SUMMER– 14 EXAMINATION

Important Instructions to examiners:

1) The answers should be examined by key words and not as word-to-word as given in the model answer scheme.

2) The model answer and the answer written by candidate may vary but the examiner may try to assess the understanding level of the candidate.

3) The language errors such as grammatical, spelling errors should not be given more Importance (Not applicable for subject English and Communication Skills.

4) While assessing figures, examiner may give credit for principal components indicated in the figure. The figures drawn by candidate and model answer may vary. The examiner may give credit for any
equivalent figure drawn.

5) Credits may be given step wise for numerical problems. In some cases, the assumed constant values may vary and there may be some difference in the candidate's answers and model answer.

6) In case of some questions credit may be given by judgement on part of examiner of relevant answer based on candidate's understanding.

7) For programming language papers, credit may be given to any other program based on equivalent concept.

SUMMER– 14 EXAMINATION

Q.1 Answer the following question (Any 8)

a)Define (any 2 ,1 mark each)

i)Hospital : Hospital is a complex organization or institution of community health with a single purpose of restoration and maintenance of good health .It provide special facilities and trained personal and physician with a single object of patient care.

ii) Clinical Pharmacy: It is a branch of pharmaceutical sciences which deals with various aspect of patient care, not only with dispensing of drug but also advising patient on rational selection & safe use of drug.

OR

It is defined as it carries traditional hospital pharmacist from product oriented approach to healthier patient oriented approach, so as to ensure patient is healthy while on therapy.

iii) **Drug abuse** - Drug abuse is defined as the consumption of a drug apart from medical need or in unnecessary quantities'. OR

Drug abuse is the persistent or sporadic excessive drug use inconsistent with, or unrelated to medical practice.

b) Give the normal values of (any 2, 1 mark each)

i) ESR:

Method	E.S.R mm/hr	
	Male	female
Westergren	3-5 /0-5	4-7 /0-7
Wintrobe's	0-9	2-20

ii) Blood Cholesterol: Normal value: 150 -250 mg%

iii)Sp.gr of urine -1.02 -1.03/1.003-1.030

c)What do you mean by (any 2 , 1 mark each)

i**) Emetics**- Drugs which induces vomiting

ii) Emulsion –are heterogeneous liquid dosage forms in which a immiscible liquid is dispersed with the help of emulsifying agent in a continuous phase.

iii) Carminatives- These drugs help to expel out the gases from GIT, and are used to relieve flatulence and intestinal colic.

d) Give the composition of Universal antidote

(Composition 1 Mark, Uses 1 Mark)

Sr. No.	Ingredients	Quantity	Use
1.	Powdered charcoal	2 parts	Adsorbs alkaloids
2.	Magnesium oxide	1 parts	Neutralises acids
3.	Tannic acid	1 part	Precipitates alkaloids

e)What advice must be given to the patient while using (any 2, 1 mark each)

i)MAO –inhibitors- Avoid cheese ,chocolate,banana, alcoholic beverages ,and liver or yeast extract.

ii) Chewable Antacid tablet –Do not swallow but chew it.

iii) Spermicidal jellies and creams –These should be applied 10-30 minutes before intercourse and must remain in vagina for 6-8 hrs afterward.

f) Mention suitable method for sterilization (any 2, 1 mark each)

i) Hand gloves –Moist heat sterilization/ ionization radiation

ii) Glass ware - Moist heat sterilization/ Dry heat sterilization

iii) Scalpel - Dry heat sterilization/Moist heat sterilization

g) State the meaning of: (1 mark each)

i)Bio-equivalence: If two or more similar dosage form of same drug reaches to the blood circulation at the same relative extent and to the same relative rate, these are bioequivalence.

OR

.ii)Lithotripsy – A procedure in which renal stone is dissolved by lesser beam. **OR**

Lithotripsy is the non-invasive treatment of stones in kidney, in the gallbladder or in the liver using an acoustic pulse

h) Give the uses of (any 2 , 1 mark each)

i) C.T.scanner- Computed Tomography use in the morphological analysis of all the organs such as Head, Ear, Neck, Abdomen, Spine, Joints. It is based on the technique of measurement of X-rays passing through the body, which could provide information of all tissues by the X-ray beam . It is multidirectional, data thus obtained could be computed & presented in a conventional form to produce three –dimensional picture.
It is used for objective study with better resolution of organs

ii) Haemostatic forcep – uses (any 1 use 1 mark)
1.To achieve haemostatis.
2. to catch bleeding of periosteal vessel
3. To hold fleeding in fibrous background .
4. In appendectomy to pass ligature around the appendicular artery .

iii)ECG – It is used to observe the functioning of the heart.

i)Translate the following in English (any 2 , 1 mark each)

i) Charata – A Powder

ii) Hora somni – At bed time

iii) More dicto – As directed

j)Name two preservatives used in parentral preparation. (any 2 , 1 mark each)

Cresol - 0.5%, Chlorcresol -0.2%, Benzalconium chloride -0.001%

Chlorobutanol -0.5%, Phenyl mercuric nitrate -0.002%,

k)Write one example of each poison (any 2)

i) Corrosive-(any 1 example- 1 mark)

a) Strong acids- Sulphuric acid, nitric acid, hydrochloric acid

b) Organic acids- Oxalic acid, carbolic acid

c) Concentrated alkalies - Caustic soda, caustic potash, carbonates of sodium, calcium and potassium.

ii) Neurotic (Sub acting on nervous system)(any 1 example 1 mark)

i) Cerebral poisons:- Opium, sedatives, and hypnotics ,insecticides ,cocaine, hyocymus

ii) Spinal poison: Nux vomica

iii) Peripheral poison: conium, Curare alkaloid

iii) Organic--(any 1 example- 1 mark)

The organic poisons can be divided into two types:

-Vegetable poisons-castor, castor oil seeds, croton oil, colocynth, ergot, aloes

-Animal poisons- cantharides, snakes venom, scorpion’s venom, poisonous insects.

l) Define following clinical terms.(any 2 , 1 mark each)

i) Patient compliance: Patient compliance is defined as the patient understanding and adherence to the directions for use of prescribed drugs.

ii) Absolute bioavailability : when a medication is administered intravenously, its bioavailability is 100% it is called Absolute bioavailability.

iii) Relative bioavailability: This measures the bioavailability of a certain drug when compared with another formulation of the same drug, or through administration via a different route. When the standard consists of intravenously administered drug, this is known as relative bioavailability.

2. Answer any FOUR of the following : (3 marks each)

a) Classify hospital on nonclinical basis.

Non clinical bases of classification

a)On the basis of ownership

1.Public ownership:- such type of hospital run by Government

They can be

i.)Central govt hospital like

railway Hospital , Defence Hospital, AIMS Hospital

PG institute of medical sciences

ii)State govt Hospital like

Civil Hospital and district head quarter

Sassoon hospital pune

J.J Hospital Mumbai

iii)Local self government Hospital

These are run by municipalties or corporation

BMC Hosp like Bhagwati Hospital ,KM hospital Parel Mumbai

2.) Private ownership

i)They can be run by trust. The board of trustees managed the Hospital affairs

Bombay Hosp mumbai,Jaslok Hospital

ii)Relegious bodies and order

Ramkrishna Hospital calcutta and

christian medical college hospiatl (banglore)

iii)Limited company

They can be incorporated as public Ltd company where public subscribes to the share capital

Apolo Hospital Ltd(Madras)

Medinova(baroda)

Private hospital or nursing home –run by single or group of private practitioner or husband wife team.They are proprietary or partnership concern and general nursing home.

b)Define DIC.(for definition 1 mark) Write sources of drug information (2 marks)

DIC:(Drug information centre) :This centre provide bank of information on the drug by abstracting information about them from standard text book ,journals literatures ,research papers ,formularies and pharmacopoeia etc.

Different sources of drug information.

1) Primary sources –Information obtained from basic researches and developments which is published in brief for first time. Information on internet, website, c.d.

2) Secondary sources - Information in the form of abstracts, journals, periodicals, references and official books is called secondary sources.

i) Journals and periodicals – American journal of hospitals pharmacy, Indian journal of hospitals pharmacy, Journal of clinical pharmacology.

ii) Text books – Text book of hospitals pharmacy, clinical toxicology.

iii) Reference books- Remingtons pharmaceutical science, Merk index

iv) Pharmacopoeias – The Indian Pharmacopoeia, British Pharmacopoeia

v) Formularies – National formulary of Indian, National formulary of America.

3) Tertiary Sources - It include dictionaries, encyclopedias, desk references

- The Chemist and Druggist directory

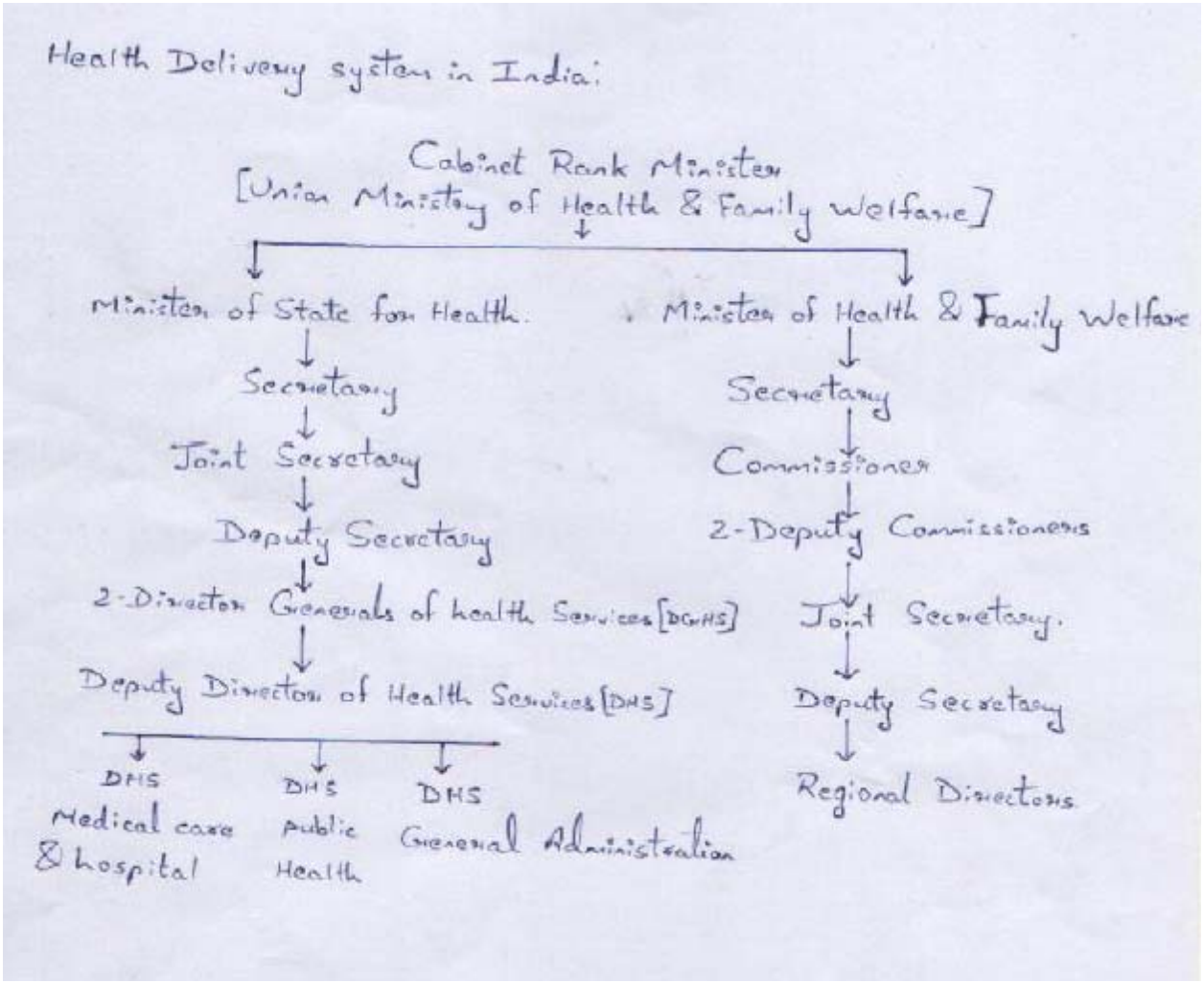
-Indian Pharmaceutical Guide- which gives the manufacturers or suppliers catalogues and price list.

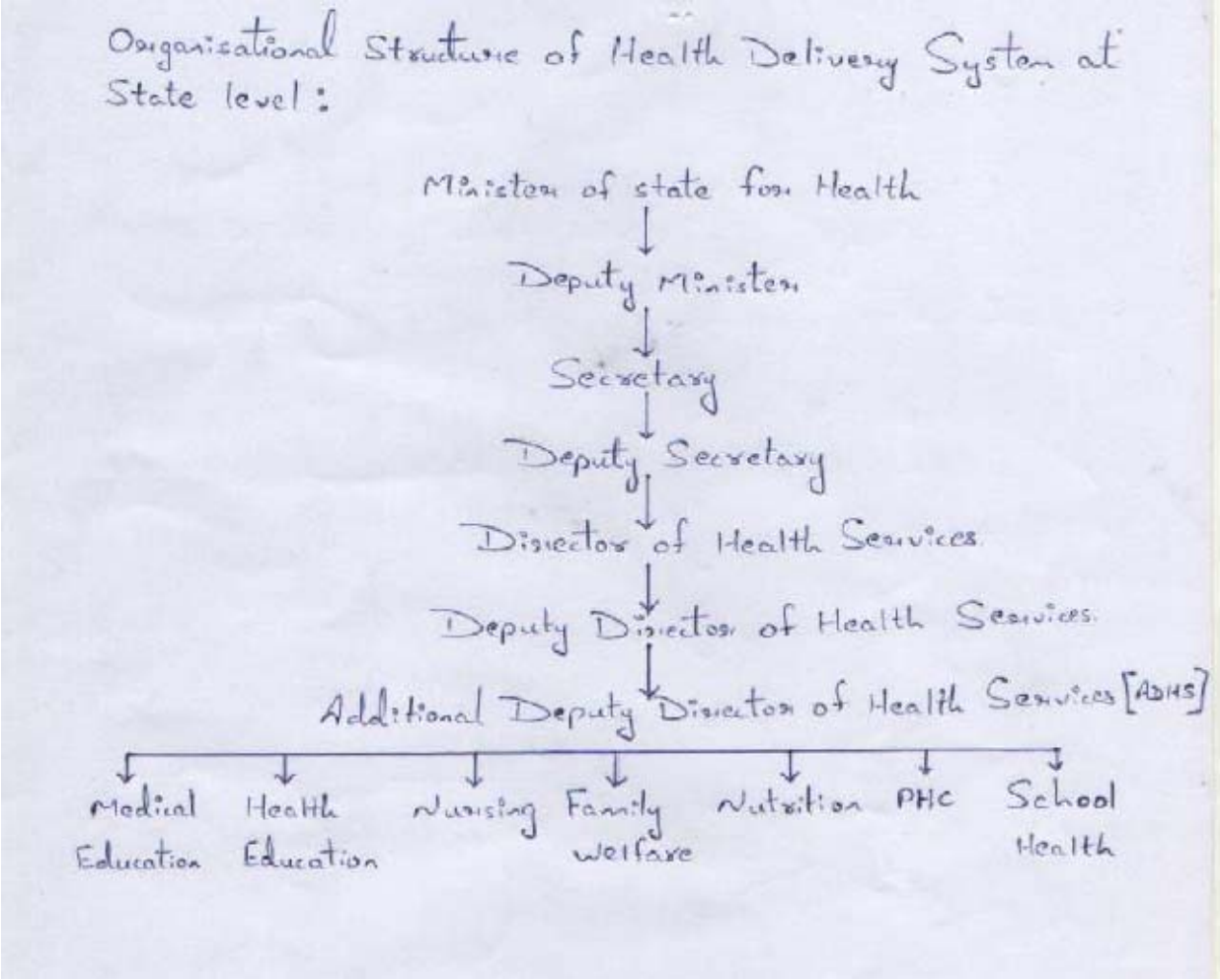
- Medical register and Directory of Pharmaceutical Chemists.

- Stastical Table And Mathematical table to provide scientific data.

c)Discuss health Delivery system in India.(1 1/2marks for health Delivery system at state and central level)

In the central government there is “Union ministry of health and Family welfare” and in state there is “Ministry of Health” which formulates and plans the overall health schemes. The following chart explains the organization of health delivery system.


Health Delivery system in India:
Cabinet Rank Minister
[Union Ministry of Health & Family Welfare]
Minister of State for Health.
Minister of Health & Family Welfare
Secretary
Joint Secretary
Deputy Secretary
2-Director Generals of health Services [DGHS]
Deputy Director of Health Services [DHS]
DHS
Medical care & hospital
DHS
Public Health
DHS
General Administration
Secretary
Commissioner
2-Deputy Commissioners
Joint Secretary.
Deputy Secretary
Regional Directors



d)What is PTC .Give the role of PTC in drug safety. (For description 1 mark, any 4 drug safety 2 marks ,1/2 mark each)

Pharmacy and Therapeutic Committee- This committee is composed of pharmacy and medical staff, which maximize rational, safe and effective use of drugs and formulate policies regarding therapeutic use of drug.

1. Hospital should employ a qualified registered pharmacist (at least B.pharm) and other 2 are Diploma holders.
2. Hospital should not permit non pharmacy personnel to dispense the drug.
3. Sufficient no of Qualified personnel must be employed in the hospital

4. Hospital should provide adequate and safe work space and storage facilities for the pharmacy.

5. Adequate no of equipment in good condition should be provided.

6. Automatic stop order regulation should be there in the hospital.

7. A drug formulary should be there in hospital, which is periodically revised and kept upto date.

8. The poisonous materials should be kept separately.

9. The external use preparations should be separated from internal use preparation.

10. Chief pharmacist should arrange teaching programme for nurses and other staff.

11. No one should permit other than registered pharmacist into the pharmacy “After Hours”.

12. All nursing drug stations should be periodically inspected for removing the deterioted and outdated drugs.

13. Adequate reference library should be provided.

e) Discuss any six objectives of hospital pharmacy (1/2 mark for each objective)

1. To teach the hospital pharmacist about the philosophy and ethics of hospital pharmacy and guide them to take responsibility of professional practice.
2. To strengthen the management skills of hosp pharmacist working as the head of the department
3. To strengthen the scientific and professional aspects of practice of hospital pharmacy such as his consulting, teaching role and research activities.
4. To utilize as max as possible the resources of hospital pharmacy for the development of profession.
5. To attract the greater number of pharmacist to work in the hospital.
6. To promote the payment of good salaries to pharmacist.

7.To establish drug information services.

f) Name any three surgical instruments with their uses.(1 mark for each instrument)

Surgical instruments are used for different activities like incision, cutting ,holding etc.

1. Scalpels : The scalpel is a blade with inter changeable handle and are of different shapes and are used to make incision .
2. Scissors: It is a cutting instrument which is generally short and long with different shapes helping in cutting and dissecting.
   E.g. Straight pointed scissors, straight blunt scissors, Curved or flat scissors, Angle on edge scissors
   3. Tissue forceps : Tissue forceps are used to hold tissues for traction or opposition ,having good grip on the tissue .there are two types i.e toothed or un toothed
   e.g. Allis tissue forceps ,Lane's tissue forceps , Rutherford Morison tissue forceps,Babcoks tissue forcep

4. Heamostastic forceps : It is also called as Artery forcep.(any 1 use)

1.To achieve haemostatis.

2. to catch bleeding of periosteal vessel

3. To hold fleeding in fibrous background .

4. In appendectomy to pass ligature around the appendicular artery

5. Swab holding forceps: It is long with blades which help to hold swab.Uses (any 1)

1. To hold fundus of gall bladder during cholecystectomy .
2. As a tongue holding forcep
3. For swabbing a cavity
4. To hold ovam.

6.Needle holder : It is used for holding the needle.

7.Protoscope : 1)To examine pile 2) To observe fissure and fistula.

8. Bunt curate or anterior vaginal wall retractor:

1) To examine vaginal cavity

2) It is also used for MTP.

9. Sharp curate: It is used for dilation of cervical and uterine curate.

10. Cusco's speculum :It is a female gonadal instrument ,mainly used to retract the vaginal walls for examination of internal structures.

11. Kocher's intestinal clamp : it is used to hold the intestine

Q3. Answer any FOUR of the following: (3X4)

(a) Describe application of computer in pharmacy.(Any 3 application – 1 mark each)

1. Maintenance of records: Computer can store data i.e records .In pharmacy various records like patient information, his medication history, current treatment and financial records are store. It includes patient 's name, age ,sex ,room number, allergies diagnosis and special precautions .The computer can store all information in the files like physician's name, Direction ,drug interaction etc.

2. Inventory control:

   a)To detect the items those have reached minimum order level.

   b)To prepare a list of drugs to be ordered and their quantities.

   c)To prepare purchase orders and avoid duplicate orders.

   d)To detect infrequently purchased item for possible return or elimination from pharmacy drug supply

   e)to produce periodic summery and inventory control statistics.

There are two types of inventory controls-periodic inventory control system and perpetual inventory control system.

3. Medication monitoring: To evaluate therapeutic action and adverse effect of any drug ,hospital pharmacist take the help of pharmacokinetics and non- pharmacokinetics applications. This is called medication monitoring

   a) Pharmacokinetics application : It includes parameter like absorption ,biotransformation distribution ,and excretion .With the help of this parameter drug dose, rate of clearance of drug is predicted/addusted.

   b) non- pharmacokinetics applications: It includes various allergic reaction ,drug interactions and ADR

   MEDIPHOR and PAD these two software are used for Medication monitoring purpose.

4. Drug Information:Computers are very helpful to give drug information to clinical pharmacist. It is helpful to the chemist and pharmacist for drug design and to formulate a new drug molecule. It also guides the patient because full text data base of drugs in American Hospital Formulary is available on CD.

   Also MICROMEDEX – like software provides information on drugs ,their identification ,poison ,emergency drugs etc. in a compact disc

b)Describe procedure for procurement of materials in hospital.

In hospital following procedure for procurement of materials is followed:

1. Purchase request form-Pharmacist or person authorized by him prepare and fill purchase request form. This form provides information to purchase dept. regarding description, packaging, specifications, price, quantity needed, inventory balanced and anticipated monthly use.

The original copy of this form is sent to administrator for approval. After his approval it is forwarded to purchasing officer. A copy of this form is retained by pharmacist for his record to indicate that the process of procurement is going on.

2. Quotation invitation-On the receipt of purchase request form, purchasing officer invites quotations from different suppliers.

3. Purchase order form- Purchasing officer scrutinizes the quotations received. He checks the quantity to be supplied in consultation with pharmacist and prepare purchase order form.

Purchase order form consists of many pages ‘snap out’-

First copy-it is send by post or by hand to supplier.

Second copy- Send to accounts dept. It is held till invoice is received from supplier. It is completed after receiving report from purchase dept. then only payment is done.

Third copy-It is kept with purchasing officer as department file. This copy served as source of information.

Fourth copy-It is kept with Hospital pharmacy dept. This copy is compared with purchase request form for accuracy.

Fifth & Sixth copy_ These copies serve as receipt report. When goods arrive in full consignment then fifth copy is used. If order is received partially then sixth copy is used and send to account dept.

Seventh copy- This copy is known as history copy. It is kept by purchasing dept.

4.Return of goods- When the ordered goods comes in dept. the quantities and prices are checked. Received goods bill sent to the account section where bill is entered in purchase record register.

5. Release of payment to supplier.

c)Give different abilities a hospital pharmacist should posses. (Any 3 abilitilities with description 1 mark each)

The hospital pharmacist should posses following abilities:

1. Administrative ability-Hospital pharmacist should be thoroughly familiar with organisation of hospital, with staff and with appropriate channel of communication. Hospital pharmacist should be capable of planning and integrating services, budgeting, inventory control, cost-review, cost-effectiveness, audit, maintenance of records and preparation of reports.

2. Technical ability- Hospital pharmacist must have ability to use his basic knowledge of effect of drug on biological systems, in assessing drug absorption, distribution, metabolism and excretion. Hospital pharmacist must be knowledgeable in pharmacology, toxicology, pathophysiology, therapeutics and patient care techniques.

3.Manufacturing ability-Hospital pharmacist must be able to develop formulations not available commercially. Hospital pharmacist should posses an adequate understanding of the principles involved in formulations and p[reparation of dosage forms.

4.Research ability-Hospital pharmacist must be prepared to participate in clinical research initiated by medical staff and to conduct pharmaceutical research himself. Hospital pharmacist must be able to establish database for drugs being used and patients participating in studies. Hospital pharmacist must have ability to collect appropriate data interpret them and make conclusion from data.

5. Teaching/Training ability- Hospital pharmacist is responsible for training of new personnel and for carrying out continuous educational programme for pharmacist and pharmacy supportive personnel. Hospital pharmacist must be able to develop well planned and co-ordinate training programme and able to deliver lectures.

6. Ability to Control-Hospital pharmacist must be able to develop quality assurance programme for quality services of pharmacy department and products dispensed. Hospital

pharmacist must be able to develop control programme for distribution of drugs throughout the hospital.

(d)Discuss the term general patient, referred patient, emergency out patient.(1 mark each)

General out patient- The patient is given service for preventive health care and for diagnosis and treatment after confirming general discomfort, early complaints, symptoms and which is not emergency or referred case.

Referred patient- The patient who is referred directly to outpatient department by his/her attending practitioner for specific treatment and the patient later on returns to practitioner for further care.

Emergency out patient- The patient is provided emergency or accidental care for condition which requires immediate medical attention

(e)Enlist name of standard prescribed by I.P. for absorbent cotton wool. Describe any one test.(2 marks to enlist the test,1 mark for description)

Following are the standards for absorbent cotton wool I.P. :-

1. Identification test

2. Test for acidity & alkalinity

3. Test for surface active substances

4. Absorbency test

5. Fluorescence test

6.Test for coloring matter

7. Test for water soluble substances

8. Test for ether soluble substances

9. Test for neps

10. Test for sulphated ash

11. Test for loss on drying

1. Fibre Length: not less than 6.25mm in length and more than 12.5 mm in length

2. Alkalinity or Acidity : Thoroughly saturated about 10 g with 100 ml of recently boiled and cooled water, then with the aid of glass rod press out two 25 ml portions of water into white porcelain dishes. To one portion add 3 drops of phenolphthalein and to the other portion add 1 drop of methyl orange. No pink colour develops in either portion

3.Surface active substances:

To the Shake the 10ml of the solution 30 times vigorously in 10 sec,allow it to stand for 1 min .after 5 minutes the height of froth should not exceed 2 mm above the surface of liquid.

4.Sinking time :Pack 5 gm of Absorbent cotton loosely in the basket and drop it at the height of 10mm on the surface of water, contained in a beaker. Should not be more than 10 seconds.

5.Water holding capacity: Not less than 23 per gram.

6.Neps: Spread thin layer 5 g of Ab. cotton for an area of 450 sq cm .uniformly between two glass plate and view by naked eye under transmitted light. Should not be more than 500 neps/gm of absorbent cotton.

7. Water soluble substances : Not more than 0. 5 %

8.Ether soluble substances: : Not more than 0. 5 %

9.Sulphated ash: : Not more than 0. 5 % 10.Loss on drying : : Not more than 8.0 %

(f)Define non sterile manufacturing (1 mark). What are requirement of equipments for compressed tablet.(2 marks)

Non sterile manufacturing-It is defined as manufacturing of all dosage forms which does not require sterilization.

Equipments for compressed Tablets

The Tableting section shall be free from dust and floating particles and may be Air-conditioned. For this purpose, each tablet machine shall be isolated into cubicles and connected to a vacuum dust collector or an exhaust system. For effective operations, the tablet production department shall be divided into four distinct and separate sections as follows: -

(a) Mixing, Granulation and Drying section

(b) Tablet compression section.

(c) Packaging section (strip/blister machine wherever required).

(d) Coating section (wherever required).

The following electrically operated equipments are recommended for the manufacture of compressed tablets and hypodermic tablets, in each of the above sections, namely: -

(a) Granulation-cum-Drying section

(1) Disintegrator and sifter

(2) Powder mixer

(3) Mass mixer/Planetary mixer/Rapid mixer granulator.

(4) Granulator

(5) Thermostatically controlled hot air oven with trays (preferably mounted on a trolley)/Fluid bed dryer.

(6) Weighing machines.

(b) Compression section.

(1) Tablet compression machine, single/multi punch/rotatory.

(2) Punch and dies storage cabinets.

(3) Tablet de-duster

(4) Tablet Inspection unit/belt.

(5) Dissolution test apparatus

(6) In-process testing equipment like single pan electronic balance, hardness tester, friability and disintegration test apparatus.

(7) Air-conditioning and dehumidification arrangement (wherever necessary)

(c) Packaging section.

(1) Strip/blister packaging machine.

(2) Leak test apparatus (vacuum system)

(3) Tablet counters (wherever applicable)

(4) Air-conditioning and dehumidification arrangement (where ever applicable).

(d) Coating section,

(1) Jacketted kettle (steam, gas or electrically heated for preparing coating suspension).

(2) Coating pan (stainless steel)

(3) Polishing pan (where applicable)

(4) Exhaust system (including vacuum dust collector)

(5) Air-conditioning and dehumidification arrangement.

(6) Weighing balance.

The Coating section shall be made dust free with suitable exhaust system to remove excess powder and fumes resulting from solvent evaporation. It shall be air conditioned and dehumidified wherever considered necessary.

Q4. Answer any FOUR of the following: (3X4)

(a) What are steps involved in general treatment of poisoning.

Goal of general treatment for the poisoning is to save life of victim. Following steps are followed:

1. Removal of unabsorbed poison 2 Use of antidote

3.Supportive care 4. Treatment of general symptoms

1.Removal of unabsorbed poison:

Ingested Poison

a).Gastrointestinal Decontamination

a) Activated Charcoal b) Gastric Lavage c) Syrup of Ipecac d) Diuretics e)Purgative

b)Contact Poison

- Poison spilt or spread on skin is immediately washed with large quantity of water, saline. Saline is preferred for eye irrigation.
- A triple wash (water, soap, water) is best for dermal decontamination.

c)Injected Poison

- It is removed by making incisions at certain place causing bleeding.

2.Use of Antidote:

a)Non systemic antidote e.g Kaolin and activated charcoal ,Sodium thiosulpahte and sodium nitrite

b) Systemic antidote e.g. Dimercaprol(BAL) ,Penicillamine,Di sodium EDTA and Desferrioxamine

c) Universal antidote: is a mixture that contains activated charcoal, magnesium oxide, and tannic acid. All three components neutralize the actions of many poisons. It is intended to be administered to patients who consumed poison that is unknown.

3. Supportive care: in poisoning there is possibility of upper respiratory tract infection, to avoid this prophylactic administration of antibiotics is given.

Vitalisation of vital centre like cardiac , Vasomotor and Respiratory centre.

Good nursing care is required to maintain general condition of victim

4. Treatment of general symptoms: When poison is unknown the treatment is given according to symptoms.

Symptoms	Treatment
Pain	Morphine
Dehydration	ORS saline
Respiratory Failure	Oxygen therapy
Cardiac depression	Cardiotonics.

(b) Define patient non compliance. Give two reasons for non compliance.(definition -1 mark ,any 4 reasons -2 marks ½ marks each)

Patient Non-compliance-Patient does not follow the instructions given by prescribers is defined as patient non compliance.

Reasons for Non compliance: Poor understanding of instructions

1. In appropriate packaging : Some time design or size of containermake difficulty to remove the medicament .Many elderly patient ,arthritis patient have difficulty with unit dose pack or foil wrapping while removing medicament

2. Poor labeling : Poorly hand written label are difficult to read or follow for the patient/pharmacist. Many prescription contain direction which are inadequate like take when required or use as directed that may produce confusion.

3. Multiple drug therapy: Greater the number of drugs patients is taking the higher is the risk of non compliance.

4. Asymptomatic nature of patient: In case of asymptomatic patient, it is difficult to convenience a patient by explaining the value of drug therapy results in non compliance.

5. Measurement of medication: Many times there is confusion to the patient in measuring liquid preparations or number of tablets.

6. Cost of medication: Because of high cost of drugs ,poor patients are not purchase such drug

7. Frequency of medication: Regular schedule of dosage intake can not be followed due to work load.

8. Duration of therapy: Long duration treatment lead to patient non compliance.

9. Illness: The nature of patient's illness may contribute to non compliance like chronic hypertension, mental illness.

(c) Write pathophysiology, signs and symptoms of T.B.

Tuberculosis is infectious disease caused by several species of Mycobacterium tuberculosis. They collectively termed as tubercle bacilli.

Pathophysiology :- (2 marks)

The bacillus that causes TB is tiny rod shaped germ . These germs are protected by an outer layer of wax which prevents the normal defense of the body from destroying them. TB may attack any part of the body such as bones, joints,glands ,lymph nodes ,eyes , kidney etc. but it especially attack on lungs causing pulmonary TB. These germs can live for months in any place especially in a damp area.

Tuberculosis is spread through the air, when people who have the disease cough, sneeze, or spit.

When the germs is entered into the lungs ,the body defense ,i.e. W.B.C surround the germs and swallow them .But because of waxy coat ,many germs continue to live for months. The larger

WBCs then move in building a wall of resistance against the invaders. This is known as 'tubercle'.Reactivation of bacilli due to decreased immunity ,as in malnutrition or old age.

The tubercle may disappear,leaving a hole or cavity .Large masses of scar tissue may form around this area. This hinders the flow of blood and interfere with normal functioning of lungs.

Signs & Symptoms: (1 mark)

Primary Tuberculosis:

-Initial infection does not produce any signs & symptoms. Incubation period is 4-8 weeks.

-Mild fever and malaise may occur.

Secondary or Pulmonary tuberculosis:

Fever up to 40^{o}c in late afternoon or evening & sweat at night

- General malaise, fatigue & weight loss
- Cough in early morning. Green or yellow sputum with blood streaks.
- Chest pain and dyspnea.
- If pulmonary artery in tubercular region ruptures,-massive hemorrhage.
- The infection may spread to pericardium. It causes inflammation and restriction in motion that may lead to heart failure.

Chronic/Miliary tuberculosis:

In this case lesion are found at lymph node kidney, meninges ,spleen , bone marrow and other organ.Difficulty in breathing, weight loss ,fatigue and GIT disturbances.

(d) Define term drug tolerance, drug addiction, drug habituation.(1 mark each)

Drug Tolerance**:** Tolerance is a physiological state characterized by a decrease in the effects of a drug (e.g., analgesia, nausea or sedation) with chronic administration. OR

It signifies the decreased response to the effect of a drug ,necessitating ever larger doses to achieve the same effect.

Drug addiction: It is state of periodic or chronic intoxication produced by the repeated consumption of drug. It shows withdrawal symptoms

Drug habituation**:** It is a condition resulting from the repeated consumption of a drug.

(e) Classify ADR with examples.(classification with any one ex.-3 marks)

Classification of ADRs:

1.Predictable ADRs: 1.Excessive Pharmacological effect 2.Secondary Pharmacological Effects,

3.Rebound response on discontinuation

2.Unpredictable ADRs: **1.**Allergic drug reaction and Anaphylaxis,2. Idiosyncracy, 3.Genetically determined Toxicities

4.Toxicity following drug withdrawal

Predictable ADRs

1. Excessive Pharmacological effect :

It is common experience of patient receiving CNS depressants, cardioactive ,hypotensive and hypoglycemic agents. If excessive dose is given ,all patients are at risk of developing this reaction. Certain patients are more susceptible to this reaction even when average dose is prescribed .

a) Patient with Kidney disease who have lost more than 70% of their kidney function

b) Patients with hypoalbunemia due to failure of albumin production by liver or excessive loss of albumin as in nephrotic syndrome.

c) Patients age – Neonates , infants and elderly patient.

2.Secondary Pharmacological Effects

It is mainly observed in patients, who consumes OTC drugs or go for self medication .e.g. Drugs like Antihistamine used mainly as anti allergic particularly for common Cold and cough , but it may produce drowsiness in large repeated doses for repeated doses on self medication.

Unpredictable ADRs

1.Idiosyncracy

It includes the drug induced foetal abnormalities ,such as phocomelia developing in offspring of mothers exposed to thalidomide

Cancer of Organ	**Causative drug**
Vaginal adenocarcinoma	High doses of stilbestrol during pregnency
Kidney pelvis	Analgesic induced nephropathy
Uterus	Oestrogens (long term)
Lymphoid tissue	Azathioprine (suppresses the immune system) ,cyclophosphamide(Anticancer)

2.Allergic drug reaction

Allergic reaction	**Causative drugs**
Anaphylaxis	Penicillin, Dextran , Iodine containing compound.
Skin rashes	Sulphonamide, penicillin, Barbiturates
Hemolytic anemia	Sulphonamide,penicillin,Quinidine and methyl dopa.
Hepatitis	Phenothaiazines,metyldopa
Leucopenia	Sulphonamide, Thiouracil, Phenylbutazone
Nephritis	Methicilin,oxacilin ,nafcillin

3.Genetically determined Toxicities

Hereditary condition	**Drug causing toxicity.**
Pseudocholinesterase deficiency	Succinyl choline
Porphyria	Barbiturates,sulphonamides
Glucose -6-phosphate dehydrogenase deficiency.	Antimalerials,quinidine,sulphas, nitrofurantine.
Glaucoma	Corticosteroids
Methaemoglobinemia	Phenacetin,salicylates.

4.Toxicity following drug withdrawal

1.Drugs acting on CNS such as narcotic analgesics ,hypnotic ,ethyl alcohol but also happens with some hypotensive agents (Clonidine) and corticosteroid.

2. Clonidine is mild hypotensive agent which has the property of causing severe rebound hypertension if its use is discontinued suddenly.

3. Long term use of corticosteroid results in the atrophy of recipient's adrenal glands. Sudden withdrawal of these can therefore causes acute adrenal crisis (Addison's disease)

(f) Give three methods of estimating of demands.(1 mark each)

Manufacturing of sterile and non-sterile products within hospital is based on requirement of hospital.

A correct estimation of demand is necessary before starting manufacturing.

There are 3 methods of estimation of demands:

1. Judgemental Method

2.Experience of past history

3.casual model

1.Judgemental method; on the basis of experience clinical and pharmacy staff express their opinion regarding the quantity of product based on this opinion the manufacturing is carried out. This is judgmental method of estimation.

2. Experience of past history: the past consumption pattern of a product in hospital is extended to the future by making time series and extrapolating it. This is the objective method of estimation.

3. The demand estimation is related to variable. For ex. Demand for antibiotics preparation is related to number of user patients with infections. Every month the requirement of antibiotics is varying as per season. According to the cause the future estimation of demand of each antibiotic preparation is calculated.

Q.5 Answer any FOUR of the following: (3Marks each)

a) Explain the term: (1.5 Marks each)

i) **Teratogenicity**: The term teratogenicity is originally derived from Latin teratos, meaning ‘monster’. Certain chemical agents can affect the somatic cells of a developing embryo in such a way, that defects are produced in one or another organ system. Thus, drugs or other factors producing deviations or abnormalities in the development of embryo that are compatible with pre-natal life and are observable post-natally are called teratogens.

True teratogens cause abnormalities in doses lower than are necessary to cause toxic effect on mother or foetus. It is most harmful if the foetus is exposed to the drug during first ten to twelve weeks of gestation. Foetus is more susceptible to drugs than the mother, as foetal hepatic enzymes function is minimum and rapidly growing foetal tissues are more susceptible to the drug effect.

Examples of certain drugs that affect foetal development adversely are shown in table below: Thalidomide causes Phocomelia, heart defects, gut atresia, Penicillamine causes Loose skin, Corticosteroids causes Cleft palate and congenital cataract-rare, Estrogens, diethylstilbesterol causes Vaginal adenosis /cervical cancer in female foetus or structural abnormalities in the genitourinary tract in male offspring etc.

ii) **Idiosyncrasy**: The term idiosyncrasy (Greek idios means 'ones own and synkrasis, a mixture together') has long been used to denote both quantitatively and qualitatively abnormal drug response. Idiosyncrasy covers unusual, bizzare or unexpected drug effects which cannot be explained or predicted in individual recepients. It also includes drug induced foetal abnormalities, e.g.phocomelia which developed in the offsprings of mothers exposed to thalidomide. Drug induced cancer is also an idiosyncratic reaction. Other examples of idiosyncrasy include:

Sr. No.	Drug	Drug effect
1.	Thalidomide	Phocomelia, heart defects, gut atresia
2.	Analgesics	Cancer of kidney pelvis
3.	Azathioprine, cyclophosphamide	Cancer of lymphoid tissue
4.	131 I therapy	Thyroid cancer

b) Discuss three physiological factors which affect the bioavailability of the drug.(1 Mark for each)

Physiological Factors Affecting Bioavailability of Drugs (any 3)

a) Effect of GIT fluid b) G.I. Transit time c) First –pass effect d) Diseased state

a) Effect of GIT fluid : Any disturbances of PH of GIT fluid affect absorption which inturn change the bioavailability. E.g. Salicylate and barbiturates (acidic drug) remain in unionized form in stomach, in acidic PH of stomach, they are rapidly absorbed.

Basic drugs like pethidine, ephedrine are only absorbed in small intestine, as these drugs exist in un-ionised form in alkaline environment.

b) G.I. Transit time :The motility of the stomach is important to the rate at which orally administer drug is passed on to the intestine. Delayed gastric emptying reduces absorption of orally administered aspirin. Food also affects gastric emptying time. Absorption of amoxycillin ,ampicillin and cephalexin reduced in presence of food . This is due to enhanced gastric emptying.

c) First –pass effect : Orally administered drugs go to the systemic circulation via hepatic portal system , which first present the drugs to the liver . Thus the entire absorbed dose of the drugs is exposed to the liver during first pass through the body. The drug, if it is rapidly metabolized in the liver, a small fraction only will reach the systemic circulation. This is known as first-pass affect and may cause significant reduction in bioavailability. Route of administration highly affects first-pass metabolism effect. Bioavailability of propranolol, oxyphenbutazone, chlorpromazine, and aspirin undergo first pass effect.

d) Diseased state: Absorption of drug may be affected by certain conditions like malabsorption, achlorhydria, cirrhosis of liver, thyrotoxicosis.

c) Define drug interaction. Give various mechanism of drug food interaction. (Definition 1 mark, mechanism 2 marks)

Drug interaction may be defined as an alteration in the effects of one drug by prior or concurrent administration of another drug. **OR**

Drug interactions are changes in a drug's effects due to recent or concurrent use of another drug (drug –drug interaction) or due to ingestion of food (drug –food interaction).

Drug food interactions: **(any 2 mechanism with ex -1 mark each)**

The presence of food in stomach influences absorption of number of drugs while food presence also reduces absorption of certain drugs

a) By binding with it

b) By changing of pH by GI content

c) By reducing surface area of stomach.

Following are some mechanisms of drug –food interactions:

With some drugs, the presence of increased amounts of stomach acid results in the destruction of acid-labile drugs, such as penicillin G, ampicillin and dicloxacillin.

Components of the food, such as calcium or iron, may form complexes with drugs like tetracycline, ciprofloxacin and their absorption is retarded.

A reduced rate of absorption may be useful in reducing the side effects of a drug, e.g. ibuprofen.

The bioavailability of some drugs may be enhanced by food, e.g. an acid environment is necessary for the absorption of ketoconazole. The absorption of griseofulvin is increased by fat in a meal.

Fenofibrate, mebendazole, tamsulosin, carbamazepine and labetalol will be better absorbed when taken with food.

Alcoholic beverage and drugs have sedative effect.

MAOIs and food rich in tyramine e.g. Cheese, Banana: Hypertensive crisis occur**.**

Erythromycin and acidic fruits: Decomposition of drug reducing the effect.

Quinidine and basic foods e.g. Milk, most vegetables: Decreased renal clearance due to alkalinity of urine.

Digoxin, tetracycline and milk: Reduced GI absorption.

Antihypertensives-diuretics and liquorice: Sodium retension, hypokalemia and increased B.P.

Anticoagulant and food rich in vitamin K e.g. egg yolk, green leafy vegetables: Vitamin K enhances the synthesis of clotting factors in liver decreasing anticoagulant effect of drug.

d) What do you mean by drug induced disease (1mark). Describe drug induced haematological disorders (Any 2 disorders-1 mark each)

Drug induced disease: The drugs used to cure one disease may induce another disease condition to various organs of the body.

Drug induced haematological disorders: Many drugs affect the normal cellular function of blood. Drugs can cause various abnormal diseased states of blood, which are discussed below:

i) **Aplastic anaemia**: In this disorder, the precursors of red blood cells, granulocytes and platelets get damaged. **Salicylates, indomethacin, chloramphenicol, phenylbutazone, tolbutamide & phenytoin can induce aplastic anaemia.**

ii) **Megaloblastic anaemia:** Vit.B12 and folic acid deficiency can affect bone marrow and GIT, which leads to increase in the number of large abnormal erythrocytes. Such erythrocytes get destroyed very fast and cause leucopenia and thrombocytopenia.

iii) **Leukopenia, agranulocytosis, granulocytopenia:** This condition is characterized leukocyte count induced by either antigen-antibody interactions or failure in cell division. **E.g. Aspirin, phenytoin, phenylbutazone, chloramphenicol.**

iv) **Thrombocytopenia:** Fall in platelet count is mediated by drug-induced immunological mechanism. Megakaryocytes of bone marrow are affected. **E.g. Aspirin, propranolol, penicillins, sulphonamides, rifampin, phenylbutazone etc.**

v) **Leukemia:** Oncogenic viruses like rous sarcoma, poloma, papilloma viruses in uncontrolled fashion. Leukocyte count may exceed beyond normal range (5000-10000/cubic mm)

vi) **Haemolytic anaemia:** It occurs due to genetic abnormality or acquired immunological abnormality. Hemolysis occurs in patients with glucnological abnormality. Hemolysis occurs in patients with glucose-6-phosphate deficiency. **E.g. Methyldopa, levodopa, mefenamic acid, streptomycin.**

vii) **Methaemoglobinaemia:** It may be caused by deficiency of enzyme methaemoglobin reductase. **E.g. Acetanilide, iodine, nitrates, pamaquin, primaquine etc.**

viii) **Thrombophlebitis or thrombosis:** In thrombophlebitis, the intravascular clot formation is induced by inflammation of vein. In thrombosis, intravascular clot formation occurs

e) Give significance of following physiological parameter. (1 mark for each parameter)

i) **Sperm count**: Persons with low counts (less than 60 millions/cc) might show infertility.

ii) **Haemoglobin**: Hb values are below normal in anaemia and leukemias. They are above normal in dehydration and polycythemia.

iii) **Blood sugar**: Increase in blood sugar indicates diabetes mellitus, acute stress, hyperthyroidism, chronic liver disease, Cushing's disease.

Decrease in blood sugar indicates Addison's disease, hypothyroidism, hyperinsulinemia.

f) Discuss about the scope of clinical pharmacy. (3 mark for any 6 points)

Scope of clinical pharmacy—

1. Medication history- it includes past and present of prescription and non – prescription drug,dietarysupplements,dietaryhabbits,drug and estimate of patient compliance with the drug therapy.

2. Monitoring drug therapy- it includes evaluation of patient pharmacokinetics and pharmacodynamics parameters ,lab. Findings medical problems and communicating relevant findings to physician.

3. Participation in ward rounds- The clinical pharmacist with physicians should participate in ward rounds, observe individual patient and decide the drug therapy.

4. Drug information- The clinical pharmacist establish drug information center. The drug info. Is available at this center and utilized suitably. This data is send to physician as per their requirements.

5. Patient counseling- it involves providing information to the patient about drug therapy and illness. The pharmacist acts as resource for information about health promotion and disease prevention.

6. Participation in new drug investigation- clinical pharmacist along with physician participates in investigation of new drugs. Data of this investigation is complied, analysed and maintained at drug information center.

7. ADR management- Along with physician clinical pharmacist's activity is involved in reporting of management of ADR.

8. Educational programme- clinical pharmacist organised educational programmes for nursing and education related to safe and effective use of drugs.

9. Tailoring drug therapy- the clinical pharmacist after the diagnosis of physician formulates drug therapy to need of patient.

Q.6 Answer any FOUR of the following (4 marks each)

a) Define the term hospital formulary .Write guiding principle while using formulary.(Definition -1 mark, guiding principle -3 marks)

A formulary is a continually updated list of medications and related information, representing the clinical judgment of physicians, pharmacists, and other experts in the diagnosis, prophylaxis, or treatment of disease and promotion of health.

OR

It is a continuous revised compilation of pharmaceutical dosage form available in the hospital and which reflect current clinical judgment of medical staff.

Guiding principle while using formulary

1. The medical staff of the hospital shall appoint a P and T committee and outline its scope, purpose, oragnisation , and function.
2. The formulary system will be sponsored by medical staff.
3. The medical staff shall adopt the written policies and procedures of the formulary system.
4. Drug should be included in the formulary by their nonproprietary names and should be prescribed by the same.
5. When there is no formulary then the pharmacist has to follow physician’s prescription .They can consult the physician when the prescribed brand is not available.

6. The management of the hospital shall inform all the medical and nursing staff about the existence of the formulary system, procedure of operation.

7. Provision shall be made or the use of drugs not included in the formulary, by the medical staff.

8. The pharmacist shall be responsible for specification as to the quality, quantity, and source of supply of all drugs used in the diagnosis and treatment of patients.

9. Limiting the no of drugs available from pharmacy can produce proper patient care and financial benefits. These benefits can be greatly increased by using generic equivalents

b) Explain pathophysiology of epilepsy. (4marks)

Epilepsy: Epilepsy is a term used to define a disorder characterized by recurrent, usually transient seizures having a sudden onset and a spontaneous resolution. It is not a disease, but rather a condition in which a patient suffers from a complex set of symptoms. Epilepsy due to unknown cause is called primary or idiopathic epilepsy whereas, secondary or organic epilepsy exists along with an identifiable precipitating factor.

Pathophysiology: Nerve impulse propagates in the brain in a synchronous pattern and electrical potential is close to zero. Any process which damages or irritates the grey matter of the brain may result in the activation or inactivation of neurons by unknown mechanism. This leads to sudden, excessive, synchronous electrical discharge, which results in an electrical potential. If this discharge remains localized it results in partial seizures, or it may spread and involve the entire cerebrum causing generalized seizures. Imbalance of excitatory transmitters such as gamma amino butyric acid (GABA) and selective central nervous system calcium channel blockers may be involved in the seizure disorders.

The excessive, disorderly neuronal discharge involving the entire brain, results in loss of consciousness, disturbances in sensation and convulsive movements. After the peak in

seizures, there is decrease in frequency of neuronal discharge. It leads to the end of seizures. The seizure may be ending due to loss of cerebral energy reserves, local tissue anoxia, accumulation of toxic metabolites of neuronal metabolism and inhibitory neuronal feedback mechanisms.

c) What is bed side pharmacy and satellite pharmacy? (2 marks each)

Satellite pharmacy services:

In large hospitals where the main section of pharmacy such as storing, manufacturing, dispensing are separated from each other it is advisable to develop satellite pharmacies at nursing station. These are sub-pharmacies which are located on each floor of the hospital to operate DUDD system. These sub-pharmacies receive their supplies from main pharmacy against receipt. The main pharmacy procures, stocks, manufactures and pack drugs. The medicines are delivered in carts. This system is useful when a hospital has several buildings.

Advantages:

1. Satellite pharmacy satisfactory provides requirement of current clinical need of patient.
2. Satellite pharmacy makes available pharmacist to the patient and nursing personel for clinical purpose rather than as a dispenser.
3. Efficiently drug can be distributed
4. Time and error in drug distribution could be reduced.

Bed-side pharmacy: A pharmacist on a bed-side visit offers advice regarding the action and uses of frequently used drugs to the medical or nursing staff. He also gives his own expert evaluation of the prescribed drugs. During his ward visits, he has to study prescriptions and offer advice on appropriate drug therapy. Bed-side pharmacy sees pharmacist as an important member of an inter-professional team of the physician, nurse and pharmacist. He has to direct his efforts to safe and efficacious use of drugs. He has to monitor the drug use by conducting pharmaco-kinetic studies. He has to share the health care responsibility with the physician and nurses.

As per need for patient and if ordered by the doctor 10 tablets of nitroglycerine are kept at the bed-side. The nurse should count number of tablets daily in morning & evening and add the tablet (if it is used by the patient) to maintain supply of 10 tablets. No medication except nitroglycerine is kept at bed-side of any patient. Medication brought to the hospital by patient is shown to the physician & then sent home with a responsible family member or a friend.

d)State eight function of hospital pharmacy.

The following functions are performed by hospital pharmacy

a) The dispensing of drugs ,chemicals and pharmaceuticals preparations.

b) The filling and labeling of drug container.

c) The inspection of all pharmaceutical supplies .

d) The dispensing of all narcotic drugs and alcohol and the maintenance of perpetual inventory of them.

e) Specification of the quality of drugs, chemicals ,antibiotics ,biological and pharmaceutical supplies used in the treatment of patient.

f) Sources to get above products.

g) To maintain adequate control over requitioning and dispensing of all drugs and pharmaceutical supplies.

h) To make large volume injection fluids and other parenterals, and to maintain aseptic condition while doing so.

i) To do inhouse production of drugs ,the buying of which from outside sources is not prudent.

j) To furnish information concerning medications to physicians , interns and nurses.

e)Name various methods for sterilization. Write the principle involved in autoclave. (3 marks for any three methods, and 1 mark for principle)

Methods of sterilization:

A) Physical:

a) Dry heat sterilization: i) Hot air oven, ii) Flaming, iii) Infra-red Radiation.

b) Moist heat sterilization: i) Autoclave, ii) Heating with bactericide, iii) Heating at 100 degree,

iv) Pasteurization, v) Tyndalization, vi) Heating at 55 to 60 degree.

c) Radiation: i) Ultra-violet light, ii) Ionizing radiation e.g. Gamma & X-ray radiation.

B) Chemical:

a) Gaseous: i) Ethylene oxide, ii) Formaldehyde,

b) Sterilization by disinfectants: i) Alcohol, ii) Isopropyl alcohol, iii) Iodine, iv) Chlorine, v) Cresol with soap solution, vi) Formaldehyde,

C) Mechanical:

a) Sterilization by filtration: i) Membrane filter, ii) Seitz filter, iii) Sintered glass filter, iv) Berkefeld filter, v) Millipore filter, vi) Pasteur-chamber land filter, vii) Ceramic filter, viii) Sintered metal filter.

D) Other methods of sterilization:

a**) Tyndalization**

b) Pasteurization

c) Sterilization of vaccines

Principle involved in autoclave: Autoclave is used to carry out steam sterilization. It works on the principle of utilization of saturated steam under pressure. Autoclave is more effective than hot air oven because steam has high penetrating power and thermal capacity than dry heat. Saturated steam penetrates in the vegetative spores and capsules of bacteria's, ruptures it and escape the protoplasm which is coagulated. For ex holding temp 121^{o} c,Holding time 20 mins , and holding pressure 15 lbs/sq inch

(f) Describe pharmacodynamics drug interactions with example. (4 marks for any four interactions)

Pharmacodynamics drug interactions: It involves interaction at pharmacodynamics aspect of the drug. There may be direct interaction between the drugs or drug effects or interaction at receptor level. This may enhance or inhibit the total effect.

(i) Interaction enhancing the effect: e.g.synergistic effect of trimethoprim and sulphamethoxazole. MAOI and sympathomimetics enhance sympathetic activity.

(ii) Interactions inhibiting the effect: e.g. Acetylcholine and atropine by competitive antagonism oppose the action of each other. E.g. Alcohol and amphetamine have opposite effects on CNS.

(iii) Alteration of electrolyte levels: Drugs which cause alterations in fluid and electrolyte balance may modify the responses of tissues to drugs. e.g. Diuretics losing potassium, may cause hypokalemia, inturn making the heart more sensitive to digitalis.

(iv) Drug interactions at receptor sites:

(a) Drug interactions at same receptors: Drugs that act at the same receptor site, if prescribed together, may produce additive effect or antagonize one another; e.g. respiratory depression and other central effects of morphine are antagonized by nalorphine.

(b) Drug interactions at different receptors: Drugs may interact on the same target organ, but at different receptor sites. E.g. Adrenaline activates adenylcyclase system and causes an increase in cyclic 3-5 AMP which then acts as the mediator in a number of beta effects of adrenaline for relaxation of bronchial smooth muscles. Theophylline produces the same effect, an increase in cyclic 3-5 AMP, by inhibiting phosphodiesterase, and also causes bronchial smooth muscle relaxation. Thus, drugs that inhibit different enzymes may show synergistic effect.