not, calibrate the machine using calibrators.

7 Before loading samples, it is very important to follow the instructions as follows:

8 Make sure that the sample collection is in the specified tube only. Using other tubes may cause the probe to hit tube and damage the instrument.

9 Ensure that there is sufficient amount of serum at the top and there is no fibrin plug blocking or else the probe can get blocked.

10 Load sample into the sample disc ensuring that barcode faces outward.

11 The instrument scan the barcode and downloads the worksheet automatically.

12 After analysis, result are transmitted to LIS

13 Repeat 6 to 12 for analyzing samples.

14 After all the samples have been run, unload all the samples the rotor.

15 If the number of tests is more than 59, the remaining samples can be loaded in real time as the sample positions get free. When opening the lid, make sure that the rotor is stationery. After fresh loading of samples, make sure that the sample id has been freshly allotted to that position and continue measurement.

16 Choose SHUT DOWN from the menu when machine in STAND BY mode

17 Switch off the machine with the switch at the side of the instrument.

MAINTENANCE

Refer to Annexure 1 for maintenance procedures for Agappe.

Assay Protocol

Go to the workplace tab

Select sample as routine or Stat

Assign the position for the sample

Enter the patient's name and Demographics

Select the tests to be done

Place the sample in the assigned position

Save the test entry

Press start to run

When the report is ready the machine will show the result in data review

QC Protocol

Go to the QC tab

Place the QC at the assigned position

Select status tab under QC

Select the Tests Parameters

Press Save and Start to run QC

Check the QC values for any outlier according to rejection criteria, if not accept the run and load patients samples.

Calibration Protocol

Go to the Calibration Tab.

Press Status tab

Select the parameter for Calibration

Select the method of calibration – 2 point/full calibration

Place the calibrator at the assigned place

Press save and start

Check for Calibration Acceptance / Failure

Run QC for the calibrated parameter and validate the run.

MACHINE MAINTENANCE:

Maintenance is performed on daily, weekly basis

Protocol For Daily Maintenance

Go to the Utility tab.

Select the maintenance type to perform

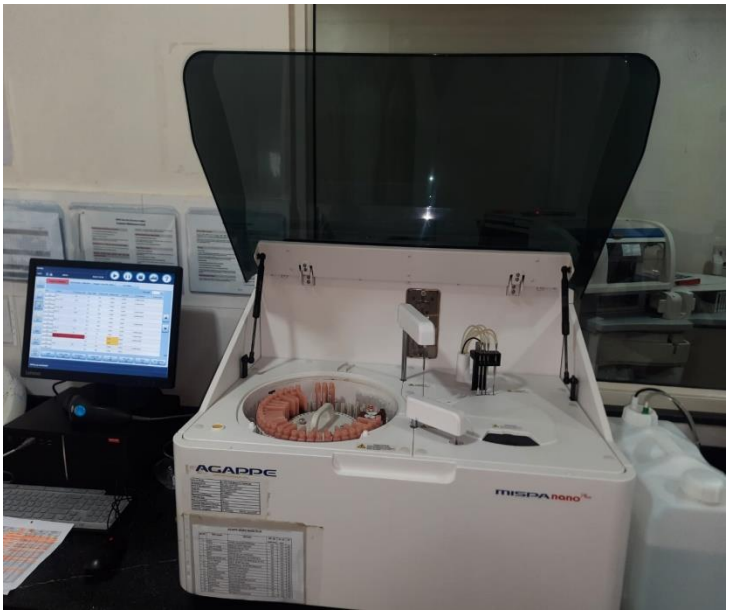
. Daily

. weekly

Select and start

DOCUMENTS GENERATED

1. Biochemistry control raw data file



Prepared by,

Incharge of Practical hall,

Dept. of Biochemistry

Approved by,

Prof and Head,

Dept. of Biochemistry

Name of the Instrument: FULLY AUTO ANALYZER

Company : Mindray

Model : DYPN- OM-06

Year of purchase: 2015

PURPOSE

To describe instruction for the operation and general maintenance of Mindray **BS -390 BIOCHEMISTRY** analyzer.

SCOPE

To ensure that the instrument is used and maintained as per the manufacturer's specifications, instructions and requirements

OPERATING PROCEDURES

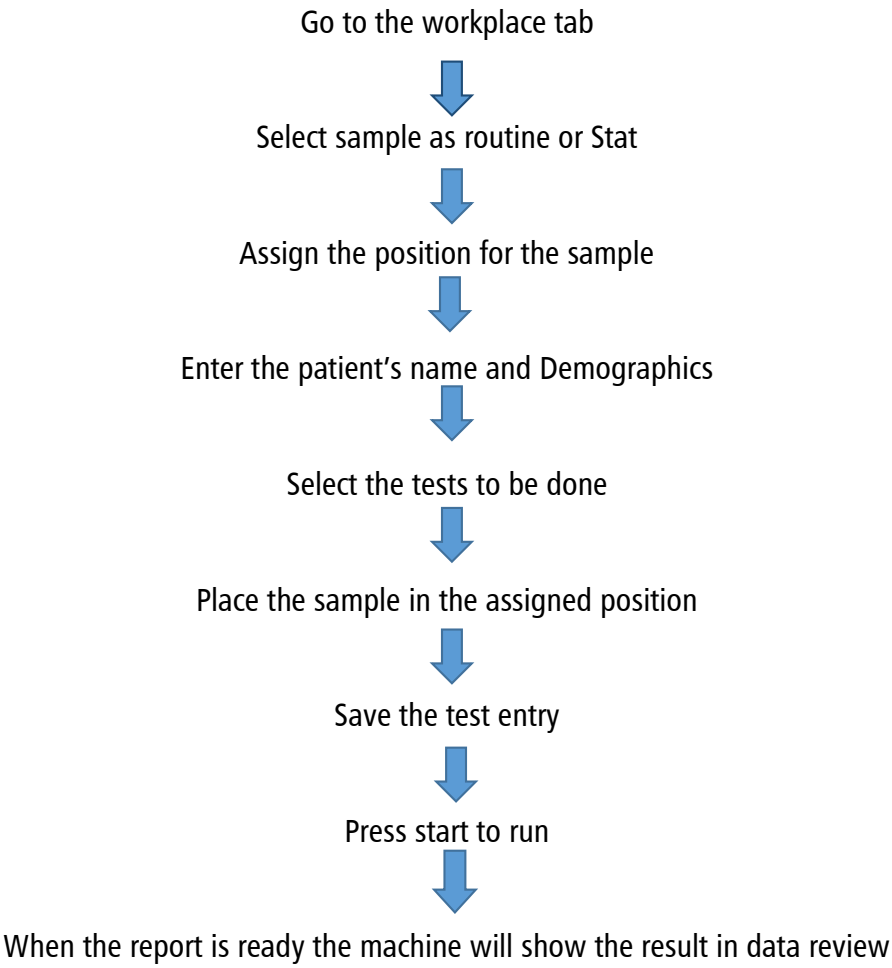
- ✓ Empty waste container, check and fill diluents and wash solution (if needed).
- ✓ Switch on the machine with the switch at the side of the instrument.
- ✓ Starting the Operating Software.
- ✓ Entering username and password let the instrument initialized.
- ✓ Load control in the sample disc at position as instructed by instrument. Load the necessary reagent in the reagent positions. Check if all results are within range.
- ✓ The machine can hold calibration data for two lots of reagents. Make sure that the reagents being used are already calibrated. If not, calibrate the machine using calibrators.
- ✓ Before loading samples, it is very important to follow the instructions as follows:
- ✓ Make sure that the sample collection is in the specified tube only. Using other tubes may cause the probe to hit tube and damage the instrument.
- ✓ Ensure that there is sufficient amount of serum at the top and there is no fibrin plug blocking or else the probe can get blocked.
- ✓ Load sample into the sample disc ensuring that barcode faces outward.
- ✓ The instrument scan the barcode and downloads the worksheet automatically.
- ✓ After analysis, result are transmitted to LIS
- ✓ After all the samples have been run, unload all the samples the rotor.

- ✓ If the number of tests is more than 49, the remaining samples can be loaded in real time as the sample positions get free. When opening the lid, make sure that the rotor is stationery.. After fresh loading of samples, make sure that the sample id has been freshly allotted to that position and continue measurement.
- ✓ Choose SHUT DOWN from the main menu When machine in STAND BY mode
- ✓ Switch off the machine with the switch at the side of the instrument.

MAINTENANCE

Refer to Annexure 1 for maintenance procedures for Mindray BS 390.

Assay Protocol



QC Protocol

Go to the QC tab

Place the QC at the assigned position

Select status tab under QC

Select the Tests Parameters

Press Save and Start to run QC

Check the QC values for any outlier according to rejection criteria, if not accept the run and load patients samples.

Calibration Protocol

Go to the Calibration Tab.

Press Status tab

Select the parameter for Calibration

Select the method of calibration – 2 point/full calibration

Place the calibrator at the assigned place

Press save and start

Check for Calibration Acceptance / Failure

Run QC for the calibrated parameter and validate the run.

Machine Maintenance:

Maintenance is performed on daily, weekly basis

Protocol For Daily Maintenance

Go to the Utility tab.

↓

Select the maintenance type to perform

. Daily

. weekly

↓

Select and start

DOCUMENTS GENERATED

1. Biochemistry control raw data file (Ref no. DYPN-BCRD-02)

Prepared by, **Approved by,**

Incharge of Practical hall,
Dept. of Biochemistry

Prof and Head,
Dept. of Biochemistry

Name of the Instrument: SEMI AUTOANALYZER

Company : Biosystem.co

Year of purchase : 2015

Assay Protocol

Go to the workplace tab

↓

Select sample as routine or Stat

↓

Assign the position for the sample

↓

Enter the patient's name and Demographics

↓

Select the tests to be done

↓

Place the sample in the assigned position

↓

Save the test entry

↓

Press start to run

↓

When the report is ready the machine will show the result in data review

QC Protocol

Go to the QC tab

↓

Place the QC at the assigned position

↓

Select status tab under QC

↓

Select the Tests Parameters

↓

Press Save and Start to run QC

↓

Check the QC values for any outlier according to rejection criteria, if not accept the run and load patients samples.

Calibration Protocol

Go to the Calibration Tab.

↓

Press Status tab

↓

Select the parameter for Calibration

↓

Select the method of calibration – 2 point/full calibration

↓

Place the calibrator at the assigned place

↓

Press save and start

↓

Check for Calibration Acceptance / Failure

↓

Run QC for the calibrated parameter and validate the run.

Machine Maintenance:

Maintenance is performed on daily, weekly basis

Protocol For Daily Maintenance

Go to the Utility tab.

↓

Select the maintenance type to perform

. Daily

. weekly

↓

Select and start

Prepared by,

Incharge of Practical hall,
Dept. of Biochemistry

Approved by,

Prof and Head,
Dept. of Biochemistry

Name of the Instrument: ABG ANALYZER

company : Siemens

Year of purchase : 2015

Scope:

This document describes good laboratory practice for Operating and maintaining (Blood Gas) Analyzer. /Electrolyte analyzer

Introduction:

The system is bench top system that analysers whole blood and dialysis fluids. It is intended for use by Laboratory Staffs, Nurses and Clinician. This system is designed for the determination of PH, PCO2, PO2, NA, K, CL or CA and HCT in heparanized whole blood samples.

The system is also designed for routine determination of PH, PCO2, NA, K and Ca in acetate- and bicarbonate-based dialysis fluids.

Purpose of Examination:

Analyzer designed for the determination of PH, PO2, PCO2, Na, K, Ca or Cl and HCT in heparinized whole blood samples. & Electrolytes in serum samples

Principle:

The technology based on electrochemistry. Electrochemistry is the measurement of current Or voltage occurring in an electrochemical cell between a chemical and an electrical system. Each Electrode or sensor is designed to selectively measure the concentration of a specific substance. The Potential generated at the sensor is converted into an electric signal by a transducer mechanism

Type of Sample:

- Arterial Sample
- Venous Sample
- Mixed Venous (Pulmonary Artery)

Type of Container and additives:

- Syringes or Capillary tubes
- Lithium heparin use as anticoagulant

Reagents: The Following reagent requires no preparation before use:

- 7.3 Buffer
- 6.8 buffer
- Hct slope
- Wash
- Conditioner

Calibration

- The system calibrate automatically for one point calibration every one hour and for two calibrations every two hours.
- System also calibrate automatically after certain routine maintenance for example: Deproteinization and condensation
- Two gas standards are used to calibrate the PCO2 and PO2 Sensors. Gas 1 (Cal) and Gas 2 (Slope)
- You can process additional calibration Ready >Settings > Calibration

Handling Sample and Reagent:

This procedure described here is based on techniques appropriate for PH, Blood Gas, and dialysis fluid and electrolyte analysis.

Collecting of Sample: With proper medical supervision, selecting a site for blood collection, performing collection and documenting sample handling. A Maintaining Sterile technique helps to avoid infecting the puncture site. Once the sample is collected, immediately expel if any bubbles that occurred during the sample collection. Cap the sample immediately after sample gets collected to avoid room air contamination. Mix gently after sample collection for proper mixing and to avoid clot formation.

Handling and Storing Samples

The Following condition can cause erroneous result even when samples are collected correctly;

- Metabolic activity in the sample that occurs between sampling and completion of analyses
- Contamination of the sample by room air
- Incorrect sample mixing before analysis

System Operation:

- Perform these steps if the system is not already turned on
- Switch on the instrument, The System begins the power up sequence and displays not ready until it is ready to function.
- System will perform internal test and then displays a warming up message
- During warming up, you can perform Prime and condition to the sensor
- Prime: Settings> Maintenance > Prime
- Settings > Maintenance > Condition
- When system reaches optimum temperature it automatically perform full two points calibration
- Once calibration gets completed perform QC and validate the results.

Analysing Samples

- Check system for ready screen
- Lift the probe lever to he second position and place the sample in the probe
- The system beeps once the sampling is completes, remove the sample from the probe and close the probe
- To enter the patient data Select Enter Patient Data on the Measuring Screen
- Select enter, if system is measuring sample, measuring screen will appear.

  If measuring is completed, then result screen will appear.

- Once system completed sample analysis it will perform washing to clear to path and avoid contamination for the next sample which takes about 30 sec. and then it returns to ready screen

Quality Control

Follow proper QC sample handling procedure to avoid significant error in Qc Measurement. Follow the manufacturer's instruction carefully.

1. Mix the QC material thoroughly and process the test as soon as opened the ampule, avoid room air contamination.
2. Don't reuse an opened ampule
3. Run the test and validate the result with the manufacture's sheet.
4. Proceed sample testing if the QC values are within the range. If Qc are not passed check the instrument condition process priming and calibration and then again rerun the QC.

Interference:

1. Using haemolysis sample interfere with the K+ results
2. Using EDTA, Citrate , Oxalate anti- coagulant have significant effect on blood PH, NA K , Ca and HCT
3. Avoid using excessive level of heparin anti-coagulants as they cause calcium heparin chelation and decrease Ca Level

Maintenance:

Daily Maintenance:

1. Wipe the probe sleeve, Sample area, reagent compartment and external surface withcleaned tissue moistened with 10%v/v bleach.

   DO NOT SPAY INTO THE MEASURMENT BLOCK
2. Check the level of reagent and replace if necessary, with typical use, the reagent need to replacing every 10 -14 days. Replace the reagent after 21 days of usage.
3. Mix or agitate the buffer pack daily to incorporate any solution that may have condensed on the inside of the bottles.
4. Check the waste bottle and empty if necessary

Weekly Maintenance:

1. Check the level of fill solution in the sensor, mainly Reference, Na, K, Cl, Ca and PH Sensor. Make Sure use correct fill solution, PH fill Solution – PH and Na/K/Cl/Ca fill Solution for – Na, K, Cl, Ca
2. Do not touch the inner Electrode as it is Fragile and Easily Damaged.
3. If required filled the solution in the sensor , - Reference Sensor should be filled to the line and the PH, Cl, K ,Ca Sensors should be almost full with only a small bubble at the top. NA Sensor should be full.
4. Please refill PH Sensor weekly once.
5. Check the sensor for air bubbles in the filled solution, if bubbles are presence then remove the sensor and tap to dislodge air bubbles.
6. Deproteinizing and conditioning need to perform once in every two weeks

Measured Parameter:

PH, pco2, po2, Na, K, Cl or Ca and HCT

Calculated data:

HCO3, BE,ct CO2,O2SAT, O2CT, PO2(A-a)(T),PO2(a/A)(T)

Prepared by, **Approved by,**

Incharge of Practical hall, **Prof and Head,**

Dept. of Biochemistry **Dept. of Biochemistry**

Name of the Instrument: IMMUNOANALYZER

Company : Siemens co.

Year of purchase : 2015

Assay Protocol

Go to the workplace tab

Select sample as routine or Stat

Assign the position for the sample

Enter the patient's name and Demographics

Select the tests to be done

Place the sample in the assigned position

Save the test entry

Press start to run

When the report is ready the machine will show the result in data review

QC Protocol

Go to the QC tab

Place the QC at the assigned position

Select status tab under QC

Select the Tests Parameters

Press Save and Start to run QC

Check the QC values for any outlier according to QC rejection criteria, if not accept the run and load patients samples.

Calibration Protocol

Go to the Calibration Tab.

Press Status tab

Select the parameter for Calibration

Select the method of calibration – 2 point/full calibration

Place the calibrator at the assigned place

Press save and start

Check for Calibration Acceptance / Failure

Run QC for the calibrated parameter and validate the run.

Machine Maintenance:

Maintenance is performed on daily, weekly basis

↓

Protocol For Daily Maintenance

↓

Change water in reservoir

↓

Clean waste tip and cup

↓

Check procell /clean cell solution levels

↓

Keep clean tips and cups

↓

Go to the Utility tab

↓

Select the maintenance type to perform

. Daily / .Weekly

↓

Select and Start

Prepared by, **Approved by,**

Incharge of Practical hall, **Prof and Head,**

Dept. of Biochemistry **Dept. of Biochemistry**

SAMPLE REJECTION CRITERIA

Rejection criteria:

- Samples brought by unauthorized person
- Sample not properly transported (packaging, temperature, delayed transit)
- Sample not labelled/label illegible
- Label not marching with that of lab requisition form
- Sample not accompanying of lab requisition form
- Sample not accompanying proper/complete lab requisition form
- Sample : insufficient quantity (to test/to repeat test/ back up)
- Sample leakage
- Haemolysed sample
- Lipaemic sample
- Sample turbid(contaminated)
- Sample coming/collected beyond stipulated period
- Sample coming beyond working hours(at odd hours) to the SRL
- Sample collected in improper container

QC Rejection criteria:

Warning : I 2s Rule violation

Rejection criteria: I 3s / 2 2s /R 4s / 4 1s Rule violation

Validity of the test Report

- ✓ Values of test parameters are reported following acceptance of quality control for the analyte
- ✓ Abnormal values are reported in correlation of previous reports.
- ✓ Critical values are informed over telephone to the concerned authority and recipients detail noted.

SOP FOR REPORTING ABNORMALLY HIGH OR LOW VALUES

Purpose

To establish the laboratory policy to ensure compliance with effective communication of laboratory critical results to patient caregivers.

Responsibility

It is responsibility of the concerned team leader/ technicians, follow and implement this SOP.

Procedure

- The laboratory critical values are informed by technicians/ team leader/ consultant to treating consultant as well as doctor on duty of respective wards.
- Laboratory personnel calls the appropriate consultant/ doctor on duty, identify yourself as clinical lab personnel and ask to speak to a doctor regarding results.
- At the time, inform the doctor that you are reporting a critical laboratory results of a patient with proper patient's details.
- Ask for the second sample if any query offered by treating doctor regarding patient status.
- The details of call are recorded in respective result register which include doctor name and time etc.

SAFETY GUIDELINES:

1) List and describe the appropriate safety procedures practiced in the clinical laboratory that pertain to general laboratory safety and awareness:
   a) personal safety
   b) eye safety
   c) handling of biologically hazardous material
   d) handling of needles and sharps
2) Discuss the significance of OSHA (Occupational safety and health administration) to the regulation of safe practices within the clinical laboratory.
3) Define the term 'Universal Precautions' and state its importance in the handling of potential biohazardous materials.

4) Discuss appropriate safety procedures practiced in the clinical laboratory when handling all chemicals, flammables, ether and compressed gases.

5) Discuss the information provided by and the appropriate use of the Material Safety Data Sheet (MSDS).

6) Discuss appropriate safety precautions practiced in the clinical laboratory when handling radioactive materials.

7) Discuss appropriate procedures practiced in the clinical laboratory for fire, electrical, and severe weather safety.

SAFETY IN THE LABORATORY

Purpose:

Faulty technique is one of the chief causes of accidents and, because it involves the human element, is one of the most difficult to cope with. The purpose of this discussion is to help the student understand proper laboratory safety, to increase his awareness of the possible risks or hazards involved with laboratory work and to realize the laboratory is generally a safe place to work if safety guidelines are properly followed.

GENERAL PERSONAL SAFETY

1. Eating, drinking, smoking, applying cosmetics or lip balm, and handling contact lenses are prohibited in areas where specimens are handled.
2. Food and drink are not stored in refrigerators, freezers, cabinets, or on shelves, countertops, or bench tops where blood or other potentially infectious materials are stored or in other areas of possible contamination.
3. Long hair, ties, scarves and earrings should be secured.
4. Keep pens and pencils out of your mouth.
5. Appropriate Personal Protective Equipment (PPE) will be used where indicated:

Lab coats or disposable aprons should be worn in the lab to protect you and your clothing from contamination. Lab coats should <u>not</u> be worn outside the laboratory.

Lab footwear should consist of normal closed shoes to protect all areas of the foot from possible puncture from sharp objects and/or broken glass and from contamination from corrosive reagents and/or infectious materials.

Gloves should be worn for handling blood and body fluid specimens, touching the mucous membranes or non-intact skin of patients, touching items or surfaces soiled with blood or body fluid, and for performing venipunctures and other vascular access procedures. Cuts and abrasions should be kept bandaged in addition to wearing gloves when handling biohazardous materials.

Protective eyewear and/or masks may need to be worn when contact with hazardous aerosols, caustic chemicals and/or reagents is anticipated.

MOUTH PIPETTE SHOULD NOT BE DONE. Mechanical pipetting devices must be used for pipetting all liquids.

Frequent hand washing is an important safety precaution, which should be practiced after contact with patients and laboratory specimens.

Proper hand washing techniques include soap, running water and 10-15 seconds of friction or scrubbing action. Hands should be dried and the paper towel used to turn the faucets off.

1. After completion of work and before leaving the laboratory.
2. After removing gloves.
3. Before eating, drinking, smoking, applying cosmetics, changing contact lenses or using lavatory facilities.
4. Before all other activities which entail hand contact with mucous membranes or breaks in the skin.
5. Immediately after accidental skin contact with blood or other potentially infectious materials.
6. Between patient contact and before invasive procedures.

1. Laboratory work surfaces must be disinfected daily and after a spill of blood or body fluid with a 1:10 dilution of Clorox in water.

2. Wearing contact lenses in the laboratory is discouraged and requires extra precaution if worn. Gases and vapors can be concentrated under the lenses and cause permanent eye

damage. Furthermore, in the event of a chemical splash into an eye, it is often nearly impossible to remove the contact lens to irrigate the eye because of involuntary spasm of the eyelid. Persons who must wear contact lenses should inform their supervisor to determine which procedures would require wearing no-vent goggles.

SAFE HANDLING OF BIOLOGICALLY HAZARDOUS MATERIAL

You should handle all patient samples as potentially biohazardous material.

This means Universal Precautions should be followed at all times.

a) Wear protective closing (lab coat, gloves. If you have a cut/abrasion, also wear a band-aid. Avoid spillage and aerosol formation.

b) Hands should be washed immediately and thoroughly if contaminated with blood or other body fluids.

c) Gloves should be removed before handling a telephone, computer keyboard, etc., and must NOT be worn outside the immediate work area. Hands should always be washed immediately after gloves are removed.

d) You should wash your hands after completing laboratory activities and before leaving the area. All protective clothing should be removed prior to leaving the lab.

e) All biohazardous material should be discarded in a biohazard bag to be autoclaved.

f) All counter and table tops should be disinfected with a proper disinfecting solution:

1. At the beginning of the day.
2. If you should spill a patient sample.
3. At the end of the day.

g) Proper handling of SHARPS:

h) Contaminated needles and other sharps are never broken, bent, recapped or re-sheathed by hand.

i) Used needles are not removed from disposable syringes.

j) Needles and sharps are disposed of in impervious containers located near the point of use.

CHEMICAL AND GAS SAFETY

To provide a safe working environment, all personnel should be aware of potentially hazardous materials and the proper way of handling this material. Avoid unnecessary exposure to chemicals. Occupational Safety and Health Administration (OSHA) requires any

necessary information in the form of MATERIAL SAFETY DATA SHEETS (MSDS) concerning the handling of hazardous materials to be available to all laboratory personnel, so that they may achieve and maintain safe working conditions.

FIRE SAFETY

a. KNOW WHERE ALL FIRE EXITS, FIRE EXTINGUISHERS

b. KNOW HOW TO PROPERLY OPERATE APPROPRIATE FIRE SAFETY EQUIPMENT!

ELECTRICAL SAFETY

- ✓ The use of extension cords is prohibited.
- ✓ All equipment must be properly grounded.
- ✓ Never operate electrical equipment with fluid spillage in the immediate are or with wet hands.
- ✓ Never use plugs with exposed or frayed wires.
- ✓ If there are sparks or smoke or any unusual events occur, shut down the instrument and notify the security officer. Electrical equipment that is not working properly should not be used.
- ✓ If a person is shocked by electricity, shut off the current or break contact with the live wire immediately. Do not touch the victim while he is in contact with the source of current unless you are completely insulated against shock.

GENERAL PROCEDURES AND EQUIPMENT

Cracked or chipped glassware should not be used.

Centrifuges should not be used without the covers completely closed.

When removing tops from evacuated test tubes, care must be taken to prevent aerosol formation.

ACCIDENTAL NEEDLE STICK

- ✓ Bleed wound.
- ✓ Wash wound thoroughly with soap.
- ✓ Notify the supervisor of the incident and report to casualty with an incident report form.
- ✓ May need to get blood tested for hepatitis.

WASTE MANAGEMENT

Introduction

These laboratory advisory guidelines provide procedural information for laboratory workers to follow when disposing of waste generated in laboratories. The guidelines should be followed in order to minimise risks associated with the disposal of laboratory waste.

Scope

These guidelines apply to all lab technicians, students and visitors who work within a laboratory that generate and dispose of any type of waste. Local waste management arrangements are in place at satellite campuses.

General Principles

All potential waste streams that arise from laboratory operations needs to be assessed and an appropriate disposal route selected prior to waste being generated. Waste should be collected in a suitable container and labelled.

Main points for consideration are:

Minimise waste and do not accumulate large amounts in the laboratory. Regular disposal from the laboratories must be part of the laboratory practices.
Segregate waste - have a separate residue container if you are generating a large amount of any particular type of waste.
Label the waste residue container with the appropriate waste label.
Store waste in a suitable area prior to collection. For example, chemicals and solvents should be stored in ventilated areas and residue container lids must be secure. Ensure container is not leaking and no spillage on the exterior of the container. Primary container should be placed in a suitable bund.
Handle waste only if you are aware of the hazards associated with the waste and appropriate risk controls are used.
Record all disposal on Waste Tracking Log to ensure evidence of correct waste management.

Chemically Contaminated Waste

Filter paper, gloves, tissues, paper towel, benchcote, spent silica, and sample vials that have been contaminated with hazardous chemicals should be placed directly into a chemically contaminated waste bin or bag.

Waste Chemicals

Waste chemicals can take various forms including solvents, aqueous solutions, dry powders, and unwanted old chemicals.

No hazardous chemical substances should be disposed down drains. All enquiries concerning wastes discharged through the sewerage system must be directed properly.

Generally chemical waste should be segregated according to its properties, such as:

- aqueous acidic
- aqueous alkaline
- halogenated
- non-halogenated
- general hazardous waste – powders etc.
- toxic
- cytotoxic

Colour coded Disposal system:

- **Waste containers with following colour codes are provided in each section of the lab and staff disposes waste as per this laboratory protocol.**

Type of container	Type of Waste
Yellow containers	Items contaminated with blood and body fluids (excluding plastic, metal and glass) Gauze pieces, Cotton balls, Soiled dressing, Human anatomical waste, Gloves, Mask
Blue containers	Clean Plastic Bag, Clean Plastic covers, any clean plastic items
Red containers	Foleys catheter, Infectious plastic waste, Tracheotomy tubes, Catheter mount, Vascular catheter, Blood bag tubings, Plastic drainage bags, O2 mask, Nasal prong Nebulization tubes, Urinary catheter, IV set Suction catheter , Syringes, Respiratory tubings.
Green containers	Biodegradable waste, Disposable Tissues, Paper/ paper plates, Food, Cups , Magazines.

MASTER LIST OF BIOCHEMISTRY TESTS

INVESTIGATION DONE IN CCL BIOCHEMISTRY

Sr.No	Investigation	Method
1	Blood Sugar Leval (Fasting, Pp, Rbs)	God -Pod
2	Creatinine	Enzymetic Method
3	Urea	Urease Method
4	Bilirubin	Dsa Method
5	Sgot	Modified Ifcc Method
6	Sgpt	Modifiedifcc Method
7	Alkaline Phospates (Alkpo4)	Modifiedifcc Method
8	Total Proteins	Biuret Method
9	Albumine	Bcg Method
10	Cholesterol	Chod Pap Method
11	Triglyseride	Gpo Pap Method
12	Hdl Chol	Chod Pap Method
13	Lactat Dehydroenase	Ifcc Method
14	Electrolytes (Na+,K+)	--------
15	Ck Mb	Ifcc Method
16	Cpk Nac	Ifcc Method
17	Amylase	Kinetic Assay Method
18	Uric Acid	Uricase Peroxide
19	Calcium	Arsenazo Method
20	Phosporous	Molybdate Uv Method
21	Hba1c	Nephelometric Method
22	24hrs Urine Protein	Turbidometryc Method
23	Csf Protein	Turbidometric Method
24	Ada	Ifcc Method
25	Plural Fluid Protein	Biuret Method
26	Ascitic Fluid Protein	Biuret Method
27	Abg	-------
28	Thyroid Function Test (T_3,T_4,Tsh)	Clia Method
29	Free Thyroid Profile (Ft_3 , Ft_4)	Clia Method

30	Psa	Clia Method
31	Ca-125	Clia Method
32	Prolactin	Clia Method
33	Fsh	Clia Method
34	Lh	Clia Method
35	Iron	Clia Method
36	Vit D	Clia Method
37	Vit.B12	Clia Method
38	Lipase	Methyl Resorutin Method

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INSTRUMENT & EQUIPMENT SOP BOOKLET

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