



Practical Laboratory Manual

BASIC WORKSHOP LAB - II (HEALTH CARE)

B.Sc. MLT (IInd Semester)

INDEX

S. No.	Name of Experiments	Expt. No.	Page
1	Good Laboratory Practices	01	3 – 4
2	First Aid	02	5 – 7
3	Quality Assurance	03	8 - 9
4	Laboratory Safety Rules	04	10 – 13
5	Various Emergencies	05	14 – 15
6	Ambulance Services	06	16 – 18
7	UV – Spectrophotometer	07	19 – 20
8	Biomedical Waste Management	08	21 - 23

Experiment - 01

Aim-To study the Good Laboratory Practices (GLP).

Objectives of GLP

- 1) GLP makes sure that the data submitted are true reflection of the results obtained from the studies.
- 2) GLP makes sure that the data is traceable.
- 3) Promotes international acceptance of tests.

GLP Principles

The Fundamental Points of GLP

The GLP regulations set out the rules for good practice and help researchers perform their work in compliance with their own pre- established plans and standardized procedures.

The regulations are not concerned with the scientific or technical content of the research programs. Nor do they aim to evaluate the scientific value of the studies.

All GLP texts, irrespective of their origin, stress the importance on the following point's five points:

1. Resources: organization, personnel, facilities and equipment
2. Characterization: test items and test systems
3. Rules: study plans (or protocols) and written procedures
4. Results: raw data, final report and archives
5. Quality Assurance

Good Laboratory Practice

- A. Good laboratory practice or GLP is a set of principles intended to assure the quality and integrity of non-clinical laboratory studies that are intended to support research or marketing permits for products regulated by government agencies.
- B. The term GLP is most commonly associated with the pharmaceutical industry and the required non-clinical animal testing that must be performed prior to approval of new drug products.
- C. However, GLP applies to many other non-pharmaceutical agents such as colour additives, food additives, food contamination limits, food packaging, and medical devices.
- D. GLP is a formal regulation created by USFDA as these regulations were proposed on November 19, 1976 and designated as a new part of Chapter 21 of the Code of Federal Regulations (CFR) as 21 CFR Part 58 in 1979.
- E. In 1981 an organization named OECD (Organization for Economic Cooperation and Development) produced GLP principles that are international standards.
- F. GLP in OECD principles is defined as “a quality system concerned with the organizational process and the conditions under which non-clinical health and environmental safety studies are planned, performed, monitored, recorded, archived and reported”.

When and Why GLP was created?

- A. GLP was first introduced in New Zealand and Denmark in 1972, and later in the US in 1978 in response to the Industrial Bio Test Labs scandal.
- B. In the early 70's FDA became aware of cases of poor laboratory practice all over the United States.
- C. They discovered a lot fraudulent activities and a lot of poor lab practices.
- D. Examples of some of these poor lab practices found were: Equipment not been calibrated to standard form, therefore giving wrong measurements. Incorrect/inaccurate accounts of the actual lab study. Inadequate test systems.
- E. GLPs were initially invoked in a reaction to malpractices in the laboratories conducting safety experiments of medicines.
- F. In the early 1970s, research laboratories in the USA found doing work in unethical ways, like: Data generation without conduct of the study. Falsification of the laboratory work. Replacement of dead animals and fabrication of test results etc.

Advantages of GLP

- A. Assures that the data are a true reflection of results obtained from studies.
- B. Preclinical safety and residue safety.
- C. Generation of high quality and reliable test data.
- D. Mutual acceptance of data
- E. Increases public confidence.
- F. Shortens the time-to-market for new products.

Disadvantages of GLP

- A. More man power is required.
- B. Expensive process.
- C. Time consuming process.

Reference: - Medical Laboratory Technology: Methods and Interpretations Ramnik Sood, Second Edition, Jaypee Publishers

Experiment - 02

AIM: - To study the First Aid.

Theory: -

First aid is the provision of initial care for an illness or injury. It is usually performed by a non-expert person to a sick or injured person until appropriate medical treatment can be accessed in a hospital or by going to a doctor. Certain self-limiting illnesses or minor injuries may not require further medical care after the first aid intervention. It generally consists of a series of simple and in some cases, potentially life-saving techniques that an individual can be trained to perform with minimal equipment

Self-help

If you, as a first-aider, are prepared to help others, you are better able to care for yourself in case of injury or sudden illness. Even if your own condition keeps you from caring for yourself, you can direct others in carrying out correct procedures to follow on your behalf.

Help for Others

Having studied first-aid, you are prepared to give others some instruction in first-aid, to promote among them a reasonable safety attitude and to assist them wisely if they are stricken. There is always an obligation on a humanitarian basis to assist the sick and the helpless. There is no greater satisfaction than that resulting from relieving suffering or saving a life.



Why First aid?

The main objective of first aid is not to cure, but to ensure safety until the patient or affected person accesses specialized treatment. It is the initial assistance or care of a suddenly sick or injured person. It is the care administered by a person as soon as possible after an illness or accident. It is this prompt care and attention prior to the arrival of the ambulance that sometimes creates the difference between life and death, or between a full or partial recovery.

The basic objectives of First Aid are:

- To give immediate care.
- To protect the casualty from further harm.
- To relieve pain.
- To promote recovery. The recovery is promoted as the heart rate goes down, which in turn prevents blood loss from the victim's body.

First aid in different cases

There are different ways of providing first aid in different cases of accidents and illnesses.

First aid for Drowning

Many deaths occur because of drowning. Death by drowning occurs when air cannot get into the lungs because of the entrance of a small amount of water into the lungs. This may cause the contraction of the throat. In such cases efforts are made to remove water from the stomach of the drowned person. Attempting to forcefully remove water from the victim's stomach should be avoided as this may make the victim vomit and there are chances of casualty.

In this particular situation, the aim of the first aid is to restore breathing, to keep the person warm and to arrange for taking him/her to hospital.

The following steps may be taken.

- Step 1: Rescue the person and get him/her to the dry land. Keep the person's head lower than the rest of the body to reduce the risk of inhaling water.
- Step 2: Lay down the person on his/her back. Open the airway and check breathing. If required, give CPR (Cardio Pulmonary Resuscitation) with chest compression.
- Step 3: Treat the person for Hypothermia (low body temperature). Remove wet clothes and cover him/her with dry blanket. If the person regains full consciousness, give him/her a warm drink.
- Step 4: Call for a doctor or ambulance to transport the person to the nearest hospital as soon as possible, even if she/he appears to have recovered fully.

First aid for Fire Injuries

When the skin comes in direct contact with fire, it gets damaged. This is known as dry burn. The burn exposes the under lying part of the skin, which increases the chances of infection. While assessing the burn, it is necessary to:

Consider the circumstances in which the burn has occurred;

- Establish the cause of the burn;

- Observe the condition of the victim; does she/he need immediate medical attention?
- Assess the extent of burn or the depth of the burn; and
- Determine the degree of risk for infection. Based on the depth of the skin damage, the burns are categorized into three types.
- A superficial burn involves only burns on the outer most layer of the skin, called the epidermis.
- A partial thickness burn is generally very painful; this destroys the epidermis. If such wounds are on more than 20 per cent of the body, then it may be fatal.
- A full thickness burn is not painful in most of the cases, so it may mislead the first-aider and the casualty about the severity of the injury. This needs immediate medical attention.

Prevention

Since prevention is better than cure, it then becomes essential to take appropriate precautions. Make the area in and around the play field hazard free. In order to prevent injuries proper warm up is required prior to executing vigorous movements. Similarly, use of appropriate physical conditioning is essential to avoid injury. First aid for strains, sprains, contusions is packaged in the abbreviation RICE which is Rest, Icing, Compression and Elevation.

Reference: - Medical Laboratory Technology: Methods and Interpretations Ramnik Sood, Second Edition, Jaypee Publishers

Experiment - 03

AIM: - To study the quality assurance in Medical Laboratory Techniques.

Theory: - Quality assurance (QA) in clinical laboratories encompasses a system of activities and procedures designed to ensure the accuracy, reliability, and validity of laboratory test results. It focuses on maintaining and improving the quality of testing processes, from sample collection to reporting, to minimize errors and ensure the reliability of test results for patient care.

Key aspects of quality assurance in clinical laboratories include:

- **Standard Operating Procedures (SOPs):**

Establishing and adhering to detailed, written procedures for all aspects of laboratory operations, ensuring consistency and accuracy.

- **Quality Control (QC):**

Implementing continuous monitoring and control measures during each stage of the testing process to ensure the test is functioning correctly and results are reliable.

- **Personnel Training and Competency:**

Ensuring that laboratory personnel are adequately trained and competent in their roles, with ongoing professional development.

- **Equipment Maintenance and Calibration:**

Regularly maintaining and calibrating laboratory equipment to ensure its accuracy and reliability.

- **Record-Keeping and Documentation:**

Maintaining accurate and comprehensive records of all laboratory activities, including test results, quality control data, and maintenance logs.

- **Internal and External Quality Assessment:**

Evaluating the performance of the laboratory through internal quality control programs (IQC) and external quality assessment (EQA) schemes.

- **Continuous Improvement:**

Regularly reviewing laboratory processes and implementing improvements to address areas of concern and maintain or enhance quality.

- **Accreditation:**

Meeting and maintaining accreditation standards from recognized accrediting bodies, which demonstrate the laboratory's adherence to quality standards.

Important of quality assurance

- **Accurate Test Results:**

QA ensures that laboratory results are accurate and reliable, leading to better diagnosis, treatment, and patient care.

- **Patient Safety:**

By minimizing errors and ensuring the quality of testing processes, QA contributes to patient safety by preventing misdiagnosis and inappropriate treatment.

- **Improved Patient Outcomes:**

Accurate and timely test results enable healthcare providers to make informed decisions, leading to improved patient outcomes.

- **Cost Reduction:**

By preventing errors and improving efficiency, QA can help reduce costs associated with retesting, errors, and patient complications.

- **Public Trust:**

A strong QA program builds public trust in the laboratory and the healthcare system as a whole.



Reference: - Medical Laboratory Technology: Methods and Interpretations Ramnik Sood, Second Edition, Jaypee Publishers

Experiment - 04

AIM: To study the safety regulation and Clinical Laboratory records.

Theory: Laboratory Safety Rules

The following safety rules must be followed at all times in the laboratory. The chemical laboratory is not necessarily a dangerous place. Intelligent precautions and a proper understanding of techniques to be followed make the chemistry laboratory no more dangerous than any other classroom.

1. Safety goggles (department approved) must be worn in the lab at all times. Glasses and contact lenses are not acceptable eye protection. Students who do not follow this rule will be asked to leave the lab immediately.
2. Never eat or drink in the lab. Food may pick up toxic chemicals.
3. Never inhale fumes or vapors. Use fume hoods for dangerous or irritating chemicals. Always waft odors toward your nose with your hand.
4. Never taste any chemical. Some chemicals are very corrosive and poisonous in very small quantities.
5. Never perform an unauthorized experiment and never work in the lab without an instructor in charge. An accident may happen when mixing simple chemicals.
6. Never remove anything (chemicals, glassware, etc.) from the lab. It is illegal!
7. Label all containers to identify their contents.
8. Never put anything back into a reagent bottle. Once a reagent has passed the mouth of its container, it has passed the point of no return. Always take as little of a chemical as possible. Use only clean, dry spatulas for removing chemicals from bottles. Properly dispose of excess chemicals.
9. Leave chemicals in their proper place. Do not carry original containers of chemicals to your bench top.
10. Avoid touching hot objects. Burns are a common accident in the chemistry lab. Be careful when using hot plates and objects which have been heated on them. Use beaker tongs to remove hot containers from the hot plate.
11. Rinse spills off skin immediately. Rinse off any chemicals spilled on the skin immediately with large amounts of water.
12. Clean up broken glassware immediately. Place it in the labeled crock at the front of the lab. Obtain replacement glassware from the instructor. 13. Properly dispose of waste chemicals. Certain liquids can be poured into the sink and flushed with water while others are poured into designated waste containers. Most solid wastes are placed in designated crocks. Your instructor will provide disposal instructions each lab.

14. Notify your instructor immediately of all accidents.
15. Learn to locate and operate (if applicable), the safety shower, fire extinguisher, eye-wash fountain, fire blanket, and fire exit.

LAB PROCEDURES

The following are procedures that must be followed for all lab sessions. Many are safety issues as well.

1. Dress properly for lab. Wear clothing that covers as much skin as possible. Sandals are not permitted. If possible, wear older clothes on lab day. All loose clothing and long hair must be confined.
2. Read the entire experiment before coming to lab. The instructor will briefly discuss the experiment at the beginning of each lab.
3. Arrive on time for lab. If a student arrives late for lab and misses a substantial portion of the introductory discussion and safety precautions, the student may be a threat to themselves and others in the lab. The instructor may deny the student the privilege of completing the assigned experiment.
4. Work independently unless otherwise instructed
5. Keep the bench top uncluttered. Only those personal items pertinent to the lab work (lab manual, etc.) are to be on the bench top at a student's work station. Book bags, coats, etc. are not to be placed on the bench top or on the floor close to the lab benches. Place all such items in the designated areas near the entrance to the lab.
6. Keep drawers closed. Drawers and cabinets are to be kept closed except when items are being taken from or returned to these drawers.
7. Take only planned breaks. If the need arises to take a short break, you may do so at any time during the experiment with these points in mind; try to plan the break during a less critical time in the experiment (e.g. while something is cooling); make sure that your hot plate is turned off; inform a neighbor and the instructor.
8. Do not come to lab under the influence of drugs. If, in the judgment of the instructor, a student presents a safety hazard to himself or his fellow students because the student is affected by medication, alcohol or other factors, the instructor may refuse to allow the student to continue working in the lab that day. If the situation is noted more than once, the student may be permanently removed from the course.
9. Clean up at the end of lab. At the end of all lab sessions return clean glassware to your drawer, clean your bench top and finally wash your hands thoroughly. Be sure all electrical devices and water are turned off.

- **Quality control data:**
 - Information regarding the performance of control samples run alongside patient specimens, used to ensure accuracy of test results
 - **Performing technician information:**
 - Name of the laboratory technician who performed the test
 - **Reviewing physician information:**
 - Name of the physician who reviewed the test results
- Importance of clinical laboratory records:
- **Accurate diagnosis:** Provides essential data for healthcare providers to make informed clinical decisions.
 - **Treatment monitoring:** Allows tracking of patient progress over time with repeated testing
 - **Quality assurance:** Enables monitoring of laboratory performance and identifying potential errors
 - **Legal documentation:** Serves as a legal record of patient testing and results
- Common types of clinical laboratory records:
- **Chemistry records:** Results from tests measuring various substances in the blood, such as electrolytes, enzymes, glucose, and lipids
 - **Hematology records:** Information related to blood cell counts, including red blood cells, white blood cells, and platelets
 - **Microbiology records:** Results from tests identifying bacteria, viruses, and fungi in specimens
 - **Immunology records:** Data on antibody levels or antigen detection
 - **Serology records:** Testing for specific antibodies in the blood
- Key considerations for clinical laboratory record keeping:
- **Standard format:** Consistent documentation format to ensure clarity and ease of interpretation
 - **Accuracy:** Precise recording of all relevant information
 - **Confidentiality:** Strict adherence to patient privacy regulations
 - **Retention policy:** Proper storage and retention of records according to legal requirements

Reference: - Medical Laboratory Technology: Methods and Interpretations Ramnik Sood, Second Edition, Jaypee Publishers

Experiment - 05

AIM: - To study the measures to be taken in various emergencies.

Theory: - During an emergency, prioritize safety, follow local authorities' instructions, and if necessary, evacuate to a safe location, taking your emergency kit with you.

General Emergency Procedures:

- **Stay Calm and Assess:** Maintain composure and assess the situation to determine the best course of action.
- **Follow Emergency Plans:** Adhere to any pre-existing emergency plans or protocols.
- **Listen to Authorities:** Pay close attention to information and instructions from local officials and emergency services.
- **Prioritize Safety:** Ensure your own safety before assisting others.
- **Stay Put or Evacuate:** Follow instructions from authorities to either stay in place or evacuate to a safe location.
- **Emergency Kit:** Have an emergency kit readily available with essential supplies like first-aid, water, food, and medications.
- **Check in with Contacts:** After an emergency, ensure you check in with family and friends to ensure their safety.
- **Stay Informed:** Listen to the radio or television for updates and information from authorities.
- **Seek Professional Guidance:** After an emergency, seek professional medical help or guidance as needed.

Specific Emergency Scenarios:

Fire:

- **Evacuate Immediately:** If a fire breaks out, evacuate the building immediately and move to a safe location.
- **Call for Help:** Call emergency services (112 in India) and provide your location and the nature of the emergency.
- **Close Windows and Doors:** If safe to do so, close windows and doors to help contain the fire.
- **Stay Low to the Ground:** If smoke is present, stay low to the ground to avoid inhaling smoke.

Natural Disasters (e.g., Flood, Earthquake):

- **Follow Evacuation Orders:** If an evacuation order is issued, follow instructions from authorities and move to a safe location.
- **Shelter in Place:** If instructed to shelter in place, move to a safe room or area and stay away from windows.
- **Stay Informed:** Monitor news and local authorities for updates on the situation.

Medical Emergencies:

- **Call for Help:** Call emergency services (112 in India) immediately and provide your location and the nature of the emergency.
- **Provide First Aid:** If trained, provide basic first aid until professional help arrives.
- **Stay Calm:** Try to remain calm and reassure the person in need of help.

Heavy Bleeding:

- **Apply Direct Pressure:** Apply direct pressure to the wound to stop the bleeding.
- **Call for Help:** Call emergency services (112 in India) immediately.

Severe Head Injury:

- **Do Not Move the Person:** Unless absolutely necessary, do not move the person with a severe head injury.

Call for Help: Call emergency services (112 in India) immediately.



Reference: - Medical Laboratory Technology: Methods and Interpretations Ramnik Sood, Second Edition, Jaypee Publishers

Experiment - 06

Aim: - Introduction to Ambulance Services.

Theory: - An ambulance is a vehicle for transportation of sick or injured people to, from or between places of treatment for an illness or injury and in some instances will also provide out of hospital medical care to the patient.

The term ambulance comes from the Latin word “ambulare” as meaning “to walk or move about which is a reference to early medical care where patients were moved by lifting or wheeling.

Types of ambulance

Ambulance can be grouped into types depending on whether or not they transport patients and under what conditions.

- **Emergency ambulance:** - the most common types of ambulance, which provide care to patients with an acute illness or injury. These can be road going vans, boats, helicopter, and fixed wing aircraft (known as air ambulance).
- **Patient transport ambulance:** - a vehicle which has the job of transporting patients to, from or between places of medical treatment, such as hospital or dialysis center, for non-urgent care. These can be vans, buses or other vehicles.
- **Response unit:** - also known as a fly-car or a (quick response vehicle), which is a vehicle which is used to reach an acutely ill patient quickly, and provide on scene care.
- **Bariatric ambulance:** - A special type of patient transport ambulance designed for extremely obese patients equipped with the appropriate tools to move and manage these patients.

Equipment

In addition to the equipment directly used for the treatment of patients, ambulances may be fitted with a range of additional equipment which is used in order to facilitate patient care. This could include: -

- **TWO-WAY RADIO-** can allow the crew to pass information back to control or to the hospital.
- **Trauma lighting-** in addition to normal working lighting ambulances can be fitted with special lighting.
- **Air conditioning-** this helps to maintain an appropriate temperature for any patient being treated, but may also feature additional features such as filtering against airborne pathogens.
- **Data recorders-** these are often placed in ambulance to record such information as speed, braking power and time, activation of active emergency warning such as lights and sirens, as well as seat belt usage.

Audible warnings

In addition to visual warnings, ambulances can be fitted with audible warning, sometimes known as siren which can alert people and vehicles to presence of an ambulance before the can be seen.

Service providers

- **Government ambulance service:** - operating separately from the fire and police services of the area, these ambulances are founded by local or national government.
- **Volunteer ambulance services:** - charities or non-profit companies operate ambulances, both in an emergency and patient transport function.
- **Private ambulance service:** - normal commercial companies with paid employees, but often on contrast to the local or national government. Private companies may provide only the patient transport element of ambulance care.
- **Charity ambulance:** - this special type of ambulance is provided by a charity for the purpose of taking sick children or adult on other hospital.

Cardiac Ambulance

Cardiac ambulance contains: -

- Doctor
- E. C. G
- Defibrillator
- Suction machine
- Oxygen
- Resuscitation kit
- Syringe pump
- Pace maker
- Trained nurse
- Cardiac monitor
- Portable ventilator
- Pulse oxy-meter
- Emergency medicine
- Nebulizer
- Bipap
- Spine board

How it works: -

- When an emergency is reported through 108, the call taker gather the needed basic information and dispatches appropriate services.

Basic information obtained includes: -

- Where the call is placed from. (district/taluka/city/town/exact location/landmark)
- The type of emergency

- Number of people injured and the condition of the injured.
 - The caller's name and contact number- for location guidance if required.
- Emergency help dispatched through this process is expected to reach the site of the emergency in an average of 18 minutes. Pre-hospital care will be given to patients being transported to the nearest hospital. The service is normally free to patients.
- 108 in managed by the EMRI (emergency management and research institute) across more than 10 states in India.

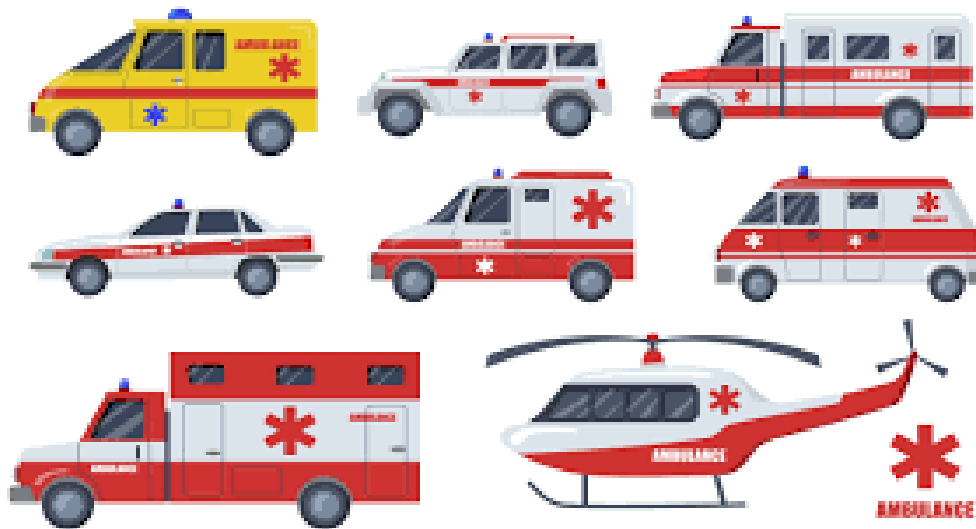


Fig: - Different type of Ambulances

Reference: - Medical Laboratory Technology: Methods and Interpretations Ramnik Sood, Second Edition, Jaypee Publishers

Experiment - 07

Aim: - To study the basic concept of operating procedure of UV-spectrophotometer.

Principle: - The principle of a spectrophotometer is based on the Beer-Lambert Law which states that the light absorbance of a substance is proportional to its concentration and path length of light through the sample. It determines how much light a sample absorbs at a specific wavelength by comparing the intensity of the incident light to the transmitted light, enabling both quantitative and qualitative analysis.

The Beer-Lambert law relates the concentration of a sample to the amount of light the sample absorbs as it passes through the sample. The equation for the Beer-Lambert Law is generally written as:

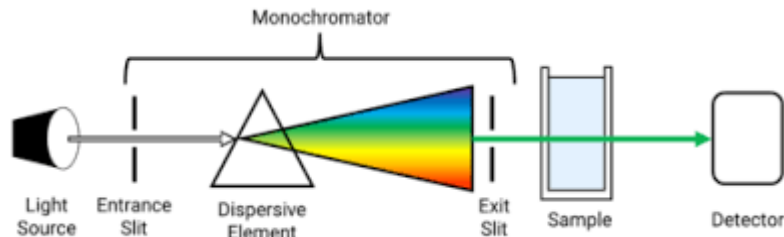
$$A = \epsilon Lc$$

A = Absorbance

ϵ = Molar extinction coefficient

L = Path length

C = Concentration of the sample



UV-Spectrophotometer: A spectrophotometer is an essential laboratory instrument used to measure the amount of light a substance absorbs at a specific wavelength. It operates by passing a beam of light through a sample and detecting the intensity of light before and after it interacts with the sample. The difference in intensity indicates how much light has been absorbed, which can be directly correlated to the concentration of specific compounds in the solution.

Procedure: To operate a UV spectrophotometer, start by turning it on and allowing it to warm up. Then, set the wavelength and prepare a blank and sample solution in clean cuvettes. Calibrate the instrument with the blank, and then insert your sample to measure absorbance or transmittance.

1. Power On and Warm-up:

Turn on the UV spectrophotometer and allow the lamps to warm up for the recommended time, typically around 20 minutes, to ensure stable operation.

2. Set Wavelength:

Determine the appropriate wavelength or wavelength range for your analysis based on the compound you are studying.

3. Prepare Blank and Sample:

Fill a clean cuvette with the solvent used for your sample (this is your blank). This helps account for any light loss due to solvent absorption or scattering.

Prepare your sample solution in a separate clean cuvette.

4. Calibrate the Instrument:

Insert the blank cuvette into the spectrophotometer's sample holder.
Close the lid and calibrate the instrument to zero (0) or adjust the instrument to read 0.
Some instruments may automatically store the blank data and perform blank subtraction.

5. Measure the Sample:

Carefully remove the blank cuvette and insert your sample cuvette into the sample holder.
Close the lid and initiate the measurement.
The spectrophotometer will measure the absorbance or transmittance of the light passing through the sample at the chosen wavelength.

6. Record Data:

Note down the absorbance (or transmittance) value displayed by the instrument.

7. Repeat for Multiple Samples:

If you have multiple samples, repeat steps 4-6 for each sample, ensuring you are using clean cuvettes for each measurement.

8. Analyze Results:

Depending on your experiment, you can use the absorbance (or transmittance) data to determine the concentration of your compound of interest using Beer's Law or other relevant analytical methods.

Reference: - Medical Laboratory Technology: Methods and Interpretations Ramnik Sood, Second Edition, Jaypee Publishers

Experiment - 08

AIM: - To study the Biomedical Waste Management (BMW) guidelines.

Theory: - BMW is the waste produced from medical activities

- Generated during - diagnosis, treatment - immunization of human beings or animals - research activities - production or testing of biologicals - health camps ... etc.,

Bio-medical Waste Management Rules Framed by Ministry of Environment and Forest (MoEF), Govt. of India

- On 20th July 1998, "Bio-medical waste (Management and Handling) Rules were framed. • 1st Amendment on 06-03-2000. • 2nd Amendment on 17-09-2003. • On 28th March 2016, Under Environment (Protection) Act, 1986, MoEF&CC notified the new BMW Rules, 2016 and replaced the earlier Rules (1988).

Why BMW is Important?

- Due to increase in population the amount of BMW generated is increasing.
- Amount of infectious waste is around 15%.
- Amount of non- infectious wastes constitutes nearly 85%
- In absence of proper segregation, the noninfectious waste becomes infectious and poses environmental threat to the society
- An inappropriate treatment and disposal can help spread infectious diseases in society.

Effects of BMW

The improper management of BMW causes serious environmental problems in terms of:

- Air Pollution
- Water Pollution
- Land Pollution
- Soil Pollution

Necessary compliance by BMW generators

- Vaccinated against Hepatitis B to Hospital Staff
 - Use of Heavy Duty Protective gears
- Annual BMW Management training to health care workers
- Report accidents caused during waste handling
- Maintain monthly records of day to day waste management
- Produce annual reports in Form-IV to the prescribed authority
- Every occupier or operator handling BMW, irrespective of the quantity shall make an application in Form II for authorization.
 - All necessary compliance in accordance with BMW (Management) Rules 2016 to avoid unwanted occurrence

Segregation of BMW in Color Coded Bags

Yellow : -Human Anatomical Waste, Animal Anatomical Waste, Soiled Waste, Expired or Discarded Medicines, Chemical Waste, Microbiology, Biotechnology and other clinical laboratory waste.



Red: - Plastic Waste such as tubing, bottles, intravenous tubes and sets, catheters, urine bags, syringes (without needles and fixed needle syringes) and vacutainers (with their needles cut) and gloves



White: - Sharp Waste including metals like Needles, Syringes with fixed needles, needles from needle tip cutter or burner, scalpels, blades, etc.



Blue: - Broken or discarded and contaminated glass including medicine vials and ampoules except those contaminated with cytotoxic wastes and metallic body implants.



Green: - A green dustbin is typically used for wet, biodegradable waste, also known as organic waste. This includes things like food scraps, kitchen waste, garden waste, and other materials that can decompose naturally. Green bins are often used to collect waste that can be composted.



Storage: -

- Once collection occurs then biomedical waste is stored in a proper place
- Segregated wastes of different categories need to be collected in identifiable containers
- The duration of storage should not exceed for 8-10 hrs. in big hospitals (more than 250 bedded) and 24 hrs. in nursing homes.

Transportation: -

- The waste should be transported for treatment either in trolleys or in covered wheel-barrow.
- The bags/ Containers containing BMWs should be tied/ lidded before transportation.
- Before transporting the bag containing BMWs should be accompanied with a signed document by Nurse/ Doctor mentioning date, shift, quantity and destination.
- Final Transport of BMW must be to CBMWTSDF only in authorized vehicle with appropriate documentation for further record.

Reference: - Medical Laboratory Technology: Methods and Interpretations Ramnik Sood, Second Edition, Jaypee Publishers