

TIRUPATI COLLEGE OF POLYTECHNIC AND PHARMACY, RATIA

D. PHARMACY SECOND YEAR

HOSPITAL AND CLINICAL PHARMACY

Section- A

Fill in the blanks. Each question carries one mark.

1×10=10

- 1) Full form of MRI **magnetic resonance imaging**.
- 2) CUDD is **centralized unit dose drug distribution system**.
- 3) The drugs on the nursing station are known as **floor stock drugs**.
- 4) Plastic syringes and catheters are sterilized by **gamma rays**.
- 5) Bead (tip) seal and pull seal are used for sealing of **ampoules**.
- 6) EOQ is **economic order quantity**.
- 7) The term used to describe abnormal drug response is **idiosyncrasy**.
- 8) Eye preparation should be discarded within **30** days after opening the container.
- 9) An increase in RBC count is called **erythrocytosis**.
- 10) Etiology is defined by **cause of disease**.
- 11) **Charge floor stock** medications are charged to the account of patient after administration.
- 12) If warfarin is given with phenyl butazone it **increase anticoagulant activity** occurs.
- 13) **Antibiotics** are an example of drug causing ototoxicity.
- 14) Antidote used in arsenic poisoning is **British anti lewisite, Ethylene diamine tetra acetic acid**.
- 15) **Dissecting forceps** are used to pick up various tissues or hold structures.
- 16) **Tetracycline** should not be taken with milk or antacids.
- 17) An increase in WBC count is called **leucocytosis**.
- 18) Tuberculosis is caused by **mycobacterium tuberculosis**.
- 19) **Atropine** is the antidote for organophosphorous poisoning.
- 20) Normal range of fasting blood sugar is **80-120 mg/100ml**.
- 21) Ampoules are sealed by **tip** and **pull** method.
- 22) **Five** is the number of pharmacist required for a hospital with 100 beds.
- 23) Haemostatic forceps are called **artery** forceps.
- 24) Triple antigen produces immunity against diphtheria, pertusis and **tetanus**.
- 25) Milk and antacids reduce absorption of tetracycline by forming **complex**.
- 26) An example of abused drug is **caffeine**.
- 27) A computer programs which can predict pharmacokinetic parameter is **NONLIN**.
- 28) Full form of SGOT is **serum glutamate oxaloacetate transaminase**.
- 29) **Small** particle size increases the bioavailability of drugs.
- 30) Presence of glucose in urine is an indicator for **diabetes**.
- 31) O.P.D is **out patient department**.
- 32) Lithotripsy is a non-invasive technique used to break up **stones**.

- 33) **Aneurysm needle** is used for ligaturing.
- 34) Cotton is **insoluble** in a 4-5% KOH solution.
- 35) Ryle's tubes are used to **feeding**.
- 36) Dyspepsia is **indigestion**.
- 37) Ulceration of GIT is common side effect caused by **aspirin**
- 38) Normal heart rate in adult males is **70-80/min**.
- 39) International pharmaceutical abstract is produced by **American society of health system**.
- 40) GMP is stands for **good manufacturing practice**.
- 41) **Lumbar puncture** is used for drawing out cerebrospinal fluid.
- 42) A partial or complete loss of memory is **amnesia**.
- 43) Policy regarding therapeutic use of drug is formulated by **Pharmacy Therapeutic Committee**.
- 44) The main ingredient of universal antidote is **charcoal**.
- 45) Antidote used in the treatment of acute iron poisoning is **desferrioxamine**.
- 46) A teratogenic drug causes toxicity to **limbs of foetus**.
- 47) The adhesive used in plaster of paris is **counter irritant in lumbago and neuralgia**.
- 48) The two main objectives of PTC is **advisory and educational**.
- 49) Polyuria is a common symptom of **diabetes**.
- 50) The normal range of total serum bilirubin is **0.2-1 mg/dl**.
- 51) D.U.D.D.is **decentralized unit dose drug distribution**.
- 52) Antidote used in the treatment of lead **Sodium Calcium Edetate (EDTA)**.
- 53) Seizure is measured in case of epilepsy **electroencephalogram (EEG)**.
- 54) Instrument used to measure blood glucose is **glucometer**.
- 55) Hemoglobin is complex of **heme + globin**.
- 56) What is the full form of NLM **National library of medicines?**
- 57) Local anaesthetics used **for temporary relief of pain in surgical procedure and injuries**.
- 58) Tranquilizers are drugs used to **schizophrenia**.
- 59) Counter irritant are used to **relieve headache and muscular pain**.
- 60) Diuretics are drugs used **increase the formation of urine**.
- 61) **Sodium succinate** is an antidote used in barbiturate poisoning.
- 62) Examples of antioxidants are **Vitamin C and Vitamin E**
- 63) Salicylates and alkalinisers should not be given together as **they are antagonist**.
- 64) **Respiratory infection** is a disorder in which there is nasal congestion, watery discharge and sneezing.
- 65) Normal range of cholesterol in adults is **less than 200 mg/dl**.
- 66) **Erythrocyte sedimentation rate** measure the rate at which the RBC settle in whole uncoagulated blood over a period of time.
- 67) Oral hypoglycaemic agent when taken with alcohol result in **feel dizziness and sick to stomach**.
- 68) Creatinine clearance is used as measurement **renal impairment**.

- 69) Iron preparation stain in urine **blue ion stain** colour.
- 70) An example of hospital based on cost is **elite hospital and budget hospital**.
- 71) Store management is the function of receiving, storing and issuing of **material**.
- 72) A classical example of an absorbable suture is **monocryl**.
- 73) Medicated surgical gauge is commonly treated with 5% **lidocaine**.
- 74) **DPT vaccine** confers immunity against diphtheria, pertuses and tetanus.
- 75) Paracetamol taken with alcohol result is **damage liver**.
- 76) **Hepatitis** is the inflammation of liver.
- 77) **BCG** vaccine confirms immunity against tuberculosis.
- 78) DIS stands for **Drug Information Services**.
- 79) Barbiturate when taken with alcohol result in **change in sensitivity of CNS**.
- 80) **Three** is the number of pharmacist required for a hospital with 50 beds.
- 81) **Tetracycline** class of antibiotic is not to be taken with milk or antacids.
- 82) Insulin should be preserved in **8°-25° C**.
- 83) **Aromatic water** is sweetened aromatic bases which may or may not be medicated.
- 84) **Thrombocytopenia** is the reduction in platelet number.
- 85) According to mode of action poisons are classified as corrosives **irritant** and **neurotics**.
- 86) Ability of a drug to induce foetal malformations of death of foetus in uterus is **salicylates**.
- 87) **Neurological** is a chronic disorder of cerebral function characterized by repeated sudden attack of seizures.
- 88) C.S.S.R means **Central Sterile Supply Room**.
- 89) Arrhythmia is a term used for **irregulation of the heart beat**.

Define the following terms. Each question carries one mark.

- 1) **OTC drugs** - OTC (Over the counter) these are the drug products that can be purchased without prescription is called OTC drugs.
- 2) **Anaphylaxia** - A hypersensitive state of the body to a foreign protein is called anaphylaxia.
- 3) **Haemostatics** - Arresting the flow of blood within the vessels.
- 4) **Glycosuria** - The presence of the sugar in the blood often due to diabetes mellitus.
- 5) **Drug clearance**- The elimination of drug from the body. Drugs and their metabolites are excreted primarily by the kidney into urine, other route for elimination include sweat, saliva, bile etc.
- 6) **Clotting time of blood** - It is time required for coagulation of blood, where fibrinogen is converted into fibrin to form matrix for fixation of cellular portion.
- 7) **Expectorant** - Drugs used to help in the removal of secretions or exudates from the trachea, bronchi or lungs.
- 8) **Pathogenesis** - The origin and development of a disease is called pathogenesis.
- 9) **Plumbism** - A diseased condition produced by the absorption of lead is called plumbis.

10) Give the names of two epileptic drugs - Diazepam, lorazepam, phenobarbitone.

11) Drug - A drug is a substance used in prevention, diagnosis, and treatment of disease.

12) Chemotherapy - Chemotherapy is the use of drugs, medication or chemicals to treat Cancer.

13) Poly pharmacy- It is defined as concurrent use of multiple medications by patient.

14) Composition of PTC (Pharmacy and therapeutic committee)- At least 3 physicians from the medical staff (one is the chairman) , a chief pharmacist (secretary), a representative from nursing staff (joint-secretary), a hospital administrator, who should be an ex-officio member of the committee.

15) Patient compliance: Patient compliance can be defined as adherence to prescriber instruction by the patient. Compliance can be calculated as follows:

$$\text{Percent compliance} = \frac{\text{NPD} - \text{NME}}{\text{NPD}} \times 100$$

Where NPD = Number of prescribed doses, NME = Number of medication errors

Section – B

Each question carries three marks.

3×5=15

Question No. 01) Give three conditions in which there is high ESR.

Question No. 02) What is congenital heart disease?

Question No. 03) What are the two major objectives served by PTC.

Question No. 04) How is lead poisoning treated?

Question No. 05) What is drug information bulletin?

Question No. 06) Give significance of Hospital Formulary.

Question No. 07) What is Glucometer?

Question No. 08) Explain bed side pharmacy (BSD).

Question No. 09) Differentiate drug addiction and drug habituation.

Question No.10) What are the causes of cardiac failure?

Question No. 11) What are the objectives of clinical pharmacy?

Question No. 12) Give the layout of sterile product area.

Question No. 13) What are the objectives of Hospital Pharmacy?

Question No. 14) Classify fibers.

Question No. 15) Classify bandages, self adhesive plasters and fabrics.

Question No. 16) Explain the role of hospital formulary system.

Question No. 17) What is causative organism of tuberculosis? Name two drugs used in its treatment.

Question No. 18) What are the uses of haemostatic forceps.

Question No. 19) Discuss pricing of prescription.

Question No. 20) What are OTC drugs?

Question No. 21) Enumerate various classification of hospital.

Question No. 1) Give three conditions in which there is high ESR.

Answer: ESR is measurement of the setting of red blood cells in a sample of blood, containing an anticoagulant over a period of 1 hrs in a cylindrical tube. The ESR is increased in inflammation, pregnancy, anemia, autoimmune disorder (such as rheumatoid arthritis and lupus), infection, some kidney diseases and some cancers (such as lymphoma and multiple myeloma).

Significance- It indicates presence of tissue of a wide variety in which it is a diagnostic tool. It helps in therapeutic treatment. It shows the progress of a disease.

Question No. 2) What is congenital heart disease?

Answer- Congenital abnormalities of heart occur in the ratio about 8 per 1000 live from birth. It is the most common cause of heart disease in children. This disease covers a broad spectrum of malformations, ranging from small lesion to severe abnormalities that may cause death in adult age. Mainly two factors play a role to cause the disease.

(a) Genetic factor- due to some chromosomal abnormalities, occurrence of familiar forms congenital cardiac malformations is found.

(b) Environmental factors- Such as congenital rubella infection are responsible for some cases. The major forms of congenital heart disease are listed below.

1. Atrial septal defect
2. Ventricular Septal Defect
3. Stenosis- Pulmonary, Aortic
4. Tricuspid atresia

Question No. 3) what are the two major objectives served by PTC.

Answer- i) Advisory: The committee assists in the formulation of professional policies regarding evaluation, selection and therapeutic use in hospital.

ii) Educational: The committee recommends and assists in various functions, designed to meet the needs of the professional's staff, the physicians, nurses, pharmacist and other health care personnel for the complete current of the matters pertaining to drugs.

Question No. 4) How is lead poisoning treated?

Answer: Treatment of lead poisoning-

During acute poisoning-

- a) Gastric lavage by sodium and magnesium sulphate.
- b) Morphine and atropine are used to relieve colic pain.
- c) EDTA is used as chelating agent.

During chronic poisoning- It is commonly known as plumbism. Chronic lead poisoning is done over a prolonged period of time.

- a) Removal of patient from sources of further exposure.

- b) Chelation therapy with edentate calcium disodium is used.
- c) Dimercaprol is used as chelating agent.
- d) Penicillamine is also included in the dosage regimen.

Question No. 5) What is drug information bulletin?

Answer: Communication of information to medical and paramedical staff is very essential. A drug information center should produce a bulletin and distribute it. The bulletin should provide new advancement in medicines, new researches, detailed analytical procedures & abstract for new development. It forms a bridge between the information and application to clinical practice. It is the duty of the clinical pharmacist to provide information about drugs to all members of “patient care team”. The bulletin should be update with the latest developments from time to time.

Question No. 6) Give significance of hospital formulary.

Answer: Hospital formulary is a list of pharmaceutical preparations including important information which reflects the current clinical views of the medical staff. A prescription constitutes a legal permit to dispense a particular drug. The prescriber may write the generic/chemical name, or the proprietary name. When the formulary is adopted the prescriber continues to prescriber prescription. The pharmacist has to obey him and dispense only the brands prescribed. Sometimes the prescriber is not aware of formulary, the pharmacist should inform him about the same and apprise him about the use of drugs from the formulary.

For every hospital, it is desirable to adopt a formulary. It is not only a healthy practice but also a good inventory control measure that provides a wide choice for the physician to fulfill the needs of patients.

Question No. 7) What is Glucometer?

Answer: A glucometer or glucose meter is a medical device for determining the approximate concentration of glucose in the blood. It can also be a strip of glucose paper dipped into a substance and measured to the glucose chart. It is a key element of home blood glucose monitoring (HBGM) by people with diabetes mellitus or hypoglycemia. A small drop of blood obtained by pricking the skin with a lancet, is placed on a disposable test strip that the meter reads and uses to calculate the blood glucose level. The meter then displays the level in units of mg/dl or mmol/l. home glucose monitoring was demonstrated to improve glycemic control of Type I diabetes.

Question No. 8) Explain bed side pharmacy (BSD).

- Answer:**
1. A bed side pharmacy has to interact with nursing and medical staff.
 2. A bed side pharmacy offers advices regarding the action and uses of frequently used drugs to the medical/nursing staff.
 3. In bed side pharmacy, pharmacist act as an important member of an inter professional team of physician, nurse and pharmacist.
 4. He helps others with additional responsibilities of drug usage and drug information.

Question No. 9) Differentiate drug addiction and habituation.

Answer-

S.no	Drug addiction	Drug habituation
1	It is a state of periodic or chronic intoxication due to repeated consumption of a drug.	It is condition resulting from repeated administration of a drug.
2	A tendency to increase the dose.	Little or no tendency to increase the dose.
3.	A compulsion to continue taking a drug or overpowering desire.	A desire but no compulsion to continue taking the drug to improve a sense of well- being.
4.	Withdrawal symptoms are observed e.g. morphine, heroin etc.	Little or no withdrawal symptoms are observed e. g. tea, coffee.

Question No.10) What are the causes of cardiac failure?

Answer: Cardiac failure often develops after other conditions have damaged or weak the heart. However, the heart does not need to be weak to cause heart failure. It can also occur if the heart becomes too stiff. In heart failure, the main pumping chamber of the heart may become stiff and not fill properly between beats. In some cases heart failure, the heart muscle may become damaged and weakened, and the ventricles stretch to the point that the heart pump blood efficiently throughout the body. Any of the following conditions can damage or weaken the heart and can cause heart failure: Coronary artery disease and heart attack, high blood pressure, faulty heart valves, damage to the heart muscle, myocarditis, congenital heart disease, arrhythmias, diabetes, HIV and hyperthyroidism etc.

Cause of acute heart failure include viruses that attack the heart muscle, severe infections, allergic reactions, blood clots in the lungs, the use of certain medications or any illness that affects the whole body.

Question No. 11) What are the objectives of clinical pharmacy?

Answer: Clinical Pharmacy is used to describe new role of pharmacist. It comprises functions necessary to discharge a particular set of social responsibilities related to therapeutic drug use.

Objectives-1. Clinical Pharmacy make the student more aware of the general methods of diagnosis and patient care specifically as they relate to drug therapy.

2. It help to develop in the student a skill for effective interaction with the patient and with practitioners of other health professions.

3. To help the student develop a patient awareness while providing pharmaceutical services.

4. To acquaint the student with clinical application of pharmacological and pharmaceutical, principles.

Question No 12) Give the layout of sterile product area.

Answer: The area that contains not more than 100 particles per cubic feet of 0.5 μm and large size can be achieved by laminar flow of HEPA filters whereas clear rooms such as class 10,000 can be defined as the area that contains not more than 10,000 particles per cubic feet.

Raw materials	Preparation area	Aseptic area	Quarantine area	Storage area
	Clean up area	Sterilization area	Packing area	

Flow diagram of the sterile production area

Question No. 13) What are the objectives of hospital pharmacy?

Answer- Hospital pharmacy may be defined as that department of hospital, which deals with procurement, storage, compounding, dispensing, manufacturing, and distribution of drugs. It also concerned with education and research in pharmaceutical services.

Objectives:- 1) To professionalize the functioning of pharmaceutical services in a hospital.

2) To act as a counseling department for medical staff nurses for patient.

3) To act as a data bank on drug utilization.

4) To participate in research projects.

5) To plan, organize and implement pharmacy policy procedure.

6) To co-ordinate and cooperate with other department of a hospital.

Question No. 14) Classify fibers.

Answer- Surgical dressing is term applied to a wide range of material used for the dressing of wounds. They are employed as coverings, absorbents, protective or supports for injured or diseased tissues.

Classification of fibers:

- 1. **Fibers-** (a) Cotton-
 - Unmedicated e.g. Absorbent cotton wool
 - Medicated e.g. Capsicum cotton wool
- (b) Rayon-
 - Lustrous (Regenerated cellulose)
 - Matt (Delustered regeneratred cellulose)

(c) Wool cellulose- Cellulose wadding

Question No. 15) Classify bandages, self adhesive plasters and fabrics.

Answer- Bandages:- Bandages are four types:-

- (a) Elastic bandages:- Twisting certain wrap threads, Rubber threads, Crimping
- (b) Non- elastic:- Cotton unbleached calico, Cotton (heavy weft)
- (c) Impregnated:- Leo, Open wove bandage
- (d) Adhesive:- Warmed for adhesion, Self adhesive

3. Self adhesive plasters:- These consist of a self adhesive mass spread on a supporting material that may be plain or elastic cloth or a plastic film. The support may be tinted in flesh colour.

- 4. Fabrics:-** (a) Impregnated
b. Non- impregnated

Question No. 16) Explain the role of hospital formulary system.

Answer- Hospital formulary is a list of pharmaceutical preparation including important information, which reflects the current clinical views of the medical staff. The hospital formulary system is a method whereby the medical staff of hospital evaluates and selects from among numerous available medicinal agent and dosage from that are considered most useful in the patient care in the particular hospital.

The contents of formulary:- The primary objective of the formulary is to provide information to hospital staff drug products approved by PTC and provides basic therapeutic information.

- i) Information of hospital policies and procedures governing the use of drugs.
- ii) Special information regarding drug dosage schedule, hospital approved abbreviation and special information about drugs.

Question No. 17) What are caustives organisms of tuberculosis. Name two drugs used in its treatment.

Answer: Tuberculosis is caused by rod shaped mycobacterium tuberculosis. There are three types of tubercle bacilli pathogenic to human's viz.: (a) Bovine (b) human (c) avian

Pathophysiology: As the bacillus is an aerobe and requires high oxygen tension for its optimum growth, the infecting organism enters into the body via lungs. This is the Primary Tuberculosis. Form the lungs; it further spreads to various pulmonary tuberculosis. After several weeks stream called Pulmonary Tuberculosis. After several weeks cellular immunity develops which prevents the spread of disease. The organism may remain inactive for the whole life of host or may get reactivated at any time. Reactivation leads to miliary tuberculosis. According to symptoms the tuberculosis are divided into three parts:-

- 1) Primary tuberculosis:** In most of cases it is without symptoms. Incubation period is 4to 8 weeks. Only mild fever, malaise is observed after 4 weeks.
- 2) Pulmonary tuberculosis:** Fever, irritability weight loss, malaise is observed. Excessive fatigue in the evening and sweat during sleep. Cough early in the morning with green or yellow sputum some times blood spots are also found.
- 3) Military tuberculosis:** Weight loss, fatigue, weakness, fever, night sweets, GIT disturbances are very common. Lesions are found at lymph nodes, kidney and spleen.

Drugs used in the treatment of tuberculosis: Isoniazide, rifampicin, ethambutol cycloserin etc.

Question No. 18) What are the uses of haemostatic forceps.

Answer: They are used to check the blood flow from the vessels. The characteristics features are blunt tip, clamp, and no interval between blades. Haemostatic forceps are called as artery forceps.

Haemostatic forceps are either short or long with different shapes like straight curved. Ordinary forceps have toothed too.

Question No.19) Discuss pricing of prescription.

Answer: The large variety of pharmaceutical products, different medical practices and patterns of pharmaceutical use among countries, and different classes of purchasers within countries make international price comparisons difficult. Factors that make such comparisons difficult include, among other things:

- Consumption patterns;
- Dosages, concentrations, strengths, pack sizes, and units of measurement;
- Courses of therapy;
- Nature of distribution chains;
- Taxes and subsidies;
- The availability of many products in patented and generic versions; and
- The use of exchange rates or purchasing power parity for currency conversion.

Question No. 20) What are OTC drugs?

Answer: Over-the-counter (OTC) drugs are medicines sold directly to a consumer without a prescription from a healthcare professional, as opposed to prescription drugs, which may only be sold to consumers possessing a valid prescription. In many countries, OTC drugs are selected by a regulatory agency to ensure that they are ingredients that are safe and effective when used without a physician's care. OTC drugs are usually regulated by active pharmaceutical ingredients (APIs), not final products. By regulating APIs instead of specific drug formulations, governments allow manufacturers freedom to formulate ingredients, or combinations of ingredients, into proprietary mixtures.

Examples: i) Sprays to numb pain: Dyclonine (Cepacol); phenol (Chloraseptic).

Section – C

Attempt any five questions. Each question carries five marks.

5×5=25

Question No. 01) Define pyrogen and how they are removed.

Question No. 02) Give the functions of hospital pharmacist.

Question No. 03) Define ligature and suture and classify them.

Question No.04) Discuss the sources of drug information.

Question No.05) Give the treatment of barbiturate poisoning.

Question No. 06) Write short note on organization of hospital.

Question No. 07) Name the various surgical instruments used in operation theatre.

Question No. 08) Write the role of computer in inventory control.

Question No. 09) What do you understand by drug interaction. Give example.

Question No. 10) Define hospital. Write the functions of hospital in detail.

Question No. 11) What is hospital pharmacy? Describe its functions and objectives in detail.

Question No. 12) What is hospital pharmacy? Describe its functions in detail.

Question No.13) Give a short note on ambulatory patient services.

Question No. 14) Give short note on Central sterile services.

Question No 15) Enumerate various classification of hospital.

Question No. 01) Define pyrogen and how they are removed.

Answer: A pyrogen is defined as any substance that can cause a fever. Bacterial pyrogen include endotoxins and exotoxins, although many pyrogens are endogenous to the host. Depyrogenation refers to the removal off pyrogens from solution, most commonly from injectable pharmaceuticals.

Pyrogen removal (depyrogenation) – Pyrogen can often be difficult to remove from solution due into the high variability of their molecular weight. Pyrogens are also relatively thermally stable and insensitive to pH changes. However, several removal techniques exist.

1) Ion exchange chromatography- Endotoxins are negatively charged, and will bind to an anion exchanger. An effective separation can be achieved. This method is sometime used in the purification of albumins.

2) Ultrafiltration- Because the molecular weight of endotoxins is usually over 10 kD, ultrafiltration can sometimes be used to perform as a size based separation. Due to high variability of endotoxin size, it can be difficult to select the correct membrane, hence this method is best used only when all endotoxins present are larger than 300,000Da.

3) Distillation- This method is also based on the larger molecular weight and heat stability of endotoxins. Low molecular weight solvents can be easily purified by boiling and collecting the condensed vapours in an endotoxin free vessels. This is the method of choice for the purification of water.

Question No. 02) Give the functions of hospital pharmacist.

Answer: Indoor pharmacist responsibilities: a) **Central dispensing area:** 1. To ensure that all drugs are stored and dispensed correctly.

2. To check the accuracy of the dosages prepared.
3. Maintain proper records.
4. Preparation of bills.
5. Co-ordinate over all pharmaceutical needs of the patient.

b) Patient care areas: 1. Maintain liaison with nurses.

2. Reviewing of drug administration.
3. Provide instruction and assistance to the junior pharmacist.

c) Direct patient areas: 1. Identification of drugs brought into the hospital.

2. Obtaining patients medication history.
3. Assist in the selection of drug products.
4. Monitor patients total drug therapy.
5. Counseling patients.

d) General responsibilities: 1. Ensure that all drugs are handled properly

2. Participate in cardio-pulmonary emergencies.
3. Provide education and training for pharmacists.

Outdoor pharmacist responsibilities: a) **Central dispensing area:** 1. To ensure that all drugs are stored and dispensed correctly.

2. To check the accuracy of the dosages prepared.
3. Maintain proper records.
4. Preparation of bills.
5. Keeps the pharmacy neat and tidy manner.

b) Patient care areas: 1. Inspect periodically the medication areas.

2. Identify the drugs brought into the hospital.
3. Monitoring of drugs.

Question No. 3) Define ligature and suture and classify them.

Answer: Ligature- A ligature is a thread used to constrict and seal off the blood vessel, vein or artery.

Suture- The thread is a suture when it is used to stitch together the edges of various tissues e.g. skin, fascia, muscle, tendon and peritoneum etc. Hence a needle is always used for a suture but not for ligature.

Classification- Suture and ligatures are classified as absorbable and non-absorbable, depending on the materials on which they are made.

1. Absorbable – Absorbable sutures and ligatures are absorbed by the tissues in which they are implanted and the time taken for complete disappearance is dependent on a number of factors. Absorbable materials are catgut, reconstituted collagen, synthetic absorbable polymer and ribbon gut.

2. Non- absorbable- Non – absorbable sutures and ligatures are not absorbed by tissue and unless they are on the surface, remain in the body after the wound has healed. The most commonly used are silk, linen, nylon, cotton, horse hairs and human hair and wires of other metals e.g. tantalum silver.

Types of sutures: a. Catgut chromic ½ circular, round bodied

b. Catgut chromic no. 0, 1 and

c. Catgut plain 2/0

d. Nylone suture 2/0

e. Silk suturtes braided, Nos. 2/0

Question No.4) Discuss the sources of drug information.

Answer: The concept of drug information service or drug information centre is an attempt to document drugs by abstracting information about them. The information about drugs is collected from various sources which are available, can be categorized as under:

1. Primary Sources- It is the original information's presented by the second party. E.g., articles published in journals, dissertations, conferences etc.
2. Secondary Sources- In this original information's modified, condensed, commented upon by other persons like review articles, abstracts, text books etc.
3. Tertiary Sources- In this information is gathered from primary and secondary sources and arranged in such a manner to give coupled information.

Question No.5) Give the treatment of barbiturate poisoning.

Answer: Barbiturate poisoning is the compounds are mainly used as sedative and hypnotics. They are also used as antipsychotics and anti epileptic. There excess used can cause poisoning.

Symptoms- Prolonged coma with respiratory depression, Hypotension, pulmonary edema, Hypothermia mental confusion, muscle weakness and cardiac arrest

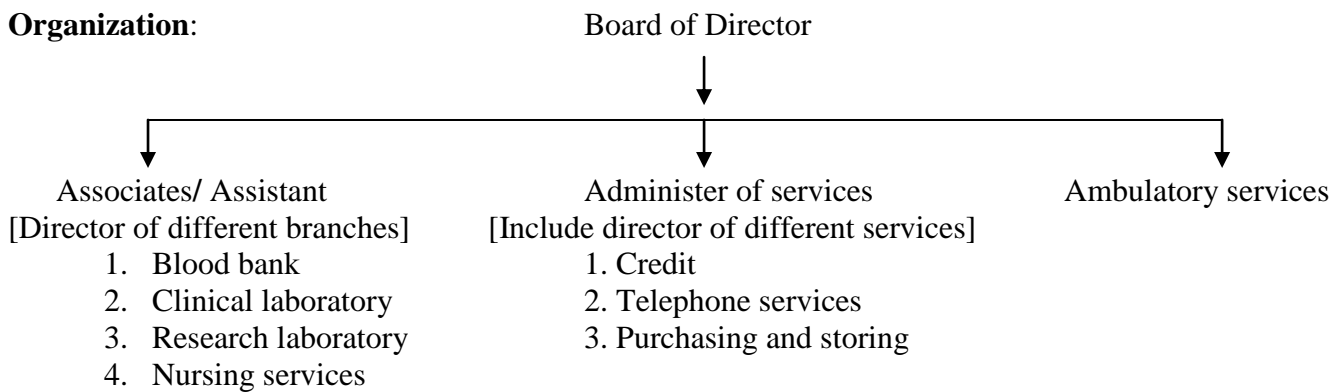
Treatment:-

1. Further absorption of barbiturates can be controlled by administrating activated charcoal.
2. Artificial respiration must be given by a mixture of 95% oxygen + 5% carbon dioxide.
3. Haemoperfusion and haemodialysis are the available options for the severe toxicity.
4. Ampetamine sulphate in the dose of 10 mg after every half- an hour must be given intravenously till improvement occurs.
5. Alkalisiation of urine to pH 8 with sodium bicarbonate helps in the elimination of phenobarbitone.

Question No. 6) Write short note on organization of hospital.

Answer- Organization of hospital: Organization is a process to achieve the objectives by grouping the people in order to get work done efficiently..

Organization:



The governing body is responsible for framing of all major policies plans and programmes. The various services performed by any organization are given as under:

i) Nursing services: - This department is the largest and an important part of any hospital as it functions for all the 24 hours. Nurses are assigned for specified number of beds. They are brained for patient care, observation comfort of the patient during labour etc.

ii) Out-patient services: Out -patient services include comfort for out patients as they come for their major or minor illness. These services make the hospital truly a community institution.

iii) Radiological Services: These services are performed under the direction of competent radiologist. It includes utilization of various equipments like X- Ray, E.C.G, and C.T Scan.

iv) Central supply services: All the medical and surgical supply services are meant for diagnosis treatment, prevention, research and education.

v) Hospital pharmacy services: - It controls the pharmacy operations in any hospital. This department fills prescription and dispenses a number of requisitions from the wards.

vi) Medical Records: Medical records are the valuable reference material as they help medical and paramedical staff for evaluation.

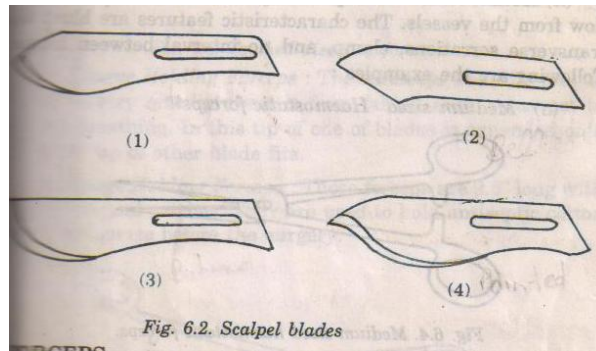
vii) Stores: Stores generally receive and issue the materials against requisition forms of various departments and wards. Hospital being a large organization has many stores like medical store, store for general items, surgical stores. Besides the above-mentioned services of hospitals, they also provide dietary services laundry, transport, mortuary, library etc for overall benefit and patient care.

Question No.7) Name the various surgical instruments used in operation theatre.

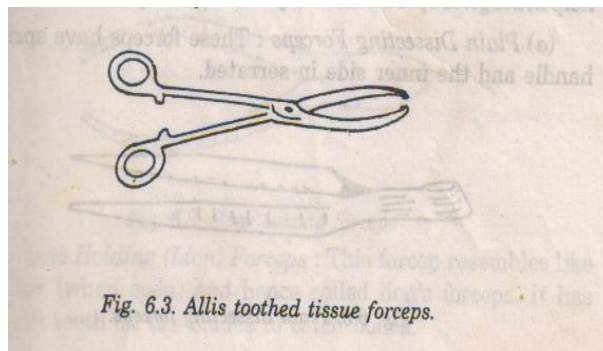
Answer- Surgical instruments are very essential for any pharmacist working in a hospital. They are meant for surgical purposes. It includes wide variety of surgical and the pharmacist is expected to handle the surgical instruments at the drug stores or in a hospital.

1. Towel clips or corner clips: - These are used as surgery accessories to fix surgical towels in such a manner which reduces the risk of contamination.

2. Scalpels and their blades:- Scalpels are used to make an incision. It is a blade with a handle and blades are detachable type.



3. Forceps:- (i) Tissue forceps: These forceps are used to hold the tissues. They may be toothed or non-toothed.



(ii) Hemostatic forceps: They are used to check the blood flow from the vessels. The characteristics features are blunt tip, clamp, and no interval between blades. e.g Medium sized haemostatic, Mosquito type Haemostatic forceps.

(iii) Dissecting forceps: These are used to hold various tissues and structures. They help in surgical operations. They are of either plain or toothed type.

Question No. 8) Write the role of computer in inventory control.

Answer: Inventory control is very essential because it maintains the balance between stock in hand and excessive capital investment. Computers are used to detect the items which had attained minimum order level. It then prepares a list and purchase orders for supplies. Generally there are two systems for inventory control.

- 1) Periodic inventory control.
- 2) Perpetual system

1) Periodic inventory control system: In this system stock levels are checked manually and the amount of inventory in hand is compared with maximum and minimum stock maintained in the computers. Computer helps in placement of order to different suppliers after checking their terms and conditions because all the entries of stock are present in it.

2) Perpetual System: In this system computer tells us about the present position of all the drugs because when they are received, they are entered in the initial stocks to get the current stocks. As the drugs are delivered to various departments the quantities are subtracted accordingly. Such type of additions and deletions from inventory balance are done with the help of “data base” package.

Question No. 9) What do you understand by drug interaction. Give example.

Answer: A drug interaction occurs whenever the diagnostic, preventive or therapeutic action of a drug is modified in or on the body by another exogenous chemical [interactant]

Pharmacokinetic interactions: -

- 1) **Alteration of gastrointestinal absorption:** Antacid delays the absorption of aspirin.
- 2) **Complexation and adsorption:** Tetracycline can combine with metal ions such as Ca^{+2} , Mg^{+2} , Al^{+3} in GIT to form complexes that are poorly absorbed. So tetracycline should not be administered with milk.
- 3) **Alteration of distribution:** In case of Warfarin and phenylbutazone both the drug has bound to plasma proteins. Phenylbutazone has greater affinity for binding sites resulting in displacement of warfarin from protein binding sites.
- 4) **Alteration of metabolism:** If one drug inhibit metabolism of another drug, it results in prolonged action or intensified activity.
- 5) **Alteration of excretion:** The acidic urinary pH is required for methenamine activity. This pH could cause precipitation of sulfonamide and produce crystaluria.

Pharmacodynamic interactions:-

- 1) **Antagonistic effect:** Acetylcholine and noradrenaline are antagonistic in nature. Acetylcholine lowers the heart rate while nor-adrenaline shows increase in heart rate.
- 2) **Synergistic effect:** - Trimethoprim and sulphonamide results in additive antimicrobial effects.

Question No. 10) Define hospital. Write the functions of hospital in detail.

Ans: 01 (a) Hospital: - Hospital is a complex organization which makes use of groups of complicated and special scientific equipments and functioning through a team of educating trained staff to solve the problems of modern science. They are coordinated together to provide the good health and all the facilities so that patient can get relief from disease or disorder.

Functions of a modern hospital:-

- i) A modern hospital helps to raise the quality of law and general standards of medical practice.
- ii) It help to provide the means and methods by which persons can work together in groups with the object of care of hospital department, patient and community.
- iii) It lowers the incidences of disease through early detection and treatment.
- iv) A Modern hospital provides a common link between the general public and policy makers.
- v) They develop and maintain an effective system of clinical and administrative records and reports.

Question No. 11) What is hospital pharmacy? Describe its functions and objectives in detail.

Answer: Hospital pharmacy may be defined as that department of hospital, which deals with procurement, storage, compounding, dispensing, manufacturing, and distribution of drugs. It also concerned with education and research in pharmaceutical services.

Objectives of Hospital pharmacy: The objectives of hospital pharmacy: -

- i) To ensure the availability of right medication, at the right time, in right dose at the minimum possible cost.

- ii) To professionalize the functioning of medical staff nurses and for patient.
- iii) To act as a counseling department for medical staff nurses and for patient.
- iv) To act as a data bank on drug utilization.
- v) To participate in research projects.
- vi) To plan, organize and implement pharmacy policy procedure.

Function of Hospital pharmacy: Hospital Pharmacy helps to

- i) Provide specifications for the purchase of drugs, chemicals and biological product.
- ii) Manufacturing and distribution of medicaments such as transfusion fluids, parenteral products.
- iii) Dispensing of sterilizing parenteral preparations, which are manufactured in hospital?
- iv) Dispensing of drugs as per the prescriptions of the medical staff of the hospital.
- v) Filling and labeling of all drugs containers from which medicine are to be administered.
- vi) Management of stores, which include purchase of drugs, proper storage and maintenance of records.
- vii) Establishment of drug information center which provide information regarding medications to the physician, nurses.

Question No. 12) What is hospital pharmacy? Describe its functions in detail.

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- vi) Management of stores, which include purchase of drugs, proper storage and maintenance of records.
- vii) Establishment of drug information center which provide information regarding medications to the physician, nurses.

Question No.13) Give a short note on ambulatory patient services.

Answer- Ambulatory patient services: Ambulatory patient are those patient which are able to walk.

Dispensing of drugs to ambulatory patient: - Depending upon the kind of hospital, ambulatory patient get themselves registered at registration counter of that hospital.

The various steps involved in dispensing are: -

- i) After the registration is over, the patients are directed for a particular department.
- ii) Physician then diagnoses the disease and writes a prescription, bearing name, age and registration number.

- iii) Patient produces the same prescription before the Pharmacist in a Pharmacy.
- iv) While dispensing a prescription, Pharmacist should take every precaution to eliminate errors.
- v) Pharmacist checks the ingredients and collects the materials for compounding and dispensing.
- vi) The compound prescription is filled in a container and labeled with detailed instructions including name, age, and sex registration number.
- vii) The pharmacist shall maintain a register for the purpose accounting.
- viii) Prescription is given back to the patient so that the same can be produced by him during his next visit

Question No. 14) Give short note on Central sterile services.

Answer.14. Central sterile services [CSS]: The main objective of sterilization process is to remove or destroy all micro-organism in or on a preparation and to ensure that the preparation is free from micro-organism. As the name indicates, it is the central department which provides all the professional equipments i.e. sterile or non-sterile to the special departments. It is also called sterile processing department and central supply department.

Functions of the CSS: -

- i) The majority of apparatuses dispensed by the CSS are disposable like syringes, needles, urine collection sets, gloves, blood bags etc.
- ii) CSS also involved in cleaning storage and dispensing of special equipments such as sanction pumps, cardiac apparatus, surgical dressings.
- iii) CSS also serve some function such as sterilization, washing and drying of equipments.

Management of CSS: -

The head of CSS department may directly report to the administrator of CSS. Various departments are divided in CSS as:

- i) Department under nurses.
- ii) Department under the pharmacist.
- iii) Department under the control of nurses as well as pharmacist.

Objectives of CSS: -

The main objectives of the CSS are: -

- i) CSS is totally responsible for direct operation room supply.
- ii) It assumes total responsibility for processing the hospital items. e. g. sterilization & cleaning
- iii) It maintain accurate and current inventory of the equipment in different department.
- v) It contributes to handle the educational program with in hospitals related to infection control.

Location of central sterile supply room- It should be centrally located but considerations must be given to the fact that this room must be able to receive large quantities of linen from the laundry, surgical dressing from the laundry and surgical dressing from the store room.

Question No. 15) Enumerate various classification of hospital.

Answer - Classification of hospitals:-

Type - I classification: On the clinical basis:

Clinical-basis			Non-clinical-basis	
Medicine	Surgery	Maternity	Governmental	Non-governmental
1) Pediatrics 2) Psychiatric and nervous diseases 3) T.B 4) General medicine	1) Orthopedic 2) Gynecology 3) ENT	1) Short-term maternity 2) Long-term maternity	1) Army hospital 2) Navy hospital 3) City hospital 4) Civil hospital 5) Big hospital 6) AIIMS/PGI	1) Private hospitals for profit 2) Non-Profit 3) Church hospital 4) Community hospital 5) Missionary hospital 6) Charitable hospital

Type – II classification: On the basis of size

- 1) Large hospitals – For the beds 1000 and above
- 2) Medium hospitals – For the beds between 500-1000
- 3) Small hospitals – For the beds between 100 - 500
- 4) Very small hospitals – For the beds less than 100.

Type – III classification: On the basis of cost

1) Elite hospitals: These are symbols of high technology and advances in medical sciences. They have deluxe rooms equipped with T.V., telephones and refrigerator. The room rates vary from Rs. 500 to 1200 per day. Therefore they are called as five star hospitals. These elite institutions have provision for some poor people for their treatment and stay also.

2) Budget hospital: These hospitals are meant for moderate budget and low budget persons e.g., civil hospitals and charitable hospitals.

Type- IV classification: On the basis of system of medicines

- (1) Allopathic hospitals (2) Ayurvedic hospitals (3) Homoeopathic hospitals (4) Unani hospitals.

Section- D

Each question carries 10 marks.

1×10=10

Question No. 01) Write a short note on teratogenicity.

QuestionNo.02) Define the term bioavailability. Discuss the various factors affecting the bioavailability.

Question No. 03) Explain about general treatment of poisoning.

Question No. 04) Write a short note on application of computers in hospital pharmacy.

Question No. 05) Which staff/personnel requirement is needed in hospital pharmacy? Describe the ability of hospital pharmacist in detailed.

Question No. 06) Describe the various systems of drug distribution for inpatients.

Question No. 07) Write a short note on drug information services and drug information bulletin

Question No.1) Write a short note on teratogenicity.

Answer.01. Teratogenicity: - Any drug of a chemical substance which produces deviations or abnormalities in the development of embryo is called a teratogen. Drugs are teratogenic only at specific times during embryogenesis. For example: Thalidomide is best example to explain the pattern of pathogenesis of anomalies.

Important points may be noted for teratiogenesis: -

- i) A teratogen may exert the effect on a developmental structure upto the time of its critical differentiation.
- ii) A single teratogen may produce a variety of abnormalities.
- iii) A variety of teratogen may produce similar abnormalities.
- iv) A drug's effect can be very damaging to a foetus.

Principles: Teratogenicity of a drug is generally depends on various points like specificity of drug, timing of exposure, genotype of mother and foetus and simultaneous drug exposure.

i) Specificity: - A drug may be teratogenic to one species but not to another e.g thalidomide is teratogenic to rabbits and human but not in rats.

ii) Timing of exposure: - Depending on the stage of development may show difference in adverse effects or even no effect.

Example: - Thalidomide if

- 1) Taken 21-22 days of gestation: - Absence of external ears and paralysis of cranial nerves.
- 2) Taken 24-27 days: - Maximum effect on arms.
- 3) A day or two later: - Defects in legs.

Question No. 2) Define the term bioavailability. Discuss the various factors affecting the bioavailability.

Ans: Bioavailability-: It is defined as the rate and extent of the active drug that is absorbed from a dosage form and becomes available in the systemic circulation.

Factors affecting drug bioavailability-:

(1) Physical properties of drugs:-

(a) Particle size: It determines the surface area which will be in contact with liquid. The smaller the particle size, larger would be the surface area, hence quicker will be dissolution and absorption rate.

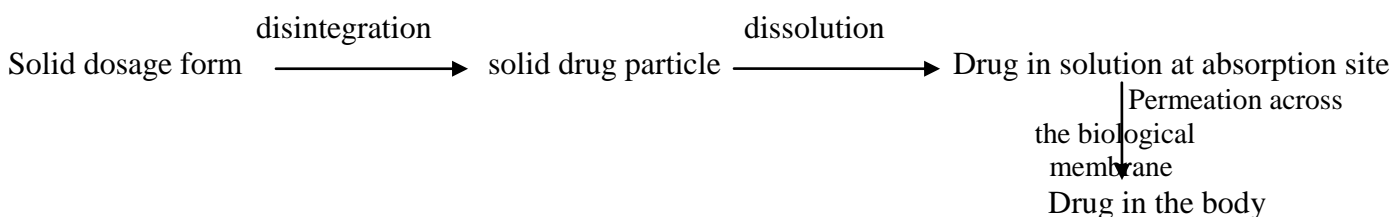
(b) Partition coefficient: Partition coefficient of a drug is the ratio of its solubility at equilibrium in a non-aqueous solvent to its solubility in an aqueous solvent. Hydrophilic drugs have higher water solubility and dissolution rate than lipophilic drugs. Non-ionized drugs are better absorbed.

(c) Physical form: Most of the chemical substances are available either in crystalline or amorphous form. The crystalline form has definite shape, whereas amorphous form does not have any definite shape. These two forms of drug exert a great influence on the bioavailability and stability of pharmaceutical formulation.

(2) Pharmaceutical factors

(a) Dissolution rate

For a drug to reach in the systemic circulation it has to undergo the process of disintegration and dissolution.



Bioavailability of different dosage forms generally follows the following order.

Solution > suspension > powder > capsule > tablet > coated tablet.

(b) Drug dosage form

Most drugs are not taken as pure chemicals but are formulated into pharmaceutical dosage form, such drug products may be simple solutions, a compressed tablet containing binders, fillers, lubricants, a coloring agent, or a capsule dosage form containing the active medicament, diluents lubricants etc. The following are few formulation and manufacturing variables that could influence the bioavailability of drug product:-

1. The properties of the salt of drug (salt form, crystalline structure).
2. Manufacturing variables (tablets compression force, processing variables)
3. The composition of the finished dosage form (presence or absence of excipients, special coating).

(3) Physiological and other factors affecting bioavailability

The rate and extent of drug absorption can be affected by a wide variety of factors related to the characteristics of the subject receiving the drug product. Some examples include:-

1. Contents of the GIT tract (fluid volume and pH, bacterial activity etc.)
2. Rate of GIT transit. This is influenced by disease, physical activity, drugs and emotional status of subject and composition of GIT contents.
3. Local blood flow, condition of GIT membrane, metabolism or degradation in the GIT or during the first pass of the drug through the liver.
4. Age, sex, race, body size, time of day, and bed rest VS ambulatory status.

The above factors are important to consider because they can contribute to intrasubject and intersubject variability in the treatment of patients.

(4) Other factors:- It is already well known that a substance will be well absorbed, if it is liposoluble and at the same time also soluble to some extent in water. Finally the drug substance should not have excessively high molecular weight for better absorption.

Question No. 3) Explain about general treatment of poisoning.

Ans: For general treatment of poisoning following steps should be considered:-

(1) Immediate removal from the environment: When poisoning appear to have occurred due to gases like carbon monoxide or from surface absorption, the patient must be immediately removed to fresh air. Poisons introduced due to snake bite needs tourniquating which prevent the poison from reaching vital organs like heart, kidneys, brain through circulating blood. Make an incision (cut) and the tissues bleeds. Neutralize the poison by a suitable method..

(2) Emesis: Emesis plays very important role in poisoning on oral ingestion of material like by ingestion of corrosives, by kerosene oil and by using convulsant drug. Vomiting can also be induced by mechanically, Ipecac syrup or powder, mustard powder, 3 teaspoonful of salt in water and by Apomorphine (6mg) causes prompt vomiting usually within 3-5 minutes. The only disadvantage is that it should be administered parentally and should never be used if the poison itself is a CNS depressant.

(3) Gastric lavage-

It is necessary if the poison is ingested. The poison is washed out by inserting catheter into alimentary canal upto stomach. Washing are usually done with:

- i) NaHCO₃, 2 gm in 300 ml water.
- ii) 30 gm (Mg or Na sulphate in ¼ litre water)
- iii) 100 ml liquid paraffin + 150 ml water.
- iv) 8 gm of activated charcoal in water.
- v) Use of emetics, *e.g.*, common salt, ipecac powder.

(4) Common antidote-

S.no	Drug	Antidotes	Mechanism
1.	Acids	Antacid or weak alkali (milk of magnesia) avoid including emesis or gastric lavage.	Chemical antagonism
2.	Acetaminophen	Acetyl cysteine	Restores depleted glutathione stores, hepatic failure
3.	Alkaloids	Potassium permanganate	Chemical antagonism
4.	Unknown	Activated charcoal	Adsorption

(5) Accelration of elimination of poisons: it can be done by purgation, dieresis, dialysis, Peritoneal dialysis and haemodialysis. Intravenous fluids are administered to excrete poisons. It should be kept in mind not to overhydrate the patient as it may lead to circulatory impairment or even pulmonary oedema. Force diuresis is done in amphetamine poisoning. Peritoneal dialysis involves instilling dialysis fluid into peritoneal cavity. Poison in the blood enters the dialysis fluid which is then drained and replaced. In haemodialysis, a semipermeable membrans separates blood from dialysis fluid and poison passes passively from the blood, where it is a present in high concentration into the fluid. It is useful for many poisons like bromides, boric acid, methyl alcohol.

(6) Treatment of general symptoms:-

- a) For increase in body temperature sponge with water.
- b) Morphine sulphate or pethidine relieves pain. Abdominal pains can be relieved by atropine.
- c) To overcome dehydration blood transfusion is advised.
- d) In anaphylaxis, antihistamine and corticosteroids with adrenaline are used.

Question No. 4) Write a short note on application of computers in hospital pharmacy.

Answer. Application of computers in hospital pharmacy:

i) Maintenance of records: Various patient records like medication history, current treatment and financial records etc. are maintained in computers by feeding accurate data. Data is collection of facts. Computers works as data base manager. “MEDLINE” is a data base package used for such purpose. It gives the current information of the patient regarding patients name, age, sex, room no., weight, allergies, diagnosis, & special precautions to be taken for the patient. These records are stored in a “File” like “Physician name” file, Direction file, Drug interaction file etc.

ii) Inventory control: - Inventory control is very essential because it maintains the balance between stock in hand and excessive capital investment. Computers are used to detect the items which had attained minimum order level. It then prepares a list and purchase orders for suppliers. Generally there are two system for inventory control.

(a) Periodic inventory control system: In this systems stock levels are checked manually and the amount of inventory in hand is compared with minimum and maximum stock maintained in the computers

(b) Perpetual system: in these system computers tells us about the present position of all the drugs because when they are received, they are entered in the initial stocks to get the current stocks. As the drugs are delivered to various departments the quantities are subtracted accordingly.

iii) Medication monitoring: - To meet the goal of optimum drug therapy, medication monitoring is essential. The prescription of a particular patient received over a period of time is entered and serves as chronological patient drug file. Computer provides two types of informations about medical monitoring.

a) Pharmacokinetic information: “NONLIN” is a computer program which can predict pharmacokinetic parameters very easily. These parameters include volume of distribution bio-availability, rate of clearance etc.

b) Non-Pharmacokinetic information: It includes the various allergic reactions, adverse drug reactions etc. For such information two computer programmes are available. (1) **MEDIPHOR (Monitoring and evaluation of drug interactions by a pharmacy oriented reporting)**

(2) **PAD** (Pharmacy Automated drug interactions screening)

iv) Drug information service: - Computers have become an important tool for clinical pharmacist in drug information service. Computer aided drug design help the chemist to formulate a new drug molecule possessing desired pharmacological action. ‘Micromedex’ provides informations on drugs, their identification, poisons, emergency drugs etc. in a single compact disk.

v) Marketing and distribution: - Computers are used for marketing and distribution of drug. It involves processing of order, invoicing maintenance of records, billing etc.

vi) Hospital Pharmacy and Retail Pharmacy: - Computers help hospital pharmacist in keeping overall patient care like maintenance of patient’s records, entry of prescription, list of preparations to be manufactured, consumption of drugs, cost analysis updation of drugs information etc. For a retail pharmacist, computers have been of valuable assistance in the prescription processing.

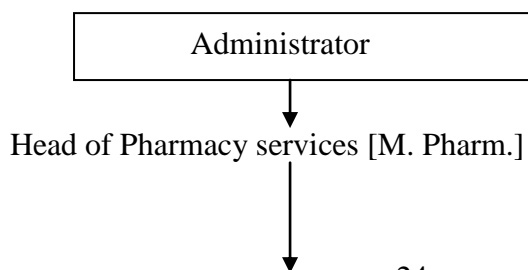
vii) In pharmaceutical industries: Complete computerized programmes are available for drug manufacture and for quality control management information for the beginning of the process till the finished product is available. Various instruments and apparatuses can be adjusted and calibrated using computers.

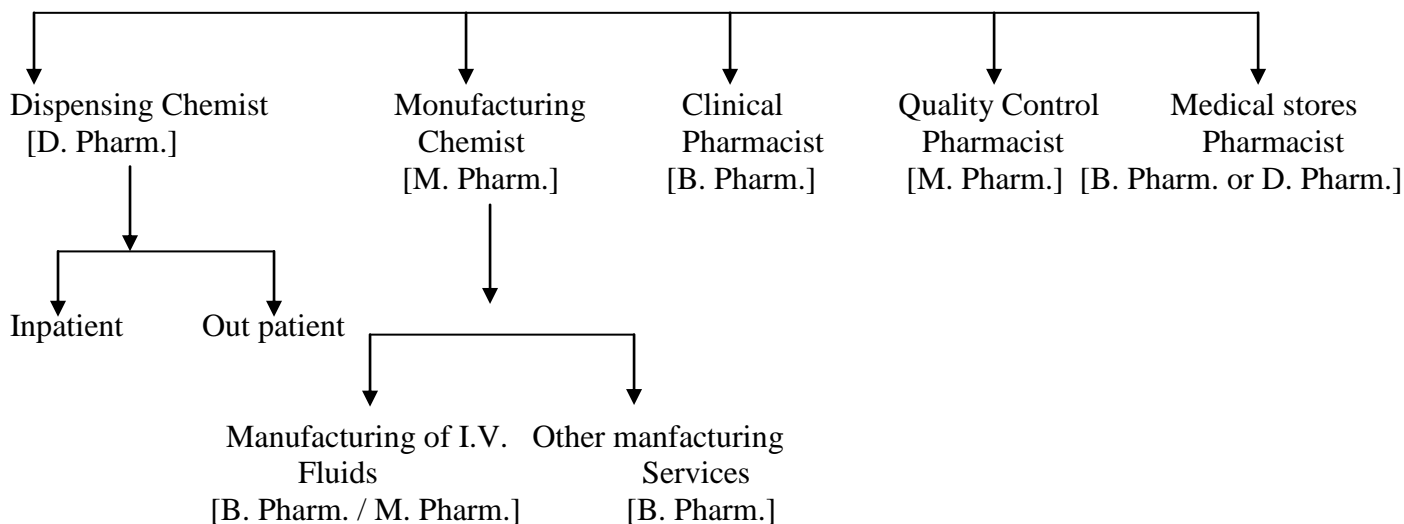
viii) Data storage and retrieval: - In 1960’s National Library of Medicine created a computerized medical information retrieval systems “MEDLARS” (Medical Literature Analysis and Retrievel system).

Question No. 05) Which staff/personnel requirement is needed in Hospital Pharmacy? Describe the ability of Hospital Pharmacist in detailed.

Ans: Staff requirements: The organized hospital pharmacy department has an integrated setup consisting of dispensing section, manufacturing section, quality control section and clinical pharmacy.

(1) There are no standard rules regarding the requirement and it is the nature and quantum of services to be provided that governs the personnel requirement.





(2) The number of pharmacist required for hospital are calculated on the basis of work load, like the number of prescriptions received and dispensed and also depends on the number of beds.

(3) The pharmacists should possess adequate pharmacy qualification and experience. The overall charge of the inpatient department should remain with the Chief Pharmacist.

Bed strength	Pharmacist Requirement
Up to 50 beds	3
Up to 100 beds	5
Up to 200 beds	8
Up to 300 beds	10
Up to 500beds	15

(4) If the pharmacy is also involved in the manufacturing of drugs an adequate number of pharmacy technicians, assistants and peons may be required.

Abilities of hospital pharmacist:

i) Technical ability: In this type the Pharmacist should have thorough knowledge of basic science, pharmacology, toxicology, route of administration, stability. The pharmacist must provide information regarding proper handling of drugs.

ii) Ability to develop a manufacturing section: Manufacturing with in a hospital requires control over supply, quality, equipment and raw material cost. Hospital Pharmacist has to organize manufacturing function by doing proper cost benefit analysis. Quality maintenance is also essential.

iii) Administrative ability: Hospital Pharmacist should be able to plan, organize and control various functions of hospital pharmacy. He should prepare work schedule for his staff. He should frame various policies and procedures to get the work done. He should interact with his staff daily. Hospital Pharmacist must maintain the legal and administrative records properly.

iv) Ability to control inventory: Chief Pharmacist has to exercise his duties on inventories of drugs which are lying at nursing stations, supply rooms and clinical units.

v) Ability to conduct and participate in research: The pharmacist is required to maintain information about pharmaceutical journals. He must advise about new methods of preservation, preparation and to improve the taste and efficacy of drug.

vi) Ability to conduct teaching programmes: The pharmacy staff can act as trainers for the nursing staff. He must prepare suitable teaching material for the nursing staff covering various aspects like storage of drugs, proper use of drugs, and dosage form. The Chief Pharmacist is also responsible for the practical training of pharmacy students.

Question No. 06) Describe the various systems of drug distribution for inpatients.

Ans: There are four systems for inpatient drug distribution departments:

- i) Individual prescription order system
- ii) Complete floor stock system
- iii) Combination of 1 and 2
- iv) Unit dose dispensing method

i) Individual prescription order system: This system is generally used in small private hospitals because of its economic consideration and reduced manpower requirement.

Advantage: -

- a) All the medication orders are directly reviewed by pharmacist, so there are less chances of medication error.
- b) This system also provides closer control of inventory.

Disadvantage: -

- a) There may be possible delay in obtaining the required medications for administration to the patient.
- b) There may be increase in the cost of drugs which are supplied to the patient.

ii) The “complete floor stock” system: Under this system the nursing station carries both “charge and non charge” patient medication. According to this system the drugs are stored at the nursing station and are administered by a nurse according to the chart order of physician. Only the commonly used drugs in considerable quantities are stocked on the floor stock or in the ward. Rarely used or costly drugs are not included in the floor stock but dispensed when order is received for the individual patient. Since these drugs are used in large quantities they are prepackaged in standard containers.

Advantage: -

- i) The drugs are readily available for administration.
- ii) Minimum return of drug.
- iii) Reduced inpatient prescription order.
- iv) Reduction in number of pharmacy personnel required.

Disadvantage: -

- i) Increase in chances of medication error due to lack of review by pharmacists.
- ii) Greater opportunity for misuse of drugs resulting in financial loss.

- iii) Increase in drug inventory.
- iv) Increased chances of drug deterioration due to lack of proper storage facilities.
- v) Increased chances of drug deterioration due to unnoticed drug degradation.
- vi) Increased work load on nurses due to medication activities.

The drugs on the nursing station are known as “floor stock drugs”

They are classified into two parts:

- a) Charge floor stock drugs.
- b) Non-charge floor stock drugs.

Dispensing of charge floor stock drugs: The charge floor stock drugs are those, for which the patient is charged for every single dose administered to him. Charge floor stock drugs are stored at various nursing stations. An envelope is used to dispense such drugs at nursing stations.

Dispensing of Non-charged floor stock drugs: Non-charged floor stock drugs are the medicaments that are placed at the nursing stations for the use of all patient on the floor. “Drug basket method” is adopted where nurses check the medicines in all rooms and in the refrigerator and prepare a masterlist for the pharmacy. Nurses fill a requisition form for delivery of drugs at their floor. When there is an empty container, the nurses place it in the drug basket. Once the procedure is completed, it is delivered to pharmacy. Alternatively a “**Mobile Dispensary Unit**” can be utilized.

iii) Combination for individual drug order and floor stock system: This system is used in those hospitals where patient pay for their hospitalization and the hospital use the individual prescription order system as their primary means of dispensing, but have several drugs in the floor stock.

iv) Unit dose dispensing: In unit dose dispensing the multiples of single dose administration of medication are prepared by the pharmacist which are ready for administration to a particular patient by the prescribed route and the prescribed time rather than supplying container of drugs to nursing units where the nurses is required to prepare the drug for administration. A single unit package is one which contains one complete pharmaceutical dosage form e.g. one tablet, one capsule.

Two methods of dispensing unit doses are:

- a) Centralized unit-drug distribution system [CUDD]
- b) Decentralized unit-drug distribution system [DUDD]

Question No. 07) Write a short note on drug information services and drug information bulletin

Answer- The concept of drug information services [DTS] or drug information center [DTC] is an attempt to document drug by abstracting information about them.

The information about drugs is collected from various sources, which are available, can be categorized as under:

i) Primary sources: - It is the original information presented by the author without any evaluation by the second party e. g. articles published in journals, dissertations, conferences.

ii) Secondary sources: - In this original information is modified, condensed, commented upon by other persons like review articles, abstracts, text books etc.

iii) Tertiary sources: - In this information is gathered from primary and secondary sources and arranged in such a manner to give coupled information. The compiled information is available for reference purpose and it help in answering specific queries regarding both old and new drugs from doctors and patients. The information can also be compiled to meet the needs of the deliberations of the PTC.

Functions of DIC [Drug information center]:

- i) DIC helps to establish and maintain a system for providing information for drug literature.
- ii) A system for providing information for the use of drugs in the hospital.
- iii) Answering request for specific items of drug information for the drug therapy of the individual patient.
- iv) DIC offer unsolicited drug information for the drug therapy of individual patient.
- v) DIC also handle to answer request for providing information of various complications like poison control information centers, pharmacy research projects, Pharmacy and Therapeutic committee.
- vi) DIC help to produce and distribute periodic compilations of information directed towards special audiences such as drug information bulletins for medical and paramedical staff.
- vii) DIC helps to maintain the drug formulary list.

Drug information bulletin: - Communication of information to medical and paramedical staff is very essential. A drug information center should produce a bulletin and distribute it. The bulletin should provide new advancement in medicines, new researches, and detailed analytical procedures, abstract for new development. It forms a bridge between the information and application to clinical practice. It is the duty of the clinical pharmacist to provide information about drugs to all members of “Patient Care Team”. The bulletin should be updated with the latest developments from time to time.