



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 anyequivalent 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		Solve any <u>EIGHT</u>: (2marks each)	16M
1	a)	Define following : (1 mark each) i) Hospital pharmacy: It is service department of hospital which receives drugs and supplies, stores, dispenses them to inpatients and outpatients under supervision of legally qualified registered pharmacist. ii) Bioequivalence: A product is considered bioequivalent if its rate and extent of systemic absorption does not show a significant difference from the pioneer drug product when administered at same dose of active ingredient by the same route and under the same experimental conditions.	2M
1	b)	What is unit dose dispensing? Give any two benefits of unit dose dispensing. Unit dose dispensing- (1mark) Those medications which are ordered, packed, handled, administered and charged in the form of multiples of single dose unit containing a predetermined amount of drug sufficient for one regular use of application is called Unit dose dispensing. Benefits: (any two) (1 mark) 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 receive 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 labelling error. 9. Drug accounting become easier. 10. Better financial control means credits are eliminated.	2M
1	c)	Give administrative pattern of central sterile service. Department under pharmacy control Department under nursing control Department under dual control of pharmacy & nursing	2M



1	d)	Classify adverse drug reaction. Classification of ADRs: A) Predictable ADRs: 1. Excessive Pharmacological effect. 2. Secondary Pharmacological Effects. 3. Rebound response on discontinuation. B) Unpredictable ADRs: 1. Allergic drug reaction and Anaphylaxis. 2. Idiosyncrasy. 3. Genetically determined Toxicities. 4. Toxicity following drug withdrawal.	2M
1	e)	What do you mean by (any two) (1 mark each) i) Sialogogue: Agents that increases the secretion of saliva. ii) Carminatives: Agent that helps to expel the gases from GI tract. iii) Mydriatics : Agents that cause dilation of the pupil.	2M
1	f)	Translate following terms into English (any four) (½ mark each) i) Folium : leaf ii) Octarius : eight iii) Bini : two each iv) Bis : Twice v) Semis : half	2M
1	g)	i) What is reorder point? (1 mark) The reordering time must closely coincide with the consumer demand and minimize the amt of inventory investment. It means to establish stock levels at which new order must be placed. The stock levels are called reorder points. Reorder point = (usage rate * lead time) + safety stock ii) What is outpatient? (1 mark) Outpatient means the patient who does not occupy bed in the hospital and is offered consultation, diagnosis and receives treatment. OR An outpatient may receive general or emergency treatment which could be diagnostic, therapeutic or preventive without being admitted in the hospital.	2M



1	<p>h) Explain (any two): (1 mark each)</p> <p>i) Ryle's tube: It is a simple rubber tubing which is passed through the nose or mouth through oesophagus into the stomach.</p> <p>USES : (any 1 use)</p> <p>1.It helps in aspirating the fluid accumulated in the stomach, keeps down the distension of abdomen, guarantees an aestheticians an empty stomach before operation,</p> <p>2.It helps nurses in administration of drugs or liquid diet, avoids pain of swallowing in diseased patients,</p> <p>3.It helps physicians to remove swallowed poison and to wash the stomach.</p> <p>ii)Anaphylaxis: It is the most serious type of drug allergic reactions. It is generally due to the immunoglobulin E. Anaphylactic reactions are shown by Penicillin, anaesthetics, dextran, iodine containing compound. Allergy response may be generalized or localized. Generalized anaphylaxis is characterized by bronchospasm, circulatory collapse, with hypotension and sometimes skin rash. If it is localized to gut, shows abdominal pain.</p> <p>(iii) Idiosyncrasy- The term idiosyncrasy (Greek idios means 'one's own and synkrasis, a mixture together') is used to denote abnormal drug response. Idiosyncrasy covers unusual, bizarre or unexpected drug effects which cannot be explained or predicted in individual recipients. It also includes drug induced foetal abnormalities, e.g. phocomelia which developed in the offsprings of mothers exposed to thalidomide</p>	2M
1	<p>i) Give any four functions of PTC. (any 4 functions – ½ mark each)</p> <p>1) To advise the medical staff and hospital administration in matters related to the use of drugs</p> <p>2) To establish and develop suitable educational schemes to improve the professional staff on the matters related to the use of drugs.</p> <p>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.</p> <p>4) To study problems related to the distribution and administration of drugs used in hospital.</p> <p>5) To review adverse drug interaction occurring in hospital.</p> <p>6) To initiate and promote studies on drug use and review the results of such studies.</p> <p>7) To recommend about the drugs to be stocked in hospital patient care areas.</p> <p>8) To advise the pharmacy in the implementation of effective drug distribution and control procedures.</p>	2M



1	j)	Give the normal values of following (any two): (1 mark each) i) Cholesterol : 150-240 mg/dL or mg % ii) Sperm count : 60 -150 millions/ml of seminal fluid iii) Blood sugar :70-110 mg/100ml or mg%	2M												
1	k)	What advice must be given to the patient while using (any two) : (1 mark each) i) Tetracycline- Do not take this medication with milk or antacid. ii) Boric acid: Contraindicated in children under 12 years old. Not for internal use. iii) MAO inhibitors: Avoid cheese, chocolate, alcoholic beverages and liver or yeast extract.	2M												
1	l)	Write about the requirement of pharmacists in the Hospital. Requirement of the Pharmacist as per the bed requirement: <table border="1" data-bbox="290 931 1366 1272"><thead><tr><th>Bed strength</th><th>Number of Pharmacist required</th></tr></thead><tbody><tr><td>Upto 50 beds</td><td>3</td></tr><tr><td>Upto 100beds</td><td>5</td></tr><tr><td>Upto 200 beds</td><td>8</td></tr><tr><td>Upto 300 beds</td><td>10</td></tr><tr><td>Upto 500beds</td><td>15</td></tr></tbody></table>	Bed strength	Number of Pharmacist required	Upto 50 beds	3	Upto 100beds	5	Upto 200 beds	8	Upto 300 beds	10	Upto 500beds	15	2M
Bed strength	Number of Pharmacist required														
Upto 50 beds	3														
Upto 100beds	5														
Upto 200 beds	8														
Upto 300 beds	10														
Upto 500beds	15														
2		Solve any four of the following : (3 marks each)	12M												
2	a)	Define Hospital .Classify hospital on the basis of ownership and control. (1 mark for definition 2 marks for classification) It is the complex organization utilizing combination of specialized scientific equipments and functioning through a group of trained people educated to a problem of modern medical science and maintenance of good health. OR The hospital is defined as the ‘an institution of community health. ’Its function embrace the entire spectrum of medical care prevention, diagnosis, therapy, rehabilitation, education and research. Classification of hospitals on the basis of ownership and control. a) <u>Controlled by the Central government</u> - Military hospital - Railway hospital - All India Institute of Medical sciences, New Delhi.	3 M												



-JIPMER

b) Controlled by the State government

- J.J. Hospital- Mumbai
- Sassoon hospital-Pune
- Ghati hospital- Aurangabad
- ESIS Hospital- Mulund
- Victoria hospital- Bengaluru
- Stanley hospital- Chennai
- Civil hospital- Jalgaon

c) Controlled by the Corporation/Municipality

- BMC Hospital-Sion,Mumbai
- KEM Hospital- Parel, Mumbai
- Cooper hospital- Vile Parle, Mumbai
- Bhagwati hospital-Mumbai.

d) Private Trust hospital

- Bombay hospital-Marine lines , Mumbai
- Jaslok hospital- Mumbai
- Rajsthan hospital- Ahmadabad
- Jindal hospital- Bengaluru

e) Run by religious bodies

- Hindu mission hospital- Chennai
- Al-Ameen Hospital- Bengalaluru
- Christian Medical college hospital – Vellore
- Minakshi Mission Hospital- Madurai.

f) Public Limited Company hospitals

- Fortis Hospital-Bengaluru
- Apollo Hospital- Chennai
- Medinova Hospital- Gujarat
- HMT Hospital- Hyderabad.

g) Private clinics/Nursing homes

Such clinics are owned by an individual doctor or a group of doctors in towns or big cities and serve for 24 hrs.



2	<p>b) Write a short note on : (1 ½ mark each)</p> <p>a)DIB (Drug information Bulletin): The drug Information Centre may publish a journal or periodical or any booklet about current or amendment information on drugs, Various technical aspects and modernization of hospital practices for all the health professional which is referred as “Drug information Bulletin”</p> <p>Importance of DIB- (any 2)</p> <ol style="list-style-type: none">1. To provide current information to physician, pharmacist, nursing staff and fellow candidates of all disciplines through bulletin in shortest possible time.2. It is a link between the DIC and health professional3. It helps hospital staffs regarding recent researches in medical science, pharmacokinetics, pharmacodynamics, adverse effect, drug interaction.4. It may give abstract service for new drug development.5. It gives detail analysis of drug information to the physician.6. It also publishes matter in question –answer session /column in the bulletin. <p>b) <u>Angina Pectoris</u> Angina pectoris is a most frequent symptom of ischemic heart disease & results from a temporary relative imbalance of oxygen demand & supply in the heart.</p> <p><u>Pathophysiology</u></p> <p>In angina there is temporary relative imbalance of oxygen demand & supply in the heart. The oxygen consumption of myocardium increases with increased heart size, heart rate, Myocardial contractility. The primary cause of Angina pectoris is supposed to be arteriosclerosis of large coronary arteries, ulceration, and haemorrhage of coronary arteries. It may also result from reduced oxygen content of the coronary blood as in anaemia, anoxia or smoking. It may be due to increased demand as in fever, thyrotoxicosis.</p> <p><u>Signs and symptoms</u></p> <p>Most patients with angina complain of chest discomfort rather than actual pain: the discomfort is usually described as a pressure, heaviness, tightness, and squeezing, burning, or choking sensation. The duration of attack of anginal pain can be from 30 sec to 45 minutes.</p>	3M
2	<p>c) Write in brief about bed side pharmacy.</p> <p>Hospital pharmacy is becoming increasingly patient oriented now a day. Hence Pharmacist must work in close association with the nursing and medical staff. Personally each pharmacist in the hospital should visit the wards, go to each patient’s bed side and discuss with them regarding the illness and drugs they take. This is called as Bed Side pharmacy.</p>	3M



	<p>Characterstics of bed side pharmacy:</p> <ol style="list-style-type: none">1.The pharmacist builds an inter-professional team of the physicians, nurses and pharmacists.2.Ward visit:-Once a day, pharmacist visits the wards and enquires about the progress of health etc.3 Pharmacist collects medication history of each patient during the ward visits.4.Pharmacist interacts with the physicians about medicines and with nurses regarding storage, handling and safe use of the medicines.5. Pharmacists are knowledgeable about drug food reactions, allergies, side effects and adverse reactions of drugs.6. Pharmacists counsel the patients regarding their food habits and ways of administration of drug.7.Pharmacists guide the patient about the treatment to be continued after discharge and how the drugs should be stored at home to avoid its degradation.8. Lifesaving medications like Nitroglycerine tablet is kept at bed- side, if ordered by physician.	
2	<p>d) Explain with examples food – drug interaction. (at least 6 examples) (½ mark each)</p> <p>Food affects the absorption of the drug. It may be attributed to</p> <ol style="list-style-type: none">1) Dilution of the drug2) Adsorption or complexation of drug3) The alteration of gastric emptying. <p>Examples:</p> <ol style="list-style-type: none">1) Food reduces the absorption of aspirin, isoniazid, tetracyclines, benzympenicillin, amoxicillin, Ampicillin, levodopa and Rifampicin2) Food increases the absorption of hydralazine, nitrofurantoin, lithium citrate, riboflavin, carbamazepine, metoprolol, propranolol, spironolactone,3) Iron absorption is reduced if food has been taken within the previous two hours. On the other hand, nausea is more likely if iron is taken on empty stomach so iron tablets are often given with food.4) Nitrofurantoin is given with food to avoid GIT irritation.5) Meals containing high fat increase the absorption of fat soluble drug Griseofulvin.6) The diuretic effect of tea takes place rapidly if given before meals but diuresis is delayed if it is given after food.7) The absorption of nitrazepam, glibenclamide, metronidazole, oxazepam, theopylline is	3M



		<p>unchanged by food.</p> <p>8) Monoamine oxidase (MAO) is an enzyme which breaks down catecholamines such as norepinephrine. When the enzyme is inhibited, there are increased levels of norepinephrine in adrenergic neurons. Thus, MAO inhibitors are used as antihypertensive. Certain food like chees, chocolate, alcoholic beverages, liver, yeast extract contain tyramine. Tyramine is metabolized by MAO. When the patients being treated by MAO inhibitors also take tyramine containing food, tyramine reaches the systemic circulation causing severe hypertension.</p> <p>9) Milk reduces absorption of tetracycline by forming an insoluble complex.</p>	
2	e)	<p>Explain how purchase order is prepared and distributed.</p> <p>Purchasing officer prepare purchase order on the basis of purchase request form received from respective department and scrutinizes the quotations received. He checks the quantity to be supplied in consultation with pharmacist and prepare purchase order form.</p> <p>Seven copies of purchase order are prepared and distributed to</p> <p>First copy-it is sending by post or by hand to supplier.</p> <p>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.</p> <p>Third copy-It is kept with purchasing officer as department file. This copy served as source of information.</p> <p>Fourth copy-It is kept with Hospital pharmacy dept. This copy is compared with purchase request form for accuracy.</p> <p>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.</p> <p>Seventh copy- This copy is known as history copy. It is kept by purchasing department.</p>	3M
2.	f)	<p>Write guiding principles while using hospital formulary (any 6 points) (½ mark each)</p> <p>The following principles will serve as guide to all those utilizing the formulary system:</p> <ol style="list-style-type: none">1. The medical staff of the hospital shall appoint Pharmacy and Therapeutic Committee (PTC) and outline its scope, purpose, organization and function.2. The formulary system will be sponsored by medical staff based upon recommendations of PTC.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.	3M



	<p>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.</p> <p>Generic equivalent- The drugs containing identical active compounds. E.g Two brands of tetracycline.</p> <p>Therapeutic equivalent- The drugs differing in composition but having very similar pharmacological or therapeutic effects. E.g.: two different antacid products.</p> <p>6. The management of the hospital shall inform all the medical and nursing staff about the existence of hospital formulary.</p> <p>7. Provision shall be made for the use of drugs not included in the formulary, by the medical staff.</p> <p>8. The pharmacist shall be responsible for specifications as to quality, quantity, and source of supply of all the drugs used in the diagnosis and treatment of patients.</p>	
3	SOLVE ANY <u>FOUR</u> OF THE FOLLOWING.	12M
3	<p>a) Define clinical pharmacy and describe the scope of clinical pharmacy. (1mark for definition and 2 marks for any 4 points)</p> <p>Definition of Clinical pharmacy – Clinical pharmacy is a new-born discipline that carries traditional hospital pharmacist from his product oriented approach to more healthier patient oriented approach, so as to ensure maximum well-being of the patient while on drug therapy.</p> <p style="text-align: center;">OR</p> <p>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.</p> <p>Scope of clinical pharmacy— (any 4 points)</p> <p>1. Medication history- it includes past and present of prescription and non – prescription drug, dietary supplements, dietary habits, drug and estimate of patient compliance with the drug therapy.</p> <p>2. Monitoring drug therapy- it includes evaluation of patient pharmacokinetics and pharmacodynamics parameters, lab. Findings, medical problems and communicating relevant findings to physician.</p> <p>3. Participation in ward rounds- The clinical pharmacist with physicians should participate in ward rounds, observe individual patient and decide the drug therapy.</p> <p>4. Drug information- The clinical pharmacist establish drug information center. The drug info. Is available at this centre and utilized suitably. This data is send to physician as per their</p>	3M



3	c) Explain the role of PTC in drug safety. Role of PTC in Drug safety - Drug safety is one of the major responsibilities 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 guidelines are provided 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.	3M
3	d) i) Give basis for selection of non charged floor stock drugs. ii) Discuss location of central service room. i) Give basis for selection of non charged floor stock drugs. (1 ½ marks each) Non charged floor stock drugs are selected on the basis of following criteria by PTC: i) Cost of drug ii) Frequency of use of drug iii) Quantity of drug used iv) The Effect on hospital budget. ii) Discuss location of central service room. (1 ½ marks each) It should be centrally located in the hospital or near a place where bulk of the supplies are required as operation theatres which contributes about 75% of work of this department. It should be near from the departments from which it receives the material and which are its largest consumers. The stores and laundry should be very near. The location should include space and layout for mass production technique.	3M



3	e) What is patient's compliance? Discuss the factors contributing to non compliance. (1 mark for patient compliance and 2 marks for any 4 factors) Patient's compliance- A faithful adherence by a patient to prescriber's instructions is called as patient's compliance. Factors contributing to non compliance- (Any 4 factors) 1. Inappropriate packaging: Some time design or size of container makes difficulty to remove the medicament. Many elderly patients, arthritis patients have difficulty with unit dose pack or foil wrapping while removing medicament. 2. Poor understanding: Poorly hand written label are difficult to read or follow for the patient/pharmacist. Many prescriptions 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 convince 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 drug, poor patients are unable to purchase such drugs. 7. Frequency of medication: Higher the frequency of the medicines, the greater is risk of non-compliance. Many times regular schedule of dosage form cannot be followed due to work routine. 8. Duration of therapy: Usually long duration treatment leads to patient non compliance. 9. Illness: The nature of patient's illness may contribute to non compliance like chronic hypertension, mental illness.	3M
3	f) Explain term bandages. Write in short about "Plaster of Paris" bandage. (1 mark for bandage and 2 marks for plaster of Paris) Bandages- Bandages are surgical dressings with continuous length without joints and having closed edges. These are protective coverings and hold the surgical dressings in a proper place and provide support and pressure. <u>"Plaster of Paris" bandage-</u> It is a cotton cloth of plain weave impregnated with dried calcium sulphate and suitable adhesives so that calcium sulphate remains adherent to the fabric.	3M



		<p>Content of calcium sulphate- Not less than 85%</p> <p>Packaging- It should be enclosed in containers which prevents access of moisture and damage by pressure.</p> <p>Uses-</p> <ol style="list-style-type: none">1. It is used for immobilization splinting of fractures and for construction of body support.2. In orthopaedic surgery it is used for immobilization, support and correction of fractures.	
4		SOLVE ANY <u>FOUR</u> OF THE FOLLOWING	12M
4	a)	<p>Write note on : (1 ½ marks each)</p> <p>i) Pre-packaging ii) Satellite pharmacy</p> <p>i) Pre-packaging-</p> <p>Pre-packaging increases the standard of pharmacy practiced of hospital. It is suitable for fastest moving items whose demand is very high and also for those items which takes long time for compounding and packaging. It offers convenience and is labour saving and time saving. The following factors should be considered while pre-packaging-</p> <ul style="list-style-type: none">• Demand and turnover of the items• Availability of containers.• The labelling to be done.• The process of packaging.• The stability of items.• Cost of pre-packaging. <p>It is useful for IPD & OPD. The size of pre-packaging is decided by consultation with the pharmacy, medical and nursing staff. The data for prepackaging of various dosage forms and therapeutic agents is obtained from Hospital formulary. In OPD the size of prepackaging is decided by call cycle of patient. But there is major drawback of prepackaging that the patient is taken off the drug that has been pre-packaged the remaining quantity will sheer waste. Pre-packaging operation is carried out either by pharmacist or under his direct supervision.</p> <p>i) Satellite Pharmacy -</p> <p>Satellite pharmacy services are the sub- pharmacies which receive their supplies from main pharmacy. In hospital, where the main sections of pharmacy such as storing, manufacturing, dispensing are separated from each other it is advisable to develop satellite pharmacies at the</p>	3M



	<p>nursing station.</p> <p>Location: Satellite pharmacies are located on each floor of the hospital. This concept is being adopted in very big hospitals which have multistoreyed separate buildings in single premises.</p> <p>Advantages: (any 2)</p> <ol style="list-style-type: none">1. Availability of pharmacist to the patient and nursing for counselling.2. Pharmacist at nursing station take patient drug history and monitor patient for drug reaction3. Drug distributed efficiently.4. Drug distribution time can be reduced.5. No error in drug distribution.	
4	<p>b) Explain in brief manufacturing of suppositories by moulding method.</p> <p>Moulding method-</p> <p>This method is commonly used. The base material is melted and the required amount of medicament is dissolved or suspended in it. Then the melt is poured into a mould and allowed to cool to form the suppositories. Remove the suppositories.</p> <p>Generally moulds are made up of stainless steel, aluminium, brass and plastic. In the machine moulding process, the operation of pouring, cooling and removal from moulds are carried out on an automated machine. The output of rotary machine is about 3000-6000 suppositories per hour.</p> <p>Lubrication of Moulds-</p> <p>For the easy removal of the suppositories from the mould lubrication is necessary. It is done by use of mineral oils.</p> <p>Calibration of moulds-</p> <p>Calibration of moulds with the base is necessary for all moulds to determine the exact capacity of particular mould. Displacement value is used for calculating the quantities.</p>	3M
4	<p>c) Explain the factors influencing make or buy decision in hospital.</p> <p>Following factors affect make or buy decision in hospital manufacturing:</p> <ol style="list-style-type: none">1. Quality2. Quantity3. Costand 4. Service. <p>1) QUALITY-</p> <p>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?</p>	3M



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

d)

Differentiate between drug addiction and drug habituation. (any 6 points)

3M

Drug Addiction	Drug Habituation
1. It is a state of periodic or chronic intoxication produced by repeated administration of drug.	1.It is a condition resulting from Repeated administration of drug.
2.It is accompanied with physical and psychological dependence	2.It is accompanied with psychological dependence only
3.Tolerance is developed	3.Tolerance is not developed
4.Tendency to increase the dose	4.No Tendency to increase the dose
5. Withdrawal symptoms are severe and require medical treatment.	5. Withdrawal symptoms are not severe and are very less.
6.Person shows compulsion to take the drug	6.Person has strong desire but not compulsion to take the drug.



		7.Detrimental effect on both person and society	7.No Detrimental effect on society.		
		e.g-Morphine, alcohol	e.g.- Tea, coffee		
4	e)	Explain the role of computers in purchase and inventory control in hospital. Purchasing & inventory control in Hospitals – By using computers it is done by- 1. Periodic inventory control method- in this method quantity of drug available in stock are manually checked. These are then compared with the minimum stock level & maximum stock level maintained on the computer. When the drug level reaches the minimum stock level purchase orders are placed by using computer. 2. Perpetual inventory control method - in this method computer maintains running balance of all the drugs in stock. All the drugs are entered in database when new stock is received by pharmacy. Computer adds this to the initial stock & reflects current available stock. The quantities of drugs leaving the pharmacy are entered in the computer. Computer subtracts this from the initial stock & reflects current available stock. Whenever the drug level reaches the minimum stock level purchase orders are placed by using computer. Thus, the computer can list out minimum order quantity of each drug. In this way computer can help in inventory control- <ul style="list-style-type: none">- To detect the items those have reached minimum order level.- To prepare the list of drugs to be ordered and their quantities.- To prepare the purchase order and avoid duplicate orders.- Keeping the inventory records for accounting aspects, audit inspections and legal requirements.- For automatic updating of price- For evaluation of demand.- To detect infrequently purchased items for possible return of elimination from pharmacy's drug supply.			3M
4	f)	Define surgical dressings. Describe any two tests to be performed to evaluate absorbent cotton wool I.P.(1 mark for definition, 2 marks for any 2 tests) Surgical dressings - Surgical dressings are the materials which are used for the dressing of wounds as coverings, absorbents, protective or supports for injured or diseased tissues. Tests for evaluation of Absorbent cotton IP –			3M

**Evaluation of Absorbent Cotton Wool I.P.: (any 2 tests – 1 mark each)****1. Identification test:**

- (a) When treated with iodinated Zinc Chloride solution, the fibres become violet.
- (b) Microscopic examination shows the length of each fibre to be up to 4 cm and the width up to 40 μ m, the shape being flattened tube with thick rounded matter, and twisted. Only occasionally one foreign fibre is observed.

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 : To check % w/w of volatile & moisture substances.

Not more than 8.0 % w/w

11. Fluorescence Test-

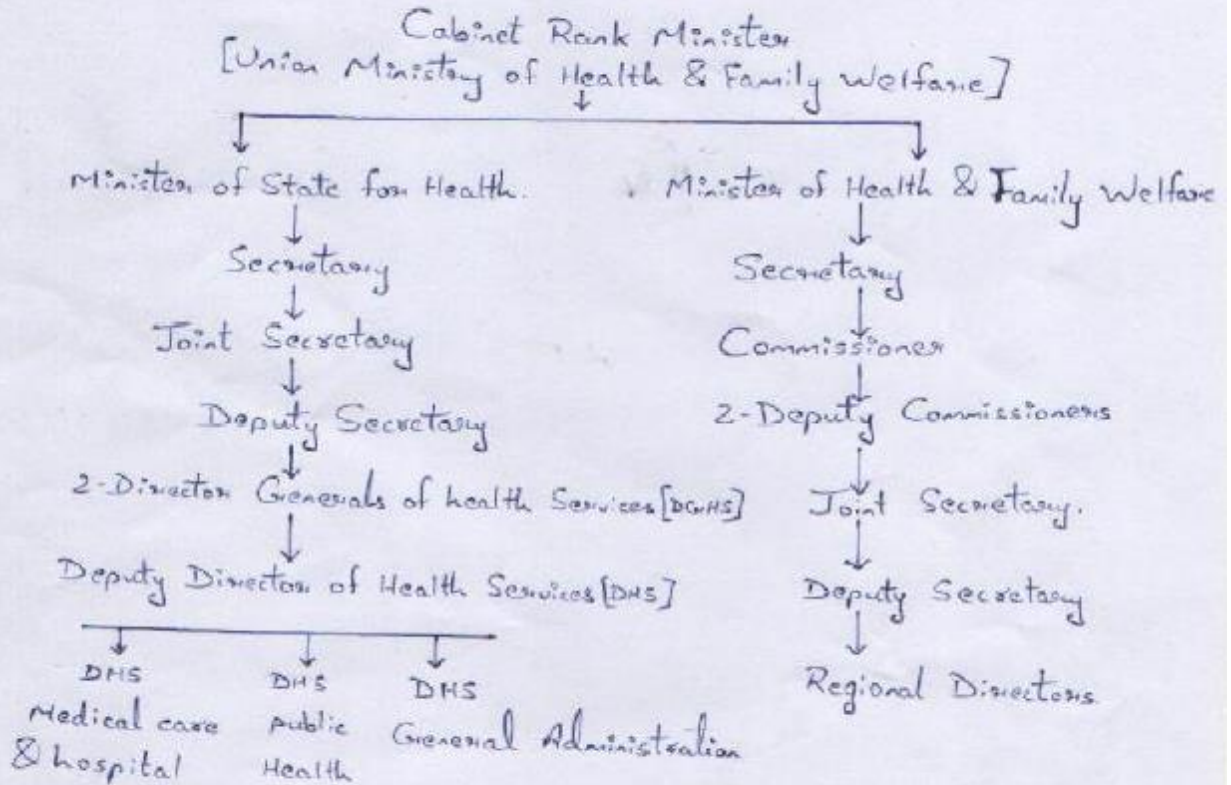
A 5mm thickness layer examine under 365 nm u.v. lamp. It shows only a slight brownish violet fluorescence & few yellow particals. Not more than few fibers show an intense blue fluorescence.



5		Solve any four of the following:	12M
5	a)	Define drug abuse. How the drug abuse is treated? (1 mark definition, 2 marks for treatment) Drug abuse: It is an inappropriate and persistent use of drugs beyond medical need. 1) Detoxification: It refers to freeing of the body from adverse effects of drug, and medical treatment of various withdrawal symptoms. It is usually done by hospitalization of the patient. It usually takes 10-21 days and can be done on outpatient basis of by admitting the patient depending upon the severity of the problem. 2) Rehabilitation: This is a part of long-term treatment for those patients who require moral support and psychotherapy, particularly victims of narcotics of alcohol. Self-help groups like Alcohol Anonymous, Narcotics Anonymous may help. 3) Government support: It is not a part of direct treatment but by controlling the traffic of narcotics under Narcotic and Psychotropic Substances Act, govt. can stop the population from being addicted.	3M
5	b)	Explain health delivery system in India at Central government level. In the central government there is “Union Ministry of Health and Family Welfare” which formulates and plans the overall health schemes. It also offers financial assistance to the state governments. The following chart explains the organization of health delivery system at central government level.	3M



Health Delivery system in India:



5 c) Define surgical instruments. Write the use of (1 mark for definition and 1 mark each for use of following)

i) Nelson scissors ii) Allis tissue forcep

Surgical instruments are those instruments which are used for surgical operations.

- i) **Nelson scissors** is used for thoracic surgery.
- ii) **Allis tissue forcep:** It is used to hold thinner structures like stomach, small intestine, rectus sheath and fibrous tissue. Because of the special structure of the teeth of the forceps, it is useful for holding the bowel at the time of anastomosis.

3M

5 d) Write the functions of hospital pharmacy. (any 6 functions) (½ mark each)

Functions-

1. Dispensing of drugs, chemicals and pharmaceutical supplies.
2. Dispensing of all narcotic drugs, alcohol & maintaining running stock account of the same.
3. Filling and labelling of all drug containers.

3M



		<ol style="list-style-type: none">4. Inspection of all pharmaceutical supplies.5. To maintain satisfactory system of record and book keeping of all products available in hospital pharmacy.6. To maintain stock of approved drugs.7. To maintain adequate control over dispensing of all drugs.8. To maintain correct specification of drugs.9. To maintain correct costing of drug.10. To prepare large volume parenterals & other parenteral preparations & to maintain aseptic condition while manufacturing.11. To check quality of manufactured product.12. To give information concerning to medicines to physicians, interns & nurses.13. To prepare periodic & annual report about working of Hospital pharmacy.14. To implement decisions of PTC.15. To implement programme of education for pharmacist, nurses and interns.	
5	e)	<p>What do you mean by differential leucocyte count? Give its importance.</p> <p>Differential leucocyte count is the percentage of each type of WBC i.e. neutrophils, eosinophils, basophils, lymphocytes and monocytes in our blood. (1 mark)</p> <p>Importance: (2 marks)</p> <p>Increase in neutrophil count is observed in bacterial infections, inflammatory lesions, intoxication and urinary tract infections.</p> <p>Increase in eosinophil count indicates allergic conditions, presence of intestinal parasites and skin diseases. Decrease in eosinophils occurs in injury, burns and release of adrenocortical hormone.</p> <p>Increase in basophil count is observed in granulocytic leukemia.</p> <p>Increase in lymphocyte count is observed in children with bacterial and viral infections and very high count is observed in whooping cough and leukemia.</p> <p>Increase in monocyte count is observed in bacterial infections like TB and in malaria.</p>	3M
5	f)	<p>Give the mechanism of interaction for the following combination. (1 mark each)</p> <ol style="list-style-type: none">i) Folic acid and phenytoin: Phenytoin inhibits the intestinal conjugase enzyme and prevent the conversion of polyglutamate form of folic acid to monoglutamate form of folic acid, leading to decreased absorption of folic acid so it will lead to folate deficiency (Anaemia).ii) Diuretics and antidiabetic agent: Diuretics elevate blood sugar level. If diuretics are combined with insulin or oral hypoglycemic agents, the effect of antidiabetic agents is	3M



		suppressed and dose adjustment is required. iii) Alcohol-Disulfiram- Disulfiram inhibits the metabolism of alcohol which produces nontoxic end products with unpleasant reactions (flushing, fast heart beats, nausea, thirst, chest pain, vertigo, decreased B.P)	
6		Solve any four of the following	16M
6	a)	Explain the abilities required for a hospital pharmacist. (any 4 abilities) (1mark each) The hospital pharmacist should possess 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 pathophysiology, therapeutics and patient care techniques. 3.Manufacturing ability- Hospital pharmacist must be able to develop formulations not available commercially. Hospital pharmacist should possess an adequate understanding of the principles involved in formulations and preparation 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.	4M



6	<p>b) What is tuberculosis? Write its pathophysiology, signs and symptoms. (½ mark for TB, pathophysiology 1 ½ mark, and signs and symptoms 2 marks)</p> <p>Tuberculosis is infectious disease caused by several species of Mycobacterium tuberculosis</p> <p>Pathophysiology :</p> <p>The bacillus that causes TB is tiny rod shaped germ. These germs are protected by an outer layer of wax which prevents the normal defence 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.</p> <p>Tuberculosis is spread through the air, when people who have the disease cough, sneeze, or spit. When the germs are entered into the lungs, the body defence, 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 which could lead to chronic to military T.B.</p> <p>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 interferes with normal functioning of lungs.</p> <p>Signs & Symptoms:</p> <p><u>Primary Tuberculosis:</u></p> <p>-Initial infection does not produce any signs & symptoms. Incubation period is 4-8 weeks. Mild fever, malaise may occur and tuberculin sensitivity.</p> <p><u>Secondary or Pulmonary tuberculosis:</u></p> <p>Fever up to 40°c in late afternoon or evening & sweat at night</p> <ul style="list-style-type: none">• General malaise, fatigue & weight loss• Cough in early morning. Green or yellow sputum with blood streaks.• Chest pain and dyspnoea.• If pulmonary artery in tubercular region ruptures,-massive haemorrhage.• The infection may spread to pericardium. It causes inflammation and restriction in motion that may lead to heart failure. <p><u>Chronic/Miliary tuberculosis:</u></p> <p>In this case lesions are found at lymph node kidney, meninges, spleen, bone marrow and other organs. Difficulty in breathing, weight loss, fatigue and GIT disturbances.</p>	4M
---	---	----



6	c)	<p>Explain the following tests for the evaluation of parenterals:</p> <p>i) Sterility test: (3 marks): The product to be tested is transferred aseptically in sterile nutrient media and incubated for a specific period of time at an optimum temperature. If living microbes are present, growth takes place in the media and if absent no growth.</p> <p>Product containing antimicrobial drugs such as penicillin, sulpha drugs have to be tested in presence of antagonistic materials e.g. penicillin in presence of penicillinase and sulpha drugs in presence of PABA.</p> <p>The nutrient medium must be sterile and able to produce microbial growth. If the test for sterility shows no microbial growth, the product is considered to be sterile. If the test shows microbial growth, the test is repeated twice or thrice to check for accidental contamination. If again the test fails the product is non-sterile.</p> <p>The test is performed under aseptic conditions under laminar air flow.</p> <p>Tests for sterility may be carried out by:</p> <ul style="list-style-type: none">Membrane filtration methodDirect inoculation method <p>The culture media used are:</p> <ul style="list-style-type: none">Fluid thioglycollate medium for anaerobic bacteriaSoyabean-casein digest medium for fungi and aerobic bacteria <p>ii) Leaker test: (1 mark)</p> <p>It is performed by producing a negative pressure within an incompletely sealed ampoule while the ampoule is entirely submerged in a deep coloured dye solution. A 1% Methylene blue solution is usually used. After releasing the vacuum, the colored dye solution enters the incompletely sealed ampoules. All such ampoules are discarded.</p>	4M
6	d)	<p>Write the mode of action and use of the following antidote:</p> <p>i) BAL ii) Desferrioxamine (2 marks for each)</p> <p>i) BAL-</p> <p>Mode of action: BAL is a chelating agent which has many SH groups which combine with the heavy metals leaving the SH group of enzymes free (which are essential for their activity). The resultant complex is stable and is excreted without any damage to kidneys or liver.</p> <p>Uses- It is a chelating agent used in heavy metal poisoning.</p>	4M



	ii) Desferrioxamine- Mode of action: It is a chelating agent which chelates iron in the stomach and binds the iron in the blood Uses- It is used in acute iron poisoning.											
6	e) Write in brief about the teratogenicity with examples. (4 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- <table border="1" data-bbox="215 1205 1412 1617"> <thead> <tr> <th>Drug</th> <th>Teratogenic effects</th> </tr> </thead> <tbody> <tr> <td>Thalidomide</td> <td>Phocomelia, heart defects, gut atresia</td> </tr> <tr> <td>Penicillamine</td> <td>Loose skin</td> </tr> <tr> <td>Corticosteroids</td> <td>Cleft palate and congenital cataract-rare</td> </tr> <tr> <td>Estrogens, diethylstilbesterol</td> <td>Vaginal adenosis /cervical cancer in female foetus or structural abnormalities in the genitourinary tract in male offspring etc.</td> </tr> </tbody> </table>	Drug	Teratogenic effects	Thalidomide	Phocomelia, heart defects, gut atresia	Penicillamine	Loose skin	Corticosteroids	Cleft palate and congenital cataract-rare	Estrogens, diethylstilbesterol	Vaginal adenosis /cervical cancer in female foetus or structural abnormalities in the genitourinary tract in male offspring etc.	4M
Drug	Teratogenic effects											
Thalidomide	Phocomelia, heart defects, gut atresia											
Penicillamine	Loose skin											
Corticosteroids	Cleft palate and congenital cataract-rare											
Estrogens, diethylstilbesterol	Vaginal adenosis /cervical cancer in female foetus or structural abnormalities in the genitourinary tract in male offspring etc.											
6.	f) Define bioavailability. Discuss any three physiological factors affecting bioavailability of drug. (definition 1 mark, any 3 factors 3 marks) Bioavailability- Bioavailability may be defined as the rate and extent at which the drug reaches the systemic circulation in the active form. Physiological factors: 1.Effect of GI fluids : Any disturbances of pH of GIT fluid affect absorption which in turn 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.	4M										



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

2. 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 cephalixin reduced in presence of food . This is due to enhanced gastric emptying.

3. 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.

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

5. Absorbing surface: Larger the surface area of absorbing surface, more will be the absorption. As compared to GI mucosa and pulmonary endothelium, skin is the poor absorbing surface. Absorption of drug from mouth cavity is faster because absorption of drug from vascular membrane is rapid.