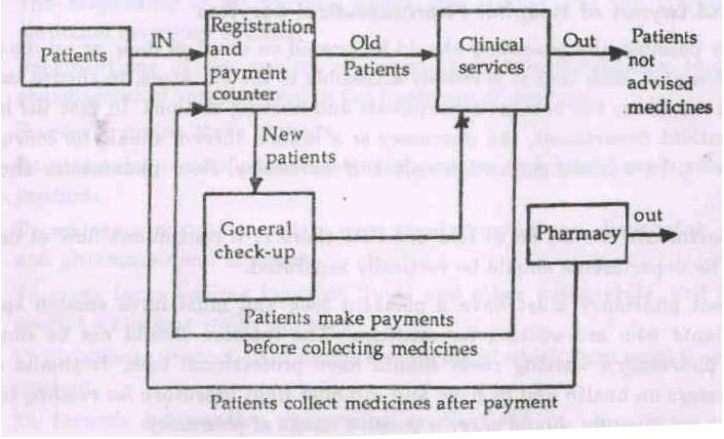
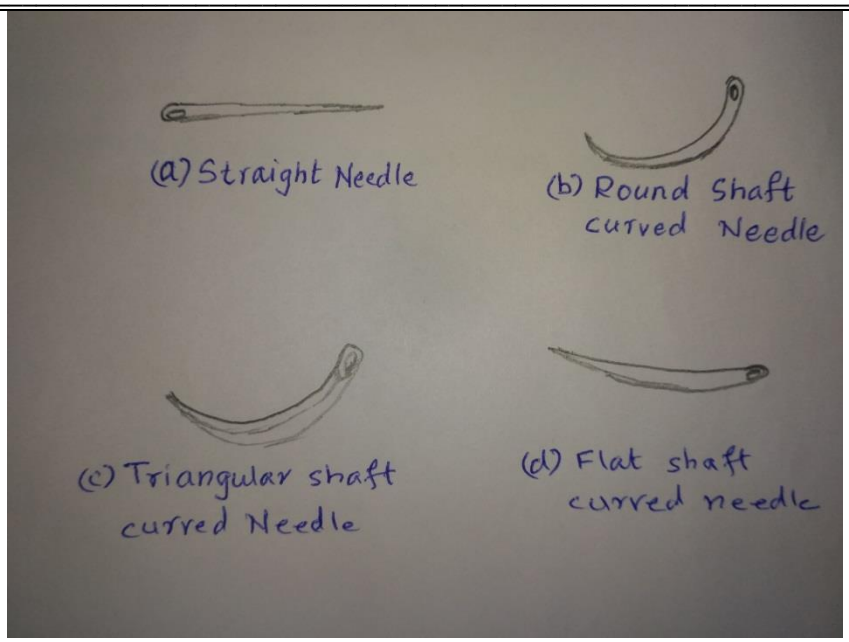
Important Instructions to examiners:

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.

Q. No.	Sub Q. N.	Answer	Marking Scheme
1.		**Attempt any EIGHT of the following**	**16M**
1.	(a)	**Define the following term (any one):(2 Marks)** **(i) Modern Hospital:** Modern Hospital is educational and social service institution with a single purpose of restoration and maintenance of good health .It provide special facilities (like accommodation, colleges and day night medical stores) with a trained professional staff. **(ii)Clinical Pharmacy:** Clinical pharmacy is a new born discipline that carries traditional hospital pharmacist from his product oriented approach to healthier patient oriented approach, so as to ensure maximum well-being of the patient while on drug therapy. **(iii)Bioavailability:** Bioavailability may be defined the amount or percentage of drug is absorbed from the administered dosage form, that reaches to the systemic circulation.	
1.	(b)	**Give the normal values of (any four): (½ mark each)** (i) Haemoglobin % in females: 1**4+ or – 2.5 gm%** (ii)Normal blood sugar:80-120 mg/100ml (iii) Clotting time of blood: 4-9 minutes OR Slide and Capillary tube Amethod.-3-6 mins. (iv) Specific gravity of urine: 1.005 – 1.030 (v) Sperm count:Normal Value: 60 -150 million/ml of seminal fluid (vi) ESR in males and females Normal Value: **Westergren Method**: Male 0-15mm at end of one hour Female 0-20 mm at end of one hour **Wintrobe Method** : Male 0-9mm at end of one hour Female 0-20mm at end of one hour	

1.	(c)	**What advice must be given to the patients while using following drugs? (any two) (1 mark each)** (i) Antacid tablets: Do not swallow but chew it. **(ii)** Boric acid:Contraindicated in children under 12 years old. Not for internal use. **(iii)**Antidiabetics: Avoid alcoholic beverages while on drug therapy **(iv)** Diphenhydramine: It may cause sedation.	
1.	(d)	**State the meanings of (any one):(2 Marks)** (i) Drug Abuse: Drug abuse is defined as 'the consumption of a drug apart from medical need or in unnecessary quantities. (ii) Bioequivalence: 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.	
1.	(e)	**List the factors affecting bio-availability of drugs. (2 Marks)** **1) Physical properties of drug:-** a) pKa b) Partition coefficient c) Particle size **2) Pharmaceutical factors:-** a) Dosage forms b) Manufacturing variables c) Dissolution rate **3) Physiological factors:-** a) Effect of GIT fluids b) G.I transit time c) First pass effect d) Disease state	
1.	(f)	**Draw the flowchart for out-patients in atypical hospital.(2 Marks)**	

1.	(g)	 **What are benefits of Unit dose dispensing?(Any 4 Benefits- ½ mark each)** 1.The patients are charged for those which are administered to them. 2. It reduces the medication error since the pharmacist checks the copy of physician's original order. 3. It avoids drug losses, no pilferage of drug. 4. Less space is required as compared to bulky floor stock. 5. Patients receives the nursing service 24 hrs a day. 6. It avoids duplication of orders and extra paper work. 7. It enhances more efficient utilization of personnel 8. It eliminates labeling error. 9. Drug accounting become easier. 10. Better financial control means credits are eliminated.	
1.	(h)	**Name and draw different needles used in a surgical hospital.(2 marks, ½ mark each)**	

			
1.	(i)	**Name two databases available for computerized drug information retrieval.(1 mark each)** Micromedex, PubMed, MEDLINE,MEDLARS,BIOSIS.	
1.	(j)	**List two objectives for taking medication history of patients.(1 mark each)** 1.To develop list of the patient's current and past medications. 2.To determine if the patient has allergies or adverse drug reactions with some drugs. 3.To know about patient's self-prescribing habits and which over the counter drugs he takes or prefers. 4.To study the ability of the patient to follow the prescribed medication and show compliance.	
1.	(k)	**Write an example of each of the following poisons. (½ mark each)** **(i) Corrosives:(any one)** **a)** Strong acids- sulphuric acid, nitric acid, hydrochloric acid b) Organic acids- oxalic acid , carbolic acid c) Concentrated alkalies- caustic potash, caustic soda, carbonates of sodium, calcium and potassium **(ii)Irritants: (any one)** Powdered glass, Asbestos, Diamond dust, Chopped hairs	

		(iii)Organic:(any one) 1. Animal origin- Snake, scorpion, Insects, Cantherides 2. Vegetable origin- Ergot aloe, capsicum, castor oil seeds etc. **(iv)Inorganic:(any one)** 1. Non- metallic- Phosphorous, chlorine , bromine, Iodine 2. Metallic- Lead, Mercury, copper, zinc, arsenic , manganese	
1.	**(l)**	**Write the antidotes for:(Any two)** (i)**Physiostigmine:** Atropine **(ii)Pentazocine**: Naloxone **(iii)Ehtylene glycol**: Ethanol **(iv)Quinidine:** Sodium bicarbonate	
2.		**Solve any FOUR questions:**	**12M**
	(a)	**What are the objectives of hospital pharmacy?(any 6 points -1/2 mark each)** 1. To professionalize the functioning of pharmaceutical services in a hospital. 2. To ensure the availability of the right medication at the right time, in the right dose, at the minimum possible cost. 3. To teach the hospital pharmacist about the philosophy and ethics of hospital pharmacy and guide them to take responsibility of professional practice. 4. To strengthen the management skills of hospital pharmacist working as the head of the department 5. To strengthen the scientific and professional aspects of practice of hospital pharmacy such as his consulting, teaching role and research activities. 6. To utilize the resources of hospital pharmacy for the development of profession. 7. To attract the greater number of pharmacist to work in the hospital. 8. To promote the payment of good salaries to pharmacist. 9. To establish drug information services 10. To participate in research projects carried out in hospital. 11. To implement decisions of Pharmacy and Therapeutics Committee	

2.	(b)	**List the technical abilities required for Hospital Pharmacist. (3 marks)** **Technical ability-** 1)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. 2) He/she knows the storage condition of various drugs and their stability. 3) He has to assure quality of pharmaceutical products used in the hospital. 4)He/ she must be an expert in pnarmacokinetics and pharmacotherapeutics of drugs. 5)He/she must give the information to his medical colegues about evaluation data of drugs,their actions, dosage, toxicity and relative cost.	
2.	(c)	**Define a modern Hospital and classify hospitals clinically.(1 mark –Definition ,2 marks for classification)** Modern Hospital is educational and social service institution with a single purpose of restoration and maintenance of good health .It provide special facilities (like accommodation, colleges and day night medical stores) with a trained professional staff. Classification of hospital on clinical basis: A. On basis of Major diseases: 1. Psychiatric hospitals or Mental Hospitals 2. T.B.Hospitals 3. Leprosy Hospitals 4. Cancer hospitals B. On basis of Anatomical Specialisation: 1. Ear, Nose and throat Hospitals 2. Orthopaedic Hospitals 3. Eye hospitals 4. Kidney Hospitals C. On the basis of Client group: 1.Paediatric Hospitals 2. Maternity Hospitals for mothers D. on the basis of system of medicine	

		1. Allopathic hospital 2. Ayurvedic Hospitals 3. Unani Hospitals 4. Homeopathic hospitals 5. Nature cure and well centers 6. Physiotherapy centers	
2.	**(d)**	**What are purposes, principles and importance of medical records in a hospital? (1 mark each)** **Purpose-** • To serve as a basis for planning & for continuity of patients care. • It assists in protecting legal interest of the patient hospital & physician. • It helps for communication among the physician & any professional contributing to the patients care. • It acts as a evidence for the patients illness & treatment during each hospital stay. • It provides data for use in research and education. • It serves as a basis for review study of the patient & evaluation of health care given to the patient. **Principle-** • It must be accurately prepared. It must be properly stored & readily available. • It must be easily accessible. **Importance-** Medical records • Facilitate good care • Allow a subsequent caregiver to understand the patient's condition and the basis for the current investigations or treatments • Provide a method of communicating with other team members • Satisfy legal and ethical obligations: medical regulatory authority, hospital, and legislative requirements for clear and legible records • Act as evidence: if your care is later questioned, it shows events as they happened	

2.	(e)	**Define general outpatient. Write about 10 lines on location and layout of OPD.(Definition -1 mark, explanation -2 marks)** 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. OR Patients who comes to the hospital for treatment of general symptoms like fever,cough ,cold etc **Location-** It should be located near main entrance of the office and the hospital and minimum disturbances to inpatient unit. It must be located on ground floor For location of this service three provisions are made 1) A separate outpatient dispensing pharmacy is set up. 2)A combined unit service for in-patients and outpatients from same window 3) A combined unit service for inpatients and outpatients from different windows. When the outpatient department and pharmacy are geographically widely separated, a separate outpatient dispensing pharmacy is set up. **Layout-** 1) The layout of this unit is important since it carries the good or bad impression about the hospital depending on the services the outpatient gets. 2) The unit should be provided with two windows, one for receiving the prescription and other for delivery. 3) When the prescription is being compounded, the patients have to wait for some time. Hence waiting area should be provided. 4) The waiting room should be clean and ventilated with sufficient no. of comfortable seats. 5) In the waiting room, general publications regarding pharmacy and medicines should be provided. It also includes magazines and news papers 6) The waiting period should be kept minimum to avoid overcrowding. 7) In the waiting room the wall posters should be displayed through which patients can learn about the family planning methods and general hygiene. 8) Thus the waiting room of the outpatient dispensing unit should be good place for educating the patients on matters relating to the health and hygiene.	

		9) There should be consulting room and store room.	
2.	(f)	**Explain the concept of clinical pharmacy (in about 10 lines) (3 marks)** Clinical Pharmacy: It is the branch of pharmacy which is concerned with various aspects of patient care & deals not only with dispensing of drug but also advising the patients on safe & rational use of drugs. Clinical pharmacist is involved in pharmaceutical care of an individual patient. He performs following activities: 1. Prepare medication histories for patient's permanent medical record. 2. Helps in selecting and monitoring of drug therapy-Deciding the dose and dosage schedule by using pharmacokinetic consideration of the drug and patient disease status, is monitoring drug therapy. 3. Arranging educational and training programmed- Arranging seminars on drug use, review and patient care programme. 4. They provide consultation regarding IV therapy, TPN, clinical pharmacokinetics selection of drug therapy. 5. Clinical pharmacist is involved in Drug administration and drug distribution in patient care area. 6. Establishes and monitor a system to insure proper storage of pharmacy items such as insulin and other biological products. 7. Detects and diagnoses adverse drug reactions and drug interactions 8. Participating in emergency situations of patients e.g. drug overdose, toxic reactions in the body, poisoning, providing first aid treatment. 9. Participation in clinical investigation-It involve clinical drug trial on animal .He participate in such activity with physician investigator.	
3.		**Solve any FOUR questions**	**12M**
3.	(a)	**Explain the prepackaging activity in a hospital(in about 10 lines) (Explanation-3 marks)** 1) Pre packaging is eminently suitable for fastest moving items whose consumption is very quick and also for those items which take a long time for compounding and packing. 2) It should give consideration to the factors like demand and turnover of the item, the container to be used, the labeling to be done, the process of packing itself, the stability and	

		cost of prepacking 3) Size of the package is the result of consultation with the pharmacy as well as nursing staff of the hospital. 4) The data for various dosage forms and therapeutic categories is the guiding factor to determine the pack size. 5) Hospital formularies may give definite guidelines of the quantities to be prescribed for certain categories of the drugs 6) In OPD of many hospitals, the call cycle of the patients determines the quantity of the drug supplied at each call. The quantity must be adequate to last between the two calls of the patient. 7) Pre- packaging operation is carried out either by a pharmacist or other persons at the pharmacy under his direct supervision. **8)** It offers convenience, labour saving and time saving 9) Pre- packaging is useful for IPD as well as OPD and is most useful during lean hours when there is hardly any skilled staff available. 10)No medication error in prepackaging as it is carried out under observation of pharmacy services.	
3.	**(b)**	**Explain the receipt and issue system of medicines in an OPD. (3marks)** 1.Patient in his first visit to OPD goes to registration counter .Take case paper after paying nominal fees. 2. Then patient goes to general check up counter –guided for medical department on the basis of clinical symptom. 3.Physician write prescription for patient and he submitted it to pharmacy dept. where Rx is compounded and dispensed by pharmacist. 4.Pharmacist number the Rx ,monitor it and assemble the materials and equipment for compounding. 5. Pharmacist gives token to the patient so patient and Rx can be identified. 6. Compounded Rx filled in suitable container, packaged, labeled and priced reasonably. 7. Pharmacist record Rx in a register for accounting purpose .	

		8. While dispensing and compounding the drug correct delivery is ensured by checking token number. For his next visit Rx is given back to the patient.	
3.	(c)	**How are the charged stock drugs selected and dispensed to Inpatients of a Hospital? (1 mark for selection and 2 marks for dispencing)** The PTC have authority to select charge stock drug. The selected list is constantly being reviewed by the PTC for necessary revision. **Dispensing of charge floor stock drugs (Envelope method)** The patients are charged mostly because of high cost of the drugs. These include injections or other single dose preparations. An envelope is used to dispense the drug to the nursing station which is used as charge ticket. The pre- labelled envelops are filled with specific drugs in specified quantity and placed at the disposal of nursing unit. When the drug is administered, the patients name and room number is entered on the envelope and sent to the pharmacy where it is priced & forwarded to account department for billing.	
3.	(d)	**Explain the "Bed side Pharmacy" in a Hospital.(Explanation -3 marks)** Hospital pharmacy is becoming increasingly patient oriented nowadays. Hence Hospital pharmacists must work in close association with the nursing and medical staff .Personally, each pharmacist in the hospital pharmacy department should visit the wards; go to each patients bed side and discuss with them regarding the medicines and drugs they take. This is called as Bed side pharmacy. Following are the points considered for Hospital Pharmacy to become bed side pharmacy: 1. The pharmacist should built an inter professional team of the physicians, nurses and pharmacists. 2. Pharmacist shouls personally visit the wards and go to the bed side of each patient. 3. Take medication history of each patient during thr visits. 4. Pharmacists carrying out such visits must have through knowledge about drug interaction , drug –food reactions, allergies, side- effects and adverse reactions of drugs. 5. Pharmacists on such visits should not give up tradional skills of compounding and dispensing of drugs. 6.These pharmacists offer advice regarding related drugs, which are frequently used, to nursing staff and medical staff.	

		7. He / She gives drug information like, their storage and administration and directs the patients regarding the use of drugs. 8. He /She should give counseling to the patient regarding their food habits and ways of administration of drugs. 9. He /She guides the patient about the treatment to be continued after discharge and how the drugs should be stored at home, to avoid its degradation. 10. The pharmacist is essentially a drug therapy advisor ; he has the ability to share health care responsibility with the physician.	
3.	**(e)**	**Where should the CSSD department be located in a hospital? Which are the areas in which the manpower of this department should be trained? (Location - 1 mark, Areas – 2 marks)** **Location**: It should be centrally located in the hospital or near a place where bulk of the supplies are required as operation theaters which contributes about 75% of the work of this department. The store and laundry should be very near. Following are the areas in which manpower of this department should be trained. 1. Principles of sterilization 2. Autoclaving 3. Gas sterilization 4. Identification of surgical instruments 5. Assembly of treatment trays. 6. Disassembly 7. Cleaning and assembling of equipments. 8. Microbial testing	
3.	**(f)**	**List and explain the economic factors affecting make or buy decision of medicines in a hospital.(3 marks)** Following factors affect make or buy decision in hospital manufacturing: **1. Quality 2.Quantity 3.Cost and 4.Service.** **1) QUALITY**-The quality of outside purchases & the quality that could be possibly achieved when manufactured within the hospital are compared. If there are no wide variations between these two, it is not an important consideration .if there is a wide variation, it becomes a	

		crucial factor. If a better quality results from in-house manufacturing, the matter should be probed further. Why do the outsiders fail to come up to the desired quality level? Also, is the hospital competent to produce the desired quality? Does it have the necessary infrastructure? Most of the times, as in case of large volume fluids, the hospital favours in-house manufacturing as it has a legitimate apprehension that an outsider may compromise with the quality of his supplies. **2) QUANTITY**-Generally, those items whose orders are too small to purchase it from an outside supplier are manufactured within the hospital.Similarly, items which are required every day for use in hospitals, in large quantities, are generally decided to be manufacture. Break-even analysis gives the hospital the break-even quantity of production. Break-even is at a point where there are no profits and no losses. **3) COST**-Here we compare the costs of buying from outside with the cost of in-house manufacturing. The cost of manufacturing the items within the hospital is estimated by drawing up a cost-sheet. It is important to allocate over-heads correctly. Cost and quantity together considered for making the decision. **4) SERVICE**: Generally, a supply is more assured when a hospital makes an item then when it buys it. Assured supply is often a valid reason for manufacturing. Interruption in supplies may affect the major clinical series of the hospital. Unfair practices of outsider make a hospital opt for making rather than buying.	
4.		**Solve any FOUR questions.**	**12M**
4.	**(a)**	**List the aseptic work precautions for working in sterile area.(Any 6 points, ½ mark each)** 1. No touch method is employed wherever possible. 2. The area should be maintained, and the personnel should also observe through cleanliness as per the programme. 3. Continuous monitoring of aseptic area is needed for contamination check. 4. Once identified, the contamination should be eliminated.	

		5. There should be minimum air disturbance. 6. There should be minimum interruption. 7. Aseptic work is carried out by suitably trained personnel. 8. Once the aseptic work is over, the product is shifted to quarantine. The aseptic area is then cleaned and disinfected to accommodate further aseptic work.	
4.	**(b)**	**List the properties of parenteral products. How is parenteral formula developed?** **(Properties -1 mark, Formulating agents any 4 -2 marks)** **Properties of Parental products: (any 2 of the following)** 1. It must be sterile. 2. It must be free from Pyrogen and viable microorganism. 3. It must be isotonic with blood plasma. 4. Its specific gravity must be similar to blood plasma. 5. It should have a pH similar to blood plasma. 6. It must be non toxic, non irritant to the body. 7. It must be free from physical and chemical contaminants. 8. It must be free from dust and dirt particles. 9. It must be chemical inert in nature. **Formulation of Parentrals: (any 4 -1/2 mark each)** It is nothing but additives added in formulation. Following are the additives used to prepare the Parentrals: **1. Vehicles**- a) Water for injection b) Sterile water for injection c) Bacteriostatic water for injection **2) Non- aqueous vehicles/ solvents**- Commonly used fixed oil are peanut oil, cotton seed	

oil, corn oil, arachis oil and almond oil.

Another non aqueous solvent , majorly used is alcohol, i.e, ethyl alcohol.

Propylene glycol and Glycerin

3) **Antibacterial agents**-

Phenol 0.5%,Cresol 0.3% ,Chlorocresol0.2%,Phenyl mercuric nitrate 0.002%

Benzethonium chloride ,Benzalkoniun chloride 0.001%

4) Antioxidants- ascorbic acid, sodium bisulphate, sodium metabisulphite, thiourea, tocopherol etc.

5) Buffers- Acetate, citrates, phosphates are commonly used buffers.

6) Tonicity contributors- 0.9% w/v NaCl,Borax

7) Wetting , suspending, emulsifying agents-

a) Wetting agents - e.g: Sorbiton tri-oleate, pluronic F68, tween -80

b) Suspending agents- e.g.: Sodium CMC, methyl cellulose, gelatin, poly-vinyl Pyrrolidone, acacia

c) Emulsifying agents- e.g: Lecithin

4. (c) Which are the equipments for manufacture of pills and compressed tablets as per Drugs and cosmetics Act & Rules? (3 marks)

Requirements for Tablets and Pills

Equipment	Examples
1.Mixer/Blender	Sigma blade mixer, tumbling mixers, Ribbon blenders.
2. Grinder /Shifter	Cutter mill, Hammer mill.
3. Dryers	Tray dryers, Fluidized bed dryers.

			4. Compression machine	Single punch , double punch , rotary etc	
			5. Coating machine	Pan coating , spray coating pans, film scoating machine and polishing pan. etc	
			6. Miscellaneous	S.S utensils like scoop , vessels and buckets etc	
			7. packaging machine	Blister/ strip packaging machine	
			8. Disintegrator		
			9 . Sifter		
			10 . Granulator / Granulating machine.		

4. (d) When and how should a Re-order be placed for materials in a hospital? (3 marks)

Re- order quantity is that quantity ordered when additional stock becomes necessary, considering the amount of consumption.

Reorder level maintains a lead time.

Lead time -It means the time between placing an order and receiving the goods.

Re- order point = Average usage rate/(in units issue) month × Lead time

13 weeks or other Hospital decided figure

After deciding reorder point, it is decided upon how much to reorder.

4. (e) What are the functions of PTC. What is its role in drug safety?

(Any 3 Functions and Role in drug safety- 1 ½ marks each)

Functions of PTC

1) To advise the medical staff and hospital administration in matters related to the use of drugs

2) To establish and develop suitable educational schemes to improve the professional staff on the matters related to the use of drugs.

3) To develop and compile formulary of drugs and prescription accepted for use in hospital. It also minimizes the duplication of the same type of drugs or products.

4) To study problems related to the distribution and administration of drugs used in hospital.

5) To review adverse drug interaction occurring in hospital.

6) To initiate and promote studies on drug use and review the results of such studies.

7) To recommend about the drugs to be stocked in hospital patient caer areas.

8) To advice the pharmacy in the implementation of effective drug distribution and control procedures

Role of PTC in Drug safety - Drug safety is one of the major responsibilitie of hospital pharmacist. The PTC can play an effective role in ensuring drug safety on a continuous basis by creating safety awareness in all departments of the hospital. For this following areas are looked into by PTC…

1. Employment of qualified registered pharmacist with at least B.Pharm degree holder as the Chief pharmacist & rest are diploma holders.
2. Takes care that dispensing is done only by the pharmacist.
3. Sufficient number of pharmacists are employed.
4. Proper & adequate storage facilities are provided in pharmacy.
5. Poisonous material & non-poisonous material are stored separately.
6. Pharmacy should have adequate equipments.
7. External preparations are kept separately from internally used preparations.
8. Follow of GMP effectively in the in-house manufacturing unit.
9. Stock & issue of narcotic & psychotropic substances shall conform to the legal requirements.
10. Hospital shall have a drug formulary which is periodically revised & kept up to date.
11. Expired & deteriorated drugs are physically separated.
12. Providing a library & documentation facility.

4.	**(f)**	**List the various surgical dressings? How is absorbent cotton prepared and identified?** **(List of any 2 surgical dressings- 1 mark, Preparation -1 mark, Identification- 1 mark)** Absorbent cotton (medicated/non-medicated), Non- Absorbent cotton, eye pad, cotton ball, sanitary napkins,Absorbent gauze, Absorbent lint, Gauze pad(gauze sponge). Elastic bandages, Muslin bandage roll, Triangular bandage, Common gauze roller bandage. Zinc oxide adhesive plaster, capsicum plaster, Belladona plaster. **Preparation of absorbent cotton**: 1. Absorbent cotton consists of the hairs from the cotton seeds. 2. Ginning process frees the hairs from the seeds. Fatty matter is removed by boiling the raw cotton with caustic alkali under pressure and fat is saponified. 3. The cellulose of the hairs remains unaffected. The saponified fat is washed off, fibres are bleached with bleaching powder , treated with dilute acid and are again washed for removing all soluble matter. 4. The product is then dried It becomes tangled mass, which is then combed so that fibres become parallel. The product becomes fleecy and uniform. **Identification tests for Absorbent cotton: (any 1 test)** 1. When examined under microscope, each fibre is seen to consist of single cell upto 4 cm long and upto 40 µm wide, in the form of flattened tube, with thick and rounded walls and often twisted. 2. When treated with Iodinated zinc chloride solution, the fibres become violet. 3. To 0.1 gm, add 10 ml of zinc chloride solution, heat upto 40 0 c and allowed to stand for 2 ½ hours, shaking occasionally the fibres do not dissolve.	
5.		**Solve any FOUR questions:**	**12M**
	(a)	**What are the consequences of non compliance by patients to prescription. (3 marks -1 mark each)** There are 3 consequences of non compliance are as follows **<u>1.Under utilization of medications</u> (any 1 example)** a) Risk of toxicity:- If the physician unaware of the patient's noncompliance, in the	

treatment of hypertensive patient, the doctor may increase the dose or prescribe more potent antihypertensive drugs, which result in toxicity.

B) Danger of death:- underutilization of anticonvulsant drug results in uncontrollable seizures and death.

C) In patient with C.C.F digoxin and hydrochlorthiazide should also take potassium chloride to replace potassium. (K^+ loss occur due to diuretic action). if patient stop taking potassium chloride, The k+ depletion results, making heart more sensitive to digoxin and activity of cardiac glycoside occurs.

d) Patient with antibiotic therapy if stop taking the drug when symptoms disappears this will result in recurrence of the infection. e.g. Tuberculosis

e) Omitting a single dose of contraceptive pill may results in unwanted pregnancy

2. Overutilsation of medication: (1mark)

Excessive dose of drug may cause serious adverse drug reactions and toxicity in the patients.

It may happen due to following reasons

i). Taking more amount/quantity than the prescribed dose.

ii). Taking more than prescribed number of doses.

iii). Taking a dose at a time other than when needed.

iv) Taking the same medication from two or more different dosage form simultaneously.

3. Miscellaneous: (1mark)

It may arises due to following factors

i) Improper technique of drug administration

ii) Using medication for wrong purpose iii) Use of out dated drugs without knowledge.

5.	(b)	**Write 5 lines on any two: (1 ½ mark each)**	

i) Antidiuretic hormone : Antidiuretic hormone(ADH) made by the hypothalamus in the brain

It is stored and secreted by the posterior pituitary gland.

ADH constantly regulates and balances the amount of water in your blood.

Diabetes insipidus occurs due to deficiency of ADH

It causes vasoconstriction and increases B.P So it's known as Vasopressin agent.

ii) Vaccines : Immunological preparations that confer an active immunity on the recipient .

Vaccines have antigenicity intact, but no pathogenecity .

Vaccine is a biological preparation that provides active acquired immunity to a particular disease.

A vaccine typically contains an agent that resembles a disease-causing micro-organism and is often made from weakened or killed forms of the microbe, its toxins or one of its surface proteins.

Their storage demands refrigeration.

iii) Immunity :

The capacity of the human body to resist either infection by parasitic microbes or their deleterious effects.

Immunity can be either natural or acquired.Acquired immunity can be either active or passive.

Phagocytosis and antibody formation are responsible for producing immunity in human beings.

Immunological products are preparations which meant for prevention for disease such as vaccines or for treatment for disease such as antitoxin and antiserum.

		All immunological products are required to be stored in dark at temperature between $2^{o}C$ and $8^{o}C$.	
5.	**(c)**	**Define Adverse Drug Reactions.What are the causes of ADR? (1 mark –Definition ,2 marks for any 4 causes)** **Definition**- Adverse drug reactions (ADR) - " Any response to a drug which is noxious and unintended, and which occurs at doses used in man for prophylaxis, diagnosis or therapy". **Causes of ADR : (any 4)** • **Medication errors:** • Self medication of OTC drugs by patient leads to over use or misuse of drug. It may result into excess pharmacological action or complications. • Over prescribing of potent medicament to the patient e.g oral hypoglycemic, antihypertensivess etc. • **Inadequate monitoring of the patient**: Drugs like cardiotonics ,Diuretics,corticosteroids needs therapeutic monitoring with continuing the administration beyond therapeutic end point which leads into adverse reactions. • **Sudden withdrawal of drugs**: Therapy with drugs like corticosteroids and harmones can not be suddenly stopped. Such drugs therapy is gradually stopped by decreasing the dose. • **Bio-availability variations**: There are number of brands of the same drug which leads to variations in bio-availability of drugs. • **New potent drugs :** The ever increasing number of new potent drugs along with brands ,may cause hypersensitivity reactions in particular indiviuals. • **Drug interaction and drug food interaction**: This type of interaction occurs when two or more drugs or presence of food may inactivate or alter the absorption of drug results in inactivation. • **Some drug having narrow margin of safety**: Difference between therapeutic dose and toxic dose is very narrow in some drugs,e.g- .Digitalis if not prescribed carefully leads to its toxicity. • **Patient factors**: • **Age:** Young and old patients are more susceptible to adverse drug reactions as	

compare to the adults, because of pharmacokinetics pattern at this age.

- **Disease state**: Mainly patients with hepatic or renal disfunctioning are prone to adverse effect of drugs.
- **Discontinuation of therapy /treatment due to :**
- High cost of medicine.
- Lack of faith on physician. Noncompliance.

5. (d) Explain the pathophysiology of gastric ulcer. (3 marks)

-H. Pylori infection may lead to the development of gastritis, in which stomach lining becomes inflamed.

-The bacteria are carried through faeces and saliva and easily spread among people who live in unsanitary conditions.

-Any condition which decreases the quantity or quality of normal protective mucus barrier, leads to peptic ulcers.

-Long term use of aspirin and anti-inflammatory drugs like ibuprofen , may damage the linning of the stomach . Peptic ulcers increase due to smoking , alcohol and caffeine.

-Genetic factors lead to duodenal ulcers. -Half the patients with duodenal ulcer show gastric hyper secretion . It is due to increased parietal cell mass, excessive gastrin release during meals, high sensitivity to gastrin.

5. (e) What is Hospital formulary? Give guiding principles for preparation of Hospital Formulary.(1 Mark for Definition, 2 marks for guiding principles- any 4 points)

Hospital formulary- Hospital formulary is revised compilation of pharmaceutical preparations and ancillary drugs which reflects current clinical judgment of medical staff of the hospital.

Guiding principles for preparation of Hospital Formulary: (any 4 points)

The following principles will serve as guide to all those utilizing the formulary system:

1. The medical staff of the hospital shall appoint P and T Committee and outline its scope, purpose, organization and function.

		2. The formulary system will be sponsored by medical staff based upon recommendations of P and T Committee. 3. The medical staff shall adopt the written policies and procedures of the formulary system. 4. Drugs should be included in the formulary by their nonproprietary names and should be prescribed by the same name. 5. Limiting the number of drugs available from pharmacy can produce substantial patient care and financial benefits. These benefits can be greatly increased by using generic equivalents. Generic equivalent- The drugs containing identical active compounds.E.g Two brands of tetracycline. Therapeutic equivalent- The drugs differing in composition but having very similar pharmacological or therapeutic effects. E.g: two different antacid products. 6. The management of the hospital shall inform all the medical and nursing staff about the existence of the formulary system , procedures of the operation of the system and any changes in those preparations. Copies of formulary must be readily available at all times. 7. Provision shall be made for the use of drugs not included in the formulary, by the medical staff. 8. The pharmacist shall be responsible for specification as to quality, quantity, and source of supply of all the drugs used in the diagnosis and treatment of patients.	
5.	**(f)**	**Explain how purchase order is prepared. (3 marks)** 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.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. Seven copies of purchase order are prepared.	
6.		**Solve any FOUR questions:**	**16M**
	(a)	**Define drug interaction. Give various mechanism of drug interaction with an example of each. (Definition 1 mark, Any 3 mechanism- 1 mark each)** 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). **Pharmacokinetics interaction:** **A)Absorption alteration** Drug interaction may reduce the total amount of drug absorbed. This reduces the therapeutic acivity of the drug. Sometimes there is delayed absorption process and onset of action is prolonged. One oral drug may interfere with absorption of other drug in the G.I.T. by altering number of variables. **1.pH** :Non ionisable Drug (the more lipid soluble) and Acidic drug (low PH) is readily absorbed. If antacid is administered with acidic drug ,it will raise the PH of GI content and inhibits the absorption. The enteric coated Bisacodyl (oral dosage form of laxative) should not be given with antacid or milk because increase in PH and cause disintegration of drug in stomach. Causing vomitting and irritation. **2.Complexation** Avoid tetracycline, fluoroquinolones (ciprofloxacin, and norfloxaxin) with metal ions like Ca, Mg, Al, iron.to avoid complexation which are poorly absorbed. **3.Adsorption**:- Antidiarrhoel mixtures contain the adsorbent like kaolin which adsorb the	

other medications,if administer decreases the absorption of these drugs.

4.Change in GI motility:-

Drugs like cathartics increases GI motility decrease absorption of drugs.Anticholinergic drug decreases GI motility resulting in increased absorption of drugs

Barbiturates reduces absorption of other drugs – e.g.

1.The absorption of warfarin is inhibited by Hepatobarbitone.

2.Griseofulvin by Phenobarbitone .

5.Food :- The presence of Food in stomach reduces the absorption of Drugs by binding with it, or by changing the PH of GI contents it reduces The dissolution rate of drug. Absorption of antibiotics in presence of food. Hence penicillin and Tetracycline Derivatives should be given 1 hr before meal or 2 hrs after meal.

Some drug like Diazepam achieve higher serum level following food. Cimetidine needs slower absorption ,hence it is advantageous to take it with meal

6.Inhibition of GI Enzyme- :

Folic acid – phenytoin Interaction

Phenytoin inhibits the enzyme intestinal conjugate which is responsible for conversion of poorly absorbed form of folic acid i.e polyglutamate into readily absorbed form of folic acid .i.e monoglutamate.This results into deficiency of Folic acid (Anemia)

(B) Distribution alteration

Dispalcement from Receptor binding Sites:

Bound Drug	Displacing drug	Result
1. Tolbutamide	Salicylates Phenylbuatazone	Hypoglycemia
2.Warfarin	Salicylates Clofibrate	Haemorrhage
3.Thiopentone	Sulphonamides	Prolong anaesthesia
4.Methotrexate	Sulphonamides	Agranolocytasis

(C)Meatabolism alteration

a)Stimulation of metabolism

Drug	Inducing agent	Result
1. Tolbutamide	Alcohol, phenytoin Rifampicin	Decreased hypoglycemia
2.Warfarin	Barbiturates Glutethimide	Decreased anticoagulant effect
3.Oral contraceptive	Rifampicin	Pregnancy
4.Quinidine	Phenytoin, Barbiturates	Reduced Quinidine level.

b)Inhibition of Enzymes:

Drug	Inhibiting agent	Result
1. Phenytoin	Isonoiazide, Phenylbuzone Phenobarbitone	Phenytoin intoxication ecreased anticoagulant
2.Warfarin	Allopurinol Nortryptiline	effect
3. Tolbutamide	Phenylbutazone	Haemorrhage .
4.Barbiturates	MAO-inhibitors	Hypoglycemia
		Prolong sedation

(**D) Excretion alteration**

a) Changes in urinary pH:

Urinary acidifiers	**Drugs whose excretion is enhanced in Acidic urine**

Ascorbic acid, PAS, Ammonium chloride, Calcium chloride, Phenylbutazone	Amphetamine, Fenfluramine, Quinidine, Pethodine, Procainamide

Urinary alkalinisers	**Drugs whose excretion is enhanced inurine**
Ascorbic acid, PAS, Ammonium chloride, Calcium chloride, Phenylbutazone	Amphetamine, Fenfluramine, Quinidine, Pethodine, Procainamide

b) Interference with urinary excretion:

Primary drug	Competing drug	Result
Indomethacin	Probenecid	Indomethacin toxicity
Salicylate	Probenecid	Salicylate toxicity
PAS	Probenecid	PAS toxicity
Digoxin	Spironolactone	Increased plasma digoxin level
Chlorpropamide	Phenylbutazone	Hypoglycemia
Methotrexate	Salicylates Sulphonamide	Bone- marrow suppresion

B)Pharmacodynamic drug interaction

This involves interaction between the drug or drug effects or interaction at receptor level.This may enhance or inhibit the total effect.

1)Interaction enhancing effect :-e.g. Synergistic effect of Trimethoprim and

		sulphamethoxazole. MAOI and sympathomimetic drugs which increses activity. **2)Inetraction inhibiting the effect**:- E.g ACH and atropine by competitive antagonism oppose the action of each other. Alcohol and amphetamine have opposite effects on CNS. **C)Miscellaneous Drug interaction :** **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. **Interaction with additives:-**Additives like CMC ,gelatin increases the viscosity around the drug particle hence decreases drug dissolution. **Drug interactions at receptor sites:** **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. **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 (Adenosine MonoPhosphate)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.	
6.	**(b)**	**How do pharmaceutical factors affects bioavailability. (any 2 – 2marks each)** **1.Dosage form** : Dosage form of a drug can affect bioavailability of the drug. It is dependent upon the particle size of the dosage form. Solutions have more bioavailability than powders, because solutions have less particle size powders. Same is the situation with tablets..Powders have more bioavailability or dissolution in body fluids than tablets, because tablets have large particle size than powder. The The bioavailability of drugs from a dosage form is general	

		show Solution >suspension>powder> capsules>Tablets.Small particle size is important for absorption of some drugs like Corticosteroids, antibiotics like Chloramphenicol and griseofulvin. **2.Manufacturing variables in formulation.** In manufacturing compression force may affect bioavailability from a given dosage form e.g addition of lubricants are generally hydrophobic in nature reduce wetting of the drug particles.This reduces rate of disintegration and affects bioavilability of drugs. For formulation of pharmaceuticals,different additives like starch, lactose ,gums ,calcium phosphate are used. These additives greatly affect bioavailability of certain drugs, e.g. Phenytoin ,digoxin ,levodopa and warfarin. Some excipients like wetting agents like lactose and polysorbate 80,enhance bioavailability of some drugs, by penetration of solvent. Excipients may interact with the drug and may affect bioavailability of the drug. **3.Dissolution Rate :** which is the rate at which the drug goes into solution. Particularly for tablet and capsule forms, of such type of drug bioavailability is measured. The drug that has less dissolution rate has more bioavailability.	
6.	**(c)**	**What is Teratogenicity**? **Explain in 10 lines with its effects.(Definition- 1 mark, Explanation-3 marks)** **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 are- 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.

6 (d) Explain the principle and working of an "Autoclave."(Principle, Working- 2 marks each)

Principle involved in Autoclaving:

Autoclave is used to carry out steam sterilization. It works on the principle of utilization of saturated steam under pressure. The steam has more penetrating power and thermal capacity than dry heat. Saturated steam under pressure causes coagulation of cell protein leading to the destruction of microorganisms. The steam penetrates in the spores and capsules of bacteria, ruptures it and escape the protoplasm which is coagulated.

Working:

A sufficient quantity of water is poured into the chamber after removing the perforated chamber.The level of the water is adjusted in such a way that it does touch the bottom of the perforated chamber.The material is packed in the perforated chamber.the lid is then closed with wing nuts and bolts.

The autoclave is switch on to heat the water.The vent is opened and safety valve is set at the required pressure.When steam starts coming out from the vent and it continues for 5 minutes,it is then closed.It indicates that air has been removed.The steam pressure starts raising and it comes to the desired pressure 15lbs/sq.inch with corresponding temperature 121^{o}C.After stated period switch off the autoclave.Allow it to cool to about 40^{o}C before opening the vent.When whole of the steam inside the autocalve is removed, the lid is opened and the sterilized material is taken out.

6. (e) What are the sign and symptoms of Rheumatoid Arthritis? (4 marks)

Sign and symptoms. Fatigue, anorexia, weight loss and fever

- Inflammation of peripheral joints, most frequently the small joints of hand and feet,

		and the writs, larger joints may also be involved. • Morning stiffness is a common symptom. The stiffness generally lasts more than 30 minutes and may last for many hours. • Chronic inflammation of joints results in erosion at the margins of the bones. • Deformities may develop, mainly of the fingers and neck etc. Joints may alkaolysed with complete loss of motion. • Around 20- 30 % patients show formation of rheumatoid nodules. They occur commonly in the elbow or along the extensor surface of forearm. • Inflammation of organs than joints like heart, lungs, eyes, may also occur.	
6.	**(f)**	**Classify Poisons. What are the steps involved in general treatment of poisoning ?** **Classification- (3 marks)** Depending upon mechanism of action of poison, these are classified as • **Corrosives**-(any one example) a) Strong acids- sulphuric acid, nitric acid, hydrochloric acid b) Organic acids- oxalic acid , carbolic acid c) Concentrated alkalies- caustic potash, caustic soda, carbonates of sodium, calcium and potassium 2**) Irritants**- (any one example) a) Inorganic: 1. Non- metallic- Phosphorous, chlorine , bromine, Iodine 2. Metallic- Lead, Mercury, copper, zinc, arsenic , manganese b) Organic: 1. Animal origin- Snake, scorpion, Insects, Cantherides 2. Vegetable origin- Ergot aloe, capsicum, castor oil seeds etc. c) Mechanical- Powdered glass 3**) Neurotics**-(any one example) a) Cerebral poison- opium , sedatives and hypnotics, insecticides, cocaine and hyoscyamus b) Spinal poisons- Nux vomica c) Peripheral poisons- curare alkaloids, conium 4) **Cardiac**- (any one example) e.g. Digitalis , stropanthus, aconite, tobacco 5) **Pulmonary depressants**- Substances acting on lungs e.g. Gases such as carbonmonooxide, coal gas	

		6) **Miscellaneous**- Analgesics, antipyretics, stimulants, antidepressants, antihistamines, hallucinogens. **Following are the 5 basic steps in general treatment of poisoning.(1mark)** 1.To remove the unabsorbed poison from the body 2.To use the antidotes. 3.To excrete absorbed poison 4.To treat the general symptoms of the victim 5.To maintain the victims general condition.	