



# B.PHARMA 7<sup>th</sup> SEMESTER

**BP-703T**

**PHARMACY PRACTICE**



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## SECTION A

VERY SHORT ANSWERS TYPE QUESTIONS (10 × 2 = 20)

1. Define ADR.

Answer

**Adverse Drug Reaction**

- Adverse drug reactions are defined as any noxious and unwanted effect of drug that occurs at doses given to human being for prophylaxis, diagnosis or treatment.



2. Explain Therapeutic Drug Monitoring.

Answer

**Therapeutic Drug Monitoring**

- Therapeutic drug monitoring (TDM) refers to the measurement of drug concentrations in biological fluids with the purpose of optimizing a patient's drug therapy. During administration of a dosage regimen, the concentration should be maintained within the therapeutic window. TDM is an important tool utilized, to individualize dosage regimen by maintaining plasma or blood drug concentrations within the therapeutic range.

3. Give some sources of Drug Information in Indian Background.

Answer

**Sources of Drug Information**

**1. Primary source**

- Original information
- Scientific journal
- Thesis
- Proceedings of conferences

**2. Secondary source:**

- Database (pubmed, embase, scopus, toxline, national Library of Medicine gateway)
- Low drug information service
- Review articles.

**3. Tertiary source:**

- Textbooks on drug or disease topics
- Pharmacopeias- IP
- Encyclopedia
- Dictionaries
- Guides Other sources

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- Public and hospital about the AE of any drug.
- Local drug lists
- National formulation, Hospital formularies
- Internet

### 4. Structure of wholesale and retail drug store.

Answer

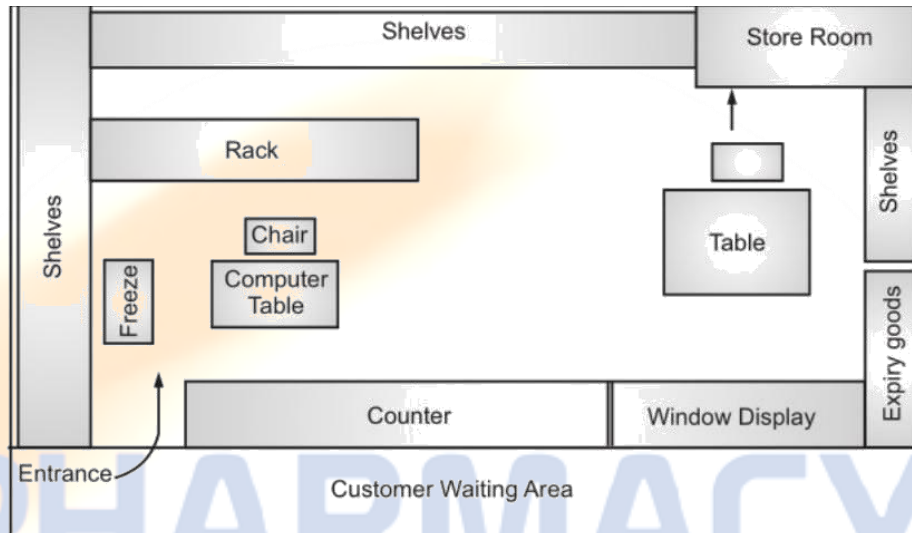


Fig. 4.1: Layout of Retail Pharmacy Store

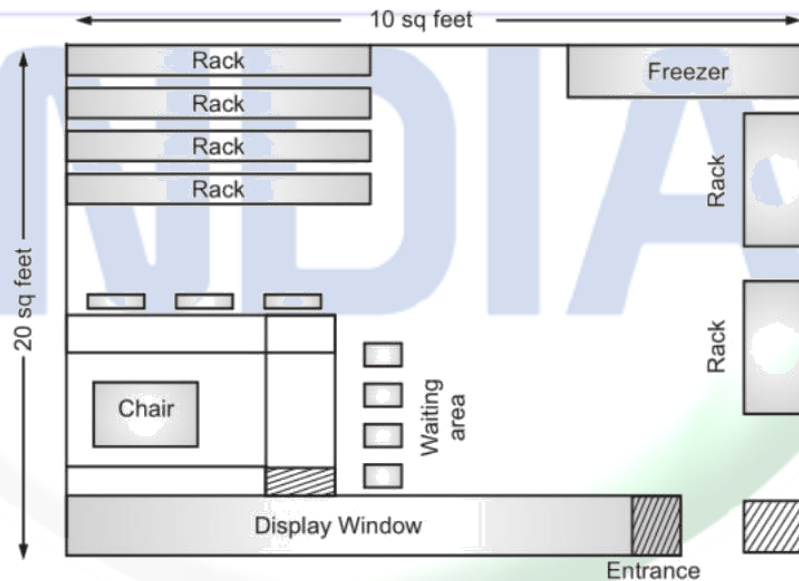


Fig. 4.2: Layout of Wholesale Pharmacy Store

### 5. Write the code of ethics of community pharmacy.

Answer

- **Respect for patient autonomy:** Community pharmacists must respect the autonomy of their patients and ensure that patients are fully informed about their medications and treatment options. Pharmacists must also obtain informed consent from their patients before providing any medications or treatments.

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- **Professional competence:** Community pharmacists must maintain the highest standards of professional competence and continually update their knowledge and skills to provide safe and effective patient care.
- **Confidentiality:** Community pharmacists must maintain the confidentiality of patient information and only disclose patient information in accordance with legal and ethical standards.

### 6. What is ward round participation?

**Answer**

#### **Ward Round Participation**

- Hepler and Strand gave a pharmaceutical care concept authorising the pharmacists with greater responsibility towards patient care.
- Pharmaceutical care involves the way in which a pharmacist, a patient and other professionals collaborate to design, implement and monitor a therapeutic plan for producing specific therapeutic effects for the patient.

### 7. What is drug store management?

**Answer**

#### **Drug Store Management**

- Drug store management is one of the important aspects of the pharmaceutical business. It is also called a retail pharmacy, which consists of final activity and is a place where drugs will be in the hands of the patients/consumers or to provide services to the patients/consumers.

### 8. Write the concept of clinical pharmacy.

**Answer**

#### **Concept of Clinical Pharmacy**

- Clinical pharmacy includes the services through which the practicing pharmacists apply their responsibilities for patient care.
- It ensures rational selection and use of medications, and their appropriate and safe use in patient care. The process of drug use involves several stages.
- The need for drug therapy should be determined. The appropriate drug, its dose, route, form, frequency, and treatment duration should be selected, and then the drugs should be administered correctly. This entire process should be examined to evaluate the success or failure of the conclusion.

### 9. Give the various types of inventory control process?

**Answer**

#### **Types of Inventory Control Process**

There are three methods used in pharmacy to manage inventory:

- a. The visual method
- b. The periodic method
- c. The perpetual method

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### 10. Give the objectives of patient counselling.

Answer

#### Objectives of Patient Counselling

- Patient counselling is an important aspect of pharmacy that can improve patient outcomes by establishing trust, providing support and understanding the impact of illnesses and treatment regimens on patients' daily lives.

### SECTION B

#### LONG ANSWERS TYPE QUESTIONS (2 × 10 = 20)

### 1. Classify hospital and explain the organization structure of a hospital highlighting its staff requirements.

Answer

#### Classification of Hospital

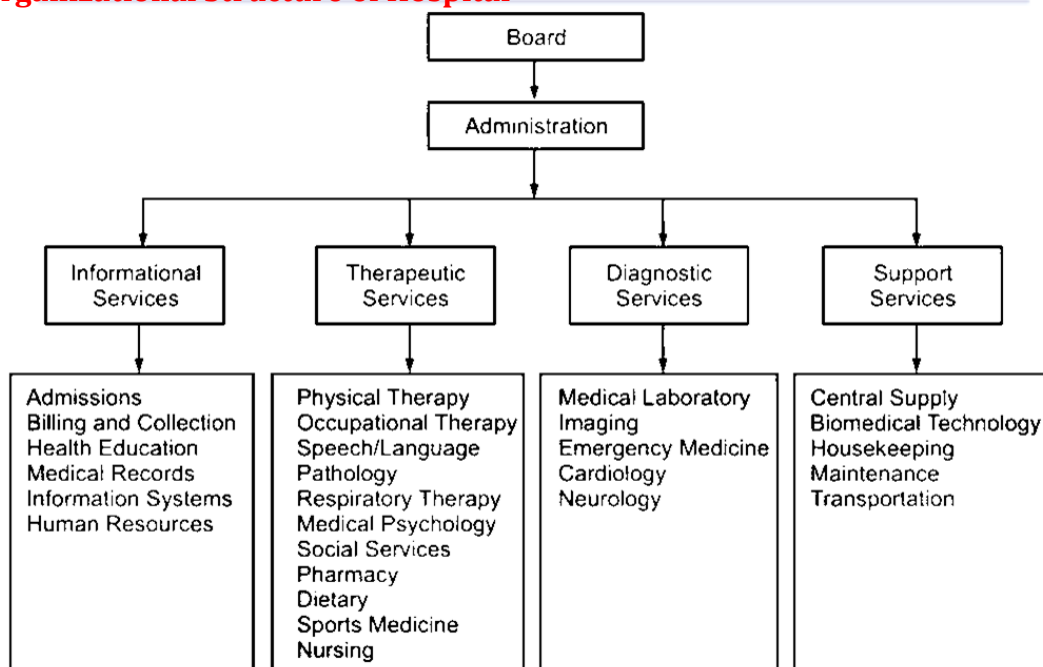
Following are different classification of hospitals as per their objectives, functions and a service provides:

Basis	Hospitals
Objectives	<ul style="list-style-type: none"><li>• General Hospitals</li><li>• Special Hospitals</li><li>• Teaching cum Research Hospitals</li></ul>
Administration, Ownership, Control or Financial Income	<ul style="list-style-type: none"><li>• Governmental or public Hospitals</li><li>• Non-governmental or private Hospitals</li><li>• Semi government Hospitals</li><li>• Voluntary Agency Hospitals</li></ul>
Length of Stay	<ul style="list-style-type: none"><li>• Short-stay hospitals; also called short-term hospitals (provide services for less than 30 days).</li><li>• Long-stay hospitals also called as long-term hospitals (provide services for more than 30 days).</li></ul>
Medical Staff	<ul style="list-style-type: none"><li>• Open-staff Hospitals</li><li>• Closed-staff Hospitals</li></ul>
Bed Capacity	<ul style="list-style-type: none"><li>• Small Hospitals (provide accommodation facility up to 100 beds).</li><li>• Medium Hospitals (provide accommodation facility from 100 to 300 beds).</li><li>• Large Hospitals (provide accommodation facility for more than 300 beds).</li></ul>
Type of care	<ul style="list-style-type: none"><li>• Primary Care Hospitals</li><li>• Secondary Care Hospitals</li><li>• Tertiary Care Hospitals</li></ul>
Teaching affiliation	<ul style="list-style-type: none"><li>• Teaching Hospitals</li></ul>

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	<ul style="list-style-type: none"> <li>• Non-teaching Hospitals</li> </ul>
<b>System of Medicine</b>	<ul style="list-style-type: none"> <li>• Allopathic Hospitals</li> <li>• Ayurvedic Hospitals</li> <li>• Homeopathic Hospitals</li> <li>• Unani Hospitals</li> <li>• Hospitals of other system of medicine</li> </ul>
<b>Region dependent</b>	<ul style="list-style-type: none"> <li>• Regional Hospitals</li> <li>• Upazila Health Complex</li> <li>• District Hospitals</li> <li>• Union Health and Family Welfare Centers</li> <li>• Community Clinics</li> </ul>
<b>Medicine System</b>	<ul style="list-style-type: none"> <li>• Allopathic Hospitals</li> <li>• Ayurvedic Hospitals</li> <li>• Homeopathy Hospitals</li> <li>• Unani Hospitals</li> </ul>
<b>As per WHO Classification</b>	<ul style="list-style-type: none"> <li>• Regional Hospitals</li> <li>• Intermediate/ District Hospitals</li> <li>• Rural Hospitals</li> </ul>

### Organizational Structure of Hospital



### Board of Trustees/Governing Board:

- The "board of trustees," controls the hospital and has obligatory duty to protect the resources of the hospital through efficient operation.
- The guardians or trustees are accountable for funding the hospital's mission and launching its regulations and strategic policies.

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- Trustees appoint the administrative leader called as Chief Executive Officer (CEO) for the hospital and delegate the hospital's daily procedures and budgeting.

### Executive Administration:

- The chief executive officer (CEO) reports to the board of trustees and delivers leadership services for the implementation of the strategic plan, goals and decisions established by the board of trustees.
- The CEO also symbolizes the hospital to the community and external environment for its growth.
- The CEO should also coordinate effectively with the hospital staff.

### Informational Services:

- Admissions related information of patients which includes full information and history of patient.
- **Billing and Collection:** There is separate department which provides the responsibilities for billing of service provided.
- **Medical Records:** These are responsible for maintaining of medical record of all patients.
- **Computer Information Systems:** Maintenance of computer and hospital network.
- **Health Education:** The personnel involve in these services are responsible for health education to staff and patients.
- **Human Resources:** The personnel involve is responsible for recruiting of employee and look towards to benefits of employees.

### Therapeutic Services:

- **Physical Therapy:** Associated with various treatment to improve large muscle mobility motor skills.
- **Occupational Therapy:** In this, the treatment goal is to help the patient to regain fine speech/ language.
- **Pathology Therapy:** It is associated to identify, evaluate, and provide the treatment to speech/language disorders.

### Diagnostic Services

Determines the cause(s) of illness or injury includes:

- **Medical Laboratory** - Dealing with studies on body tissues.
- **Medical Imaging** - Provide the services related to radiology, MRI, CT, Ultra Sound.
- **Emergency Medicine** - Provide the services related to emergency diagnoses and treatment.

### Administrative Support Services

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- The CEO is responsible for the implantation various administrative supportive services and day-to-day operations activities of the facility.
- The non-medical staff are involved to management of admitting and discharge of patients, record maintenance, handling of the accounts related to third party payers such insurance companies.

### Staff Requirements in Hospital

Medical unit of hospital comprises following personnel according to their designation and they are assigns to perform various activities as given below:

- Doctors
- Nurses
- Allied Health Professionals
- Support staff



## 2. Discuss various types of drug distribution system in a hospital for in and out patient.

**Answer**

### Out-patient Services:-

- This type of patients is not admitted in hospital and is given general or emergency treatment which could be diagnosis, therapeutic, or preventive. An out-patient department keeps a check on patients who not to be admitted and require only diagnostic and therapeutic services.
- There are three types of out-patients:-
  1. General out-patient: such a patient is given treatment for a general condition or emergency condition but not referred case. E.g. Diarrhoea, Hypertension, Diabetes, Fever etc.
  2. Referred Out-patient: In this type patient is referred to out-patient department by the attending medical/dental practitioner for specific treatment, and the patients for further treatment returns to the practitioner.
  3. Emergency out-patient: In this type patient is given emergency or accident care for conditions (Determined clinically or considered by the patient or his representative) demanding instant medical attention.

### In-patient services: -

- The patient which is admitted in hospital receiving general or specific treatment is called Inpatient.
- Types of services provided to In-patients.
  - 1) Individual prescription order system
  - 2) Complete floor stock system
  - 3) Combination of individual drug order and floor stock system
  - 4) Unit dose dispensing system
  - 5) Bed size pharmacy



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## Unit Dose Dispensing System

- It is the system which consist of depending unit dosage to patient containing an amount of drug.
- These unit dosage are either stored or distributed from many pharmacy department unit dose are prepare as per requirement it is useful to In-patients and out-patient.
- They are mainly two types.
- 1. **Centralized unit dose dispensing system:-** The unit dose are dispensing from pharmacy department.
- 2. **Decentralize unit dose dispensing system:-** The unit dose dispensing system are dispensing from nursing station.
- **Advantage of unit dose dispensing system**
  - Patient should be pay the cost of medicine.
  - Purchasing cost and budget of hospital.
  - Paper work is less at nursing unit as well as the pharmacy.
- **Disadvantage of unit dose dispensing system**
  - Man power is required for pre-packaging.
  - Separate container machinery and also space is required.
  - Unit deepening should be handle by skilled person.

## Floor ward Stock System

- Floor ward stock system is seen in private hospitals. In this system the drugs are stored in the pharmacy Store, supplied to the wards when ordered and are supervised by a registered nurse at the nursing station.
- Type of drugs
  - 1) **Charge Drugs**
    - The charge floor stock medicine are given to the patient cost of medicine is directly added to the patient account.
    - The selected are list of charge floor stock drug and requirement.
  - 2) **Non-Charge Drugs**
    - The medication are stock on nursing department at all time but they are not directly charge to account of patients.

## Central Sterile Service

- The central supply department (CSD) in a hospital provides the essential professional supplies and equipment (Drapes, syringes, tubing, intervenous etc.)The central supply department
- (CSD) and procurement, Storage, distribution and manufacturing of various sterile solutions within should be managed by the pharmacist.
- **Central supply department (CSD) has the following objectives.**
  1. Maintains operation theatres supply.

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2. Cleans and sterilizes all hospital supplies.
3. Makes an accurate inventory of all hospital supplies and equipment.
4. Contributes to education programmers.

### 3. Write the role of Pharmacist in education and training program in the hospital and also explain the internal and external training program in hospital.

#### Answer

#### Role of Pharmacist in Education and Training Program in the Hospital

The following are the roles and functions of pharmacists that need to be strengthened and supported:

- To instruct on all medicine including; pharmacokinetic properties, adverse drug reactions, and drug interactions.
- To instruct and educate on the proper use of all medicines.
- To monitor products sold directly to the public, prescription trends, and the selection, management, and procurement of drugs by government and local purchasing agents.
- Development and drafting of rules for controlling the manufacture, distribution, and supply of drugs.
- Training, supervision, and guidance to community health workers with pharmacy tasks.

#### The Internal and External Training Program in Hospital

##### Training Programs in Hospital

- Hospital staff should receive necessary technical training to perform their task better, improve their work-related skill set, increase knowledge about their work, become aware of their future roles and responsibilities related to their task, etc.
- The most important strength of a hospital is the employee who works for the growth of the hospital and patient care which includes the hospital's security guards, lab technicians, pharmacists, nurses, including physicians.

#### A. Internal Training Programs:

- Internal training programs are generally carried out in hospitals and these are taught by someone staff of hospital organization that has expertization in a special type of work.
- Internal training methods are associated with to use of the hospital's resources and expertise to develop and deliver the specific type of training.

#### a. Induction:

- This type of program is generally provided to the entire newly recruited

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employee at the time of their joining of the hospital organization.

- In this type of program, a session of introductions to the hospital's quality policy, Vision, Mission, any other hospital policies and procedures, job description and responsibilities, etc. are taught to an employee.

### b. On Job Training:

- The purpose of this type of training in hospital is to make the employees familiar with the normal working condition such as handling of the patient, cleaning of machinery, storage of material, sterilization, handling of equipments, management of various risks accompanying with the care environment, etc.
- Such type of training also helps the employee to make comfort during the execution of the jobs.

### c. Training during rotation of staff:

- There is a need to give the training to those employees who are transferred or get rotated to other departments of the hospital to make them familiar with new things, understand new assignments and responsibilities.

## B. External Training Programs:

- The external training programs are generally conducted by someone from the outside of the hospitals. In this program, the external courses are taught by professionals who have skilled and expertization in the subject of the training.
- In such a training program an outside perception is one of the main benefits. In this outsource person may offer a new way of approach that has not previously been considered.

### a. Advancement/introduction/change in Technology/ Equipment:

- As per the need every concerned employee has to provide training to upgrade them according to situations. For example training for servicing of new instruments or advanced care and treatment of a patient.

## SECTION C

### SHORT ANSWERS TYPE QUESTIONS (5 × 7 = 35)

#### 1. Discuss and define investigational use of drug.

**Answer**

#### **Investigational use of Drug**

- Any drug or placebo which is being tested or used as a reference in a clinical trial, including a registered drug used in a different formulation, or used for an unapproved indication, or used in doses outside the approved range is called as investigational drugs.

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- An investigational drug can also be called an experimental drug and is being studied to see if disease or medical condition improves while taking it.
- Hospitals and other healthcare agencies are the major centers for clinical studies with investigational drugs and pharmacists in these institutions should be involved with policies and procedures for the safe and ethical use of these drugs.

### Principles

- Hospitals are the primary centers for clinical investigations on drugs.
- By definition these are drugs which have not yet been released by the Federal Food and Drug Administration for general use.
- Since investigational drugs have not been certified as being for general use and have not been cleared for sale in interstate commerce by the Federal Food and Drug Administration, hospitals and their medical staffs have an obligation to their patients to see that proper procedures for their use are established.
- Procedures for the control of investigational drugs should be based upon the following principles:
  1. Investigational drugs should be used only under the direct supervision of the principal investigator who should be a member of the medical staff and who should assume the burden of securing the necessary consent.
  2. The hospital should do all in its power to foster research consistent with adequate safeguard for the patient.
  3. When nurses are called upon to administer investigational drugs, they should have available to them basic information concerning such drugs-including dosage forms strengths available, actions and uses, side effects and symptoms of toxicity etc.
  4. The hospital should establish, preferably through the pharmacy and therapeutics committee, a central unit where essential information on investigational drugs is maintained and whence it may be made available to authorized personnel.
  5. The pharmacy department is the appropriate area for the storage of investigational drugs as it is for all other drugs. This will also provide for the proper labeling and dispensing in accordance with the investigator's written orders.

### Classification of Investigational Drugs

#### I. On the basis of hospital research programme the investigational drugs

<b>Class A</b>	Should contain all investigational use drugs that are in a preliminary experimental stage. The use of drug in this category is usually restricted to the principal investigator.
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<b>Class B</b>	Should consist of investigational use drugs which have passed through the preliminary research stage. Usually, drugs in this category are supplied to the department of pharmacy by the principal investigator and are dispensed only upon his written prescription.
<b>Class C</b>	It is limited to drugs approved by the USP, NF or passed by the Federal FDA for commercial distribution. Drugs in this category may be used within the hospital or its clinics if the physician complies with some specific procedures.
<b>Class D</b>	Drugs are preparations which have been accepted for use in the hospital and are listed in the hospital formulary.

### II. On the basis of hospital pharmacy operation

<b>General</b>	An FDA-approved drug which as recommended as essential for good patient care with a well-established usage, once accepted, may be prescribed by all members of the attending and house staff.
<b>Conditional</b>	Certain drugs may be approved for a conditional period of trial. A drug approved by the FDA for general use, but which the Committee wishes to evaluate for given period before final consideration, may be prescribed by all members of the attending and house staff.
<b>Investigational</b>	Drugs which are not approved by the FDA for use other than under controlled clinical settings must be approved by the Research Advisory Committee. A protocol of any study involving drugs must be submitted to the pharmacy.

### 2. Write a note on drug therapy monitoring and OTC medication.

**Answer**

#### **Drug Therapy Monitoring**

- Drug therapy monitoring, also known as Therapeutic Drug Monitoring (TDM), is a means of monitoring drug levels in the blood.
- Therapeutic drug monitoring (TDM) refers to the measurement and interpretation of principally blood or plasma drug concentration measurements with the purpose of optimising a patients drug therapy and clinical outcome while minimising the risk of druginduced toxicity.
- TDM involves tailoring a dose regimen to an individual patient by maintaining the plasma or blood concentration within a particular range.
- To achieve optimal drug therapy 3 objectives should be met:
  - To attain desired pharmacological effect of the drug.
  - To reach the maximal effect in shortest possible time.
  - To decrease the risk of toxicity.

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### TDM is useful in drugs:

- With a narrow therapeutic index.
  - Which are highly protein bound.
  - Which are liable to interact.
  - In which the metabolite might be toxic.
- Drug therapy monitoring is an ongoing process in which pharmacists actively review patients' records, identify and resolve drug therapy problems such as adverse drug events (ADEs), and communicate with prescribers when problems occur.
  - Pharmacists educate patients and their caregivers about potential adverse effects and work with patients to ensure adherence to therapy and attainment of therapeutic goals.

### OTC Medication

- OTC drugs mean Over the Counter drugs. They are also known as non-prescription drugs, and can be sold or purchased without a prescription order.
- OTC drugs have minimal abuse potential of the controlled constituents and contain formulations with limited amounts of few narcotic drugs, usually for anti-tussive and anti-diarrhoeal purposes.
- The most significant difference between non-prescription and prescription medicine is established on the availability of acceptable ways for use under which a layman can use the medicine safely.
- OTC drugs are those drugs which can be purchased without a prescription. Few OTC drugs relieve aches, pains, and itches, whereas few of them prevent or treat diseases, such as tooth decay and athlete's foot. They also help to manage migraine conditions.
- Few examples of OTC drugs are painkillers (like ibuprofen and acetaminophen), decongestants, anti-fungal creams, laxatives, acne creams, and sunscreens.

### Sale of Over-the-Counter Drugs

- Prescription drugs come under Schedule H, whereas drugs that can be sold without prescription under certain conditions come under Schedule K or Indian Drugs and Cosmetics Act, 1940.
- To be sold as OTC, any product should achieve the following three criteria:
  - 1) It should be safe.
  - 2) It should be effective.
  - 3) It should be for a situation that can be managed by the patient without supervision by a licensed health professional.
- OTC drugs can cause side effects, drug interactions, and disease interactions.
- Drugs like NSAIDs, gastrointestinal and prochlorperazine, would be unsafe to be used as OTC drugs knowing the different side effects and restrictions related to their daily and chronic use.
- **Advantages of OTC Sale:** Easy availability, accessibility, and less difficulties for the patient.

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- **Disadvantages of OTC Sale:** Scheduled and banned drugs can also be sold as OTC drugs. Antimicrobials, tranquilizers, and other drugs with abuse liability can also be sold without prescription. The ancillary cost to healthcare because of this irrationality is terrific, e.g., antimicrobial resistance, and medicine dependence (tranquilizers, sedatives, opioids).

### 3. Define therapeutic drug monitoring and give its factors to be considered and what are the roles in Indian scenario.

#### Answer

#### Therapeutic Drug Monitoring

- Therapeutic drug monitoring (TDM) refers to the measurement of drug concentrations in biological fluids with the purpose of optimizing a patient's drug therapy. During administration of a dosage regimen, the concentration should be maintained within the therapeutic window. TDM is an important tool utilized, to individualize dosage regimen by maintaining plasma or blood drug concentrations within the therapeutic range.

#### Factors to be Considered

- A number of factors may affect serum drug concentrations and need to be considered when interpreting TDM results. Some of the factors explain below:

<b>Patient demography</b>	<ul style="list-style-type: none"><li>• The patient's age, sex, body weight and ethnicity should be considered when interpreting TDM results.</li></ul>
<b>Dosage regimen and duration of therapy</b>	<ul style="list-style-type: none"><li>• For a drug, sufficient time should elapse to allow steady-state to be achieved before TDM is performed. If a loading dose has not been given, this means at least 5 half-lives of the drug should elapse.</li></ul>
<b>Sampling time</b>	<ul style="list-style-type: none"><li>• The serum concentration of a drug depends on the time when the blood drawn for a TDM assay was sampled in relation to the last dose.</li></ul>
<b>Patient compliance</b>	<ul style="list-style-type: none"><li>• If the concentration of the drug is lower than expected. The possibility of non-compliance should be considered before a dose increase.</li></ul>
<b>Individual capacity to distribute/ metabolise / excrete the drug</b>	<ul style="list-style-type: none"><li>• Patients with renal impairment have a reduced ability to excrete renally cleared drugs, and the interpretation of TDM for renally- cleared drugs such as digoxin and aminoglycosides should always be made in the context of the patient's renal function.</li></ul>
<b>Altered protein binding</b>	<ul style="list-style-type: none"><li>• Conditions such as malnutrition or nephropathy may reduce the concentration of plasma protein. The strongly plasma protein bound drugs such as phenytoin, a reduced albumin level may result in higher concentration of unbound (free) drug. The</li></ul>

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	measurement of both total drug concentration and free drug concentration can be useful in that situation.
<b>Drug interaction</b>	<ul style="list-style-type: none"><li>• TDM results should be interpreted in the light of the patient's concomitant drug therapy. Example digoxin toxicity with drug amiodarone, quinidine or verapamil.</li></ul>
<b>Pathological factors</b>	<ul style="list-style-type: none"><li>• The patient's co-morbidities should be taken into consideration when interpreting TDM result.</li></ul>

### Roles in Indian Scenario

In India TDM is available in following two ways

1. Clinical pharmacological departments in large teaching hospitals.
  - Generally, HPLC is used in teaching hospital
  - Instrument available locally
  - Cost effective for many patients
2. Private medical laboratories
  - Private laboratories use automated equipment and imported ready-to-use kits.
  - More expensive
  - It does not provide clinical interpretation of results.
  - The final results are providing a therapeutic drug measuring service rather than therapeutic drug monitoring. There are a number of factors which influence the use of TDM in India.
  - **Cost:** The widespread availability of TDM in India will need strong economic justifications but it's quite expensive for India.
  - **Alternative medical systems:** Pharmacokinetic and pharmacodynamic interactions between various drugs which are difficult to assess the outcome of drug therapy and the result of TDM assay.

#### 4. Define budget and what are the steps involving in preparing a budget? Explain briefly.

**Answer**

##### **Budget**

- Halma defined budget as "an instrument through which hospital administration, management at the departmental levels, and the governing board can review the hospital's services in relation to a prepared plan in a comprehensive and integrated form expressed in financial terms".

##### **Steps involving in preparing a Budget**

- Budgets are prepared as per the requirement or types of organization. Based on the requirement, the budget may be prepared considering the length of the period of its implementation.

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1. **Long-term Budget:** These budgets are prepared for the long term. They are prepared for the period of 5 to 10 years. This type of budget is prepared to depend upon the size of the organization.
2. **Short-term Budget:** This type of budget is prepared for a duration of 2 to 5 years. These budgets are prepared under control conditions.
3. **Current Budget:** This type of budget is prepared for a shorter duration. The duration is usually 1 to 3 months.

### Development of Budget:

- In the preparation/development of the budget, there are different sections. The details of each section and its significance are discussed below:

### Revenue Accounts:

- Total income must be calculated for the implementation of the budget.
- The pharmacy department or accounts department maintains daily, weekly, monthly and annual costs of the pharmaceuticals issued to the patient services.
- The other statistics include the number of prescriptions, number of prescriptions dispensed by each pharmacist, hours of work put in prescription volume per hour of service, medication cost per patient day, average drug cost per clinic visit, average salary cost per prescription, and average supply cost per requisition.

### Expense/Expenditure Accounts:

- Expenditure accounts include administrative and general expenses. Professional care of the patients, out-patients and emergency expenses, and miscellaneous expenses.
- The expenditure accounts also include the following categories of expenses like salaries and wages, in this expenditure salaries and wages of all employees need to be taken into consideration.

### Capital Equipment Requests:

- The equipment and construction budget includes a budget for immediate arrangements of new model equipment. The budget is also made for remodelling and replacement of equipment. It also includes the construction of buildings/infrastructure for future expansion.

### 5. Explain the principle involved in the methods of inventory control ABC, VED and EOQ.

#### Answer

#### Principle Involved in the Method of Inventory Control ABC, VED and EOQ

TOOLS & TECHNIQUES	COMMENT						
A.B.C analysis	Basic tool with selective approach for concentration upon item according to this items classified into 3 category						
	<table border="1"><thead><tr><th>Class</th><th>% of Item</th><th>% of Annual Expenditure</th></tr></thead><tbody><tr><td>A</td><td>10-15</td><td>70-80</td></tr></tbody></table>	Class	% of Item	% of Annual Expenditure	A	10-15	70-80
	Class	% of Item	% of Annual Expenditure				
A	10-15	70-80					

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	B	20-25	15-20
	C	60-70	5-15
<b>V.E.D. analysis</b> (V = Vital) (E = Essential) (D = Desirable)	VED analysis is based on the importance of the item and its effect on the functioning and efficiency of hospital. <ul style="list-style-type: none"> <li>• <b>Vital drugs</b> – These are those drugs whose absence cannot be tolerated</li> <li>• <b>Essential Drugs</b> – these are those drugs without which hospital can function but may affect the quality.of service.</li> <li>• <b>Desirable Drugs</b> – These are those drugs whose absence will not affect the functioning of hospital.</li> </ul>		
<b>EOQ</b> (Economic Order Quantity)	It is the quantity of material to be ordered at one time which minimizes the cost		

### 6. Write the different clinical laboratory test for blood.

**Answer**

#### Basic Metabolic Panel (BMP)

- The basic metabolic panel (BMP) is a group of 8 tests that measures several substances in the blood.
- The BMP includes the following test

<b>Blood Glucose Level</b>	<ul style="list-style-type: none"> <li>• This test is conducted to screen for and diagnose diabetes and prediabetes and to monitor for high blood glucose (hyperglycemia) or low blood glucose (hypoglycemia).</li> <li>• The normal fasting blood sugar level is from 60-100 mg/100 ml. 50 mg of glucose is then taken, blood sample is withdrawn after 2 hours.</li> <li>• Blood sugar reaches to a maximum level and then it returns to normal levels within 1-2 hours. If it does not return to normal levels and remains elevated to more than 50 mg above the fasting value, it indicates diabetes mellitus.</li> <li>• High blood sugar indicates pancreatic disease, hyperthyroidism, hepatic disorders, hyperglycaemia. Low blood sugar levels are observed in hyperthyroidism, hypo-pituitarism or over dose of insulin.</li> </ul>
<b>Blood Calcium Level</b>	<ul style="list-style-type: none"> <li>• It is tested whenever there are symptoms of a disorder, or known presence of one, affecting the kidneys, bones, thyroid, parathyroid, or nerves or when symptoms of significantly increased or decreased calcium concentrations are present; when someone has certain types of cancer.</li> <li>• There are two tests to measure blood calcium. The total calcium test measures both the free and bound forms.</li> </ul>

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	<p>The ionized calcium test measures only the free, metabolically active form. The reference range for blood calcium level in adult is 8.6-10.2 mg/dL.</p> <ul style="list-style-type: none"> <li>• However in case of child there is no fixed reference range. Higher total calcium level (hypercalcemia) than the reference value may be due to hyperparathyroidism, presence of cancerous cell, hyperthyroidism, sarcoidosis, tuberculosis etc.</li> </ul>
<p style="text-align: center;"><b>Blood urea nitrogen (BUN)</b></p>	<ul style="list-style-type: none"> <li>• This test is conducted to evaluate the health of the kidneys; to help diagnose kidney disease; to monitor the effectiveness of dialysis and other treatments related to kidney disease or damage.</li> <li>• The reference ranges of blood urea nitrogen in adult and the person &gt;60 years are 2.1-7.1 mmol/L and 2.9-8.2 mmol/L respectively.</li> <li>• The conditions responsible for increase in BUN levels include: kidney disease, dehydration, increased protein in diet, congestive heart failure, shock, stress, recent heart attack, or severe burns etc. However, the conditions responsible for decrease in BUN levels are liver disease, malnutrition.</li> </ul>
<p style="text-align: center;"><b>Serum Creatinine</b></p>	<ul style="list-style-type: none"> <li>• This test is conducted to know how well the kidneys are working. Results of creatinine tests are interpreted along with BUN results, and with other tests results that may have been performed at the same time, such as a renal panel.</li> <li>• The reference range male and female of 18-60 yrs age group are 80 - 115 <math>\mu\text{mol/L}</math> and 53 - 97 <math>\mu\text{mol/L}</math> respectively. However in case of male and female of &gt;60 yrs age group have 71 - 115 <math>\mu\text{mol/L}</math> and 53 - 106 <math>\mu\text{mol/L}</math> respectively.</li> <li>• Conditions that responsible for higher serum creatinine levels include are glomerulonephritis, pyelonephritis, pyelonephritis, reduced blood flow to the kidney due to shock, dehydration, congestive heart failure, atherosclerosis, or complications of diabetes. Low blood levels of creatinine are not common and are not usually a cause for concern. They can be seen with conditions that result in decreased muscle mass.</li> </ul>
<p style="text-align: center;"><b>Erythrocytes (Red Blood Cells)</b></p>	<ul style="list-style-type: none"> <li>• Total RBC count of blood is expressed as number of</li> </ul>

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	<p>cells per mm<sup>3</sup>.</p> <ul style="list-style-type: none"><li>• <b>Significance:</b> A relative or absolute increase in the number of circulating R.B.C. Leads to polycythaemia (erythrocytosis) and is observed in various pathological conditions like chronic heart disease, cholera, burns. A decrease in number of R.B.C. is observed in pregnancy anaemia etc.</li></ul>
<b>Leucocytes (White blood cells)</b>	<ul style="list-style-type: none"><li>• The total leucocytes count is expressed as number of W.B.C. in a cubic mm of whole blood.</li><li>• <b>Significance:</b> An Increase in W.B.C's indicates an infection like bacterial infection, fever, tonsillitis, diphtheria, smallpox, cold, etc. Physiological leucocytosis (increase W.B.C count) is observed in pregnancy, newborn infants, emotional disturbances, menstruation, fear etc. Great increase shows leukaemia.</li></ul>

### 7. Give the objective, need, advantages of hospital formulary.

#### Answer

#### Hospital Formulary

##### Objective

1. To provide essential information about the drug which are approved by HTC to physicians and nurses.
2. To update the knowledge/hospital guidelines and procedures to the medical staff regarding drugs, their use, their merits, and demerits.
3. To avoid unnecessary use of medicine in hospitals during treatment.
4. To reduce the cost burden on the patient.
5. To prevent duplication and wastage of drugs in hospitals.
6. To help the hospital pharmacist in the procurement of new drugs.

##### Need

1. The increasing no. of new drugs manufactured and marketed by drug companies.
2. Increasing complexity of untoward effects of modern potent drugs.
3. Newer sales promotion strategies of pharmaceutical industry.
4. The public interest in getting possible healthcare at lowest possible cost.

##### Advantages

- To discourage the use of "less than optimal drug therapy", and
- To provide a generic product list.
- Generic product selection policies stimulate bio-equivalency comparison which prevents the unnecessary stocking of less than optimal products.
- Formularies must include the cost to provide relative cost data for similar drug products that are generically equivalent.
- Today new drugs and drug therapies are more complex, so the formulary

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system will rely more upon 'recommended for use' criteria for many drugs.

- A drug that has specific advantages in a small number of patients will be included in the formulary.

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