Subject Title: Hospital and clinical pharmacy Subject Code: 0816

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 EIGHT: (2marks each)**	**16M**
1	**a)**	**Define: (Any two) (1 mark for each definition)** **i) Surgical Dressing-** Surgical dressings are the materials which are used for the dressing of wounds as coverings, absorbents, protective or supports for injured or diseased tissues. **ii) Hospital-** 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. **iii) Drug Tolerance-** It is a state of decreased responsiveness to pharmacological effect of drug resulting from a prior exposure to that drug or related drugs.	**2M**
1	**b)**	**Give normal values of- (any TWO) (1 mark each)** **i) Blood Sugar-** Normal value- 80-120 mg/100ml **ii) Blood Cholesterol** Normal value: 150 -250 mg% iii) **Sperm Count**- Normal value: 60-150 million/cc	**2M**

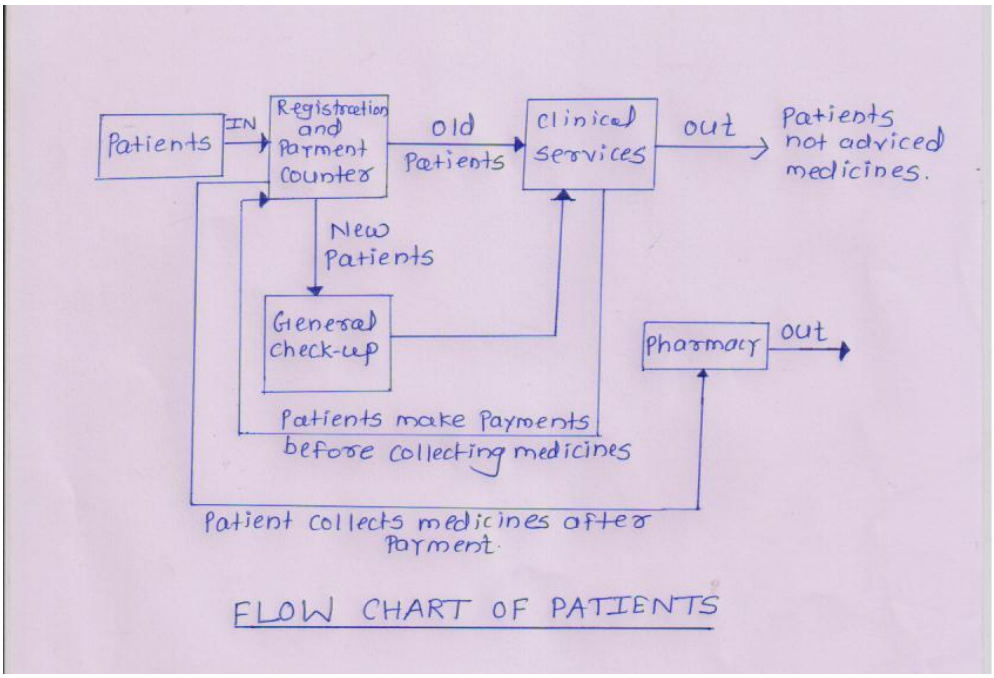
1	**c)**	**What advice must be given to patients while using following drugs: (any two)** **(1 mark each)** i) **MAO Inhibitors**-"Avoid cheese, alcoholic beverages and liver or yeast extract. ii) **Diazepam-** "Do not drive vehicle". "Do not work with dangerous machinery" iii) **Phenolphthalein-** " This laxative may color the urine and faeces pink"	**2M**
1	**d)**	**Mention any four reasons for patient non-compliance. (any 4 - ½ mark each)** **1.Inappropriate packaging** : Sometime design or size of container make difficulty to remove the medicament .Many elderly patient ,arthritis patient have difficulty with unit dose pack or foil wrapping while removing medicament **2. Poor labelling**: 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 convenience a patient by explaining the value of drug therapy results in non-compliance. **5. Measurement of medication**: Many times there is confusion to the patient in measuring liquid preparations or number of tablets. **6.Cost of medication**: Because of high cost of drugs ,poor patients are not purchase such drug **7. Frequency of medication**: Regular schedule of dosage intake cannot be followed due to work load. **8. Duration of therapy**: Long duration treatment lead to patient noncompliance. **9. Illness**: The nature of patient's illness may contribute to non-compliance like chronic hypertension, mental illness.	**2M**

1	**e)**	**Write the objectives of clinical pharmacy (Any four) (½ mark each)** **1.** To assist the physician in doing a better job of prescribing and monitoring drug therapy. **2.** To assist nurses in administering medication. **3.** To increase patients role in drug use process. 4. To maximize the effectiveness of drug therapy with minimum side effects or adverse effect. 5. To decrease patients non-compliance through the patients counselling. 6. To study drug therapy by monitoring it and it should maintain the record of drug therapies, any adverse effect or drug interaction should be reported to PTC and physician of the hospital.	**2M**
1	**f)**	**What do you mean by- (any two) (1 mark each)** **(*please note that (any two) option is not mention in the question paper)** i) **Lithotripsy-** A procedure in which renal stone is dissolved by laser beam. **OR** Lithotripsy is the non-invasive treatment of stones in kidney, in the gallbladder or in the liver using an acoustic pulse. ii) **MRI-**Magnetic Resonance Imaging is a diagnostic technique that uses magnetic fields and radio waves to produce a detailed image of the body's soft tissue and bones. iii) **Crutches-** Crutches are the health accessories that help to transfer the weight of the weak limb and maintain the balance of the body.	**2M**
1	**g)**	**State the meaning of- (Any two) (1 mark each)** i) **Anuria-** Anuria is absence of urine or non-passage of urine often caused by failure of functioning of kidneys.	**2M**

		ii) **Bradycardia-** It is the condition in which heart rate decreases. In bradycardia heart rate is less than 60 beats per minutes. iii) **Hypertension-** Hypertension is an abnormal elevation of arterial blood pressure. The patient is said to be hypertensive when diastolic pressure is greater than 90 mm Hg.	
1	**h)**	**Translate into English-(Any two) (1 mark each)** **i) Guttae-** Drops. **ii) Semel in die-** Once a day. **iii) Hora somni-** At bed time.	**2M**
1	**i)**	**Mention abnormal constituents of urine with its significance (any two) (1 mark each)**	**2M**

Constituents	Significance
1.Proteins	In nephritis, renal TB, pregnancy, Nephritis.
2.Bile salts/pigments	Jaundice.
3.Ketone bodies	Indicates deficient carbohydrate metabolism (Diabetes), carbohydrate starvation and anaesthesia.
4.Blood cells	In TB, cancer, kidney stones, haemolysis due to poisons.
5.Pus cells	Nephritis.
6.Sugar (Glucose)	Glycosuria (Diabetes)

1	**j)**	**What these abbreviations stand for-(Any two) (1 mark each)** **i) TPN-** Total Parenteral Nutrition **ii) SWFI-** Sterile Water For Injection	**2M**

		iii) BAL- British Anti Lewisite	
1	**k)**	**Draw the flow chart for the movement of patients in a typical hospital.**  	**2M**
1	**l)**	**Write the names of any two types of scissors with their uses. (any two)** **(1 mark each)** **1) Straight pointed scissors-** Are used freely at places where there is no risk of injury to vital structures. **2) Straight blunt scissors-** Are used where there is risk of damaging important structure. **3) Curved on flat scissors-** Are used in the deep region where the space is very much confined. **4) Angle on Edge scissors-** Are used to dissect structures which run obliquely. **5) Stitch cutting scissors** -for cutting stitches **6) Lister's Bandage cutting scissors –** to cut the bandage **7) Mayo's scissors: -** For fine surgical dissection.	**2M**

		8) Nelson scissors – for thoracic surgery **9) Lloyd Davis Rectal scissors and Abel scissors –** for pelvic surgery.	
2		**Solve any FOUR :(3marks each)**	**12M**
2	**a)**	**Write the functions of Administrator in the hospital. (any 6 functions – ½ mark each)** 1. He frames the overall administrative policies. 2. He is in charge of admission and discharge of all patients. 3. He looks after legal formalities of the hospital. 4. He looks after training of nurses, physician and health volunteers. 5. Implementing the policies, procedure & guidelines framed by governing body in the daily management of hospital laid down by governing body. 6. He takes all reasonable steps to see that hospital works with laws and regulation or not. 7. He arranges proper structure in the hospital to carry out programs of the hospital. 8. He prepares a hospital budget for approval by the Governing body. 9. He provides and maintains proper physical resources. 10. He develops and implements a management reporting system throughout the hospital. 11. He plans for the expansion of the hospital. 12. He has to provide facilities, equipment and assistance to clinical department 13. He ensures smooth functioning of the OPD.	**3 M**
2	**b)**	**Define clinical pharmacy. Write the function of clinical pharmacist. (1 mark for definition, 2 marks for any 4 functions)** **Definition of Clinical pharmacy** – Clinical pharmacy is a new born discipline that carries traditional hospital pharmacist from his product oriented approach to more healthier	**3M**

patient oriented approach, so as to ensure maximum well-being of the patient while on drug therapy.

OR

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.

Functions of Clinical pharmacist – (any 4)

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.
2. **Monitoring drug therapy**- it includes evaluation of patient pharmacokinetics and pharmacodynamics parameters, lab. Findings medical problems and communicating relevant findings to physician.
3. **Participation in ward rounds**- The clinical pharmacist with physicians should participate in ward rounds, observe individual patient and decide the drug therapy.
4. **Drug information**- The clinical pharmacist establish drug information centre. The drug information. Is available at this centre and utilized suitably. This data is send to physician as per their requirements.
5. **Patient counselling**- it involves providing information to the patient about drug therapy and illness. The pharmacist acts as resource for information about health promotion and disease prevention.
6. **Participation in new drug investigation**- clinical pharmacist along with physician participates in investigation of new drugs. Data of this investigation is compiled, analysed and maintained at drug information centre.
7. **ADR management**- Along with physician clinical pharmacist's activity is involved in reporting of management of ADR.
8. **Educational programs**- clinical pharmacist organized educational programs for nursing and education related to safe and effective use of drugs.
9. **Tailoring drug therapy**- the clinical pharmacist after the diagnosis of physician formulates drug therapy to need of patient.

2	**c)**	**Write content and significance of medication history of patient.** **(1 ½ mark for content and 1 ½ mark for any 3 significance)** **Content of Medication history-** • Name • Age • Sex • Date of Birth • Address, phone no of patient • Family background • Economic and social status • Tendency about consumption of medicines. • Habits of the patient. • Body disorders. • Drug Allergies. • Habit of Taking OTC drugs. • Previous diseases. • Previous medicine consumed. **Significance- (any 3)** 1. To develop a list of the patient's current and past medication. 2. To determine if the patient has allergy or adverse drug reactions with some drugs. 3. To know about patient's self-prescribing habit and which over the counter drug he takes or prefer. 4. To study the ability of the patient to follow the prescribed medication and show compliance. 5. To maintain essential information of the patient. 6. To study refilling frequency of the patient. 7. To know about dietary habits of the patient. 8. To avoid drug-drug interaction	**3M**
2	**d)**	**Differentiate between Drug addiction and Drug habituation.**	**3M**

(any 6 points – ½ mark each)

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

2 e) Describe the functions of Hospital. (any 3 functions – 1mark each) **3M**

Functions of Hospital:-

1. **Patient care**: It includes services for diagnosis, prophylaxis and treatment of diseases to the sick or injured patients. It is a centre of community health and contributes a great deal to preventive and social medicine.

2. **Public health**: The hospitals are required to support all the activities carried out by various public health and voluntary agencies such as immunization programme, blood donation camps, social and economics rehabilitation, health education etc. by providing facilities and advice.

3. **Medical research**: Research is an important activity in the hospital that helps in developing the new methods of treatment and improving the hospital services. Some of the

		common areas of research in the hospital are development of new techniques in surgery, laboratory diagnostic procedures, evaluation of investigational drugs in diseases. 4. **Educational training:**- This facility , particularly for medical students , pharmacists , nursing staff, medical technologist and allied health professional helps to fulfil their curriculum requirement. Hospital also educates the general public through lectures and demonstrations on the preventive aspects of common and serious diseases. Hospital provides the methods by which the persons can work together in groups with the object of care of patient and community. 5. **Counselling and patient advice**: It is a modern concept adopted in big hospitals for the wellbeing of the patients. During these counselling sessions pharmacists educate people on communicable diseases, epidemics and family welfare etc.	
2.	**f)**	**Write the requirement of equipments for the manufacturing of compressed tablets.** **Equipments for the manufacturing of compressed tablets-** For effective operations, the tablet production department shall be divided into four distinct and separate sections as follows: - **(a) <u>Mixing, Granulation and Drying section</u>** (1) Disintegrator and sifter (2) Powder mixer (3) Mass mixer/Planetary mixer/Rapid mixer granulator. (4) Granulator (5) Thermostatically controlled hot air oven with trays (preferably mounted on a trolley)/Fluid bed dryer. (6) Weighing machines. **(b) <u>Tablet compression section.</u>** (1) Tablet compression machine, single/multi punch/rotatory. (2) Punch and dies storage cabinets. (3) Tablet de-duster (4) Tablet Inspection unit/belt. (5) Dissolution test apparatus (6) In-process testing equipment like single pan electronic balance, hardness tester, friability and disintegration test apparatus. (7) Air-conditioning and dehumidification arrangement (wherever necessary)	**3M**

		(c) Packaging section (strip/blister machine wherever required). (1) Strip/blister packaging machine. (2) Leak test apparatus (vacuum system) (3) Tablet counters (wherever applicable) (4) Air-conditioning and dehumidification arrangement (where ever applicable). **(d) Coating section (wherever required).** (1) Jacketed kettle (steam, gas or electrically heated for preparing coating suspension). (2) Coating pan (stainless steel) (3) Polishing pan (where applicable) (4) Exhaust system (including vacuum dust collector) (5) Air-conditioning and dehumidification arrangement. (6) Weighing balance.	
3		**Solve any FOUR : (3 marks each)**	**12M**
3	**a)**	**Write a note on addition or deletion of drug in the hospital formulary. (3 marks)** Addition of drug in a formulary is a complex decision and it is not taken by committee members alone. Many times expertise from outside is invited. Following criteria is used to take a decision of entry or deletion of a drug: 1. Medical staff based on their experience should consider a drug to be of appropriate clinical value. 2. The drug should be manufactured by licensed manufacturer and he should not have been punished for any serious offence under any law of drugs. 3. The drugs should be included in official books (I.P./B.P./U.S.P., etc) or in N.F. 4. No drug preparation of secret composition is admitted in the formulary. 5. No drug preparation containing many drugs shall be admitted if similar therapeutic effect can be obtained by the use of single ingredient preparation.	**3M**
3	**b)**	**Describe the procedure for purchasing of drug in the hospital. (3 marks)**	**3M**

The procedure for purchasing of drug is hospital is as follows:

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

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

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

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

Seven copies of purchase order are prepared –

1) a copy for the supplier for supply of materials

2) a copy for the account section for audit

3) a copy for the purchase section for filing

4) a copy for the department from where purchase requisition originated

5) Two copies for the receipt section of stores out of which one is used once the goods arrive for checking and the other when the goods are returned

6) a copy for history with the purchase section to ascertain the rates and other information in future.

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

If a part of order is returned to supplier, it contains Goods Returned Note (1 copy to

		supplier and 1 to the department) **5. Release of payment to supplier.**	
3	**c)**	**Explain withdrawal symptoms and treatment in narcotic addiction. (symptoms ½ marks and treatment ½ marks)** **Withdrawal symptoms** begin 8 hours after the last dose and repeat every 32-72 hours. First yawning, rhinorrhoea, crying and sweating are seen. At 20 hours, sweating, chills and gooseflesh appear. At 24-48 hours, nausea, vomiting, diarrhoea, hypertension, and sometimes fever are seen and the patient complains of severe cramps which may last upto a week. Sleep disturbances and anxiety may persist for weeks or months. **Treatment**: It involves pharmacological or psychological methods or combination of both. 1. In psychological method, dosage reduction with appropriate psychotherapy and social counselling is undertaken. 2. The pharmacological approach mainly involves methadone maintenance. A substitute like methadone at a dose of 30 mg in divided doses is given for initial 3 days. Then the dose is reduced to 10 mg/ day Long acting compounds like Levo- alpha- acetyl methadol (LAAM) and Naltrexone are also used for narcotic addiction.	**3M**
3	**d)**	**Explain the abilities required for hospital pharmacist. (any 3 abilities -1 mark 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,	**3M**

		metabolism and excretion. Hospital pharmacist must be knowledgeable in pharmacology, toxicology, pathophysiology, therapeutics and patient care techniques. 3.**Manufacturing ability**-Hospital pharmacist must be able to develop formulations not available commercially. Hospital pharmacist should posses an adequate understanding of the principles involved in formulations and 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 coordinate 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.	
3	**e)**	**Write the pathophysiology and signs and symptoms of rheumatoid arthritis.** **<u>Pathophysiology: (1 ½ marks)</u>** Rheumatoid arthritis is an autoimmune disease. In these diseases, body's immune system no longer accepts certain body proteins and reacts as if they were foreign antigen and produces antibodies against them. It is observed that patient's body considers human gamma globulin (IgG) as the antigen and produces antibodies against them, known as 'Rheumatoid factors". The antigen reacts with antibody to form immune complex, which then reacts with complement. Complement is a series of proteins, which helps to stimulate the inflammatory process. Thus, the immune complex reacts with the complement in the joints, which leads to the inflammatory response. **<u>Signs and symptoms (1½ marks)</u>: (any 3 sign and symptoms)**	**3M**

		1. Fatigue, anorexia, weight loss and fever 2. Inflammation of peripheral joints, most frequently the small joints of hand and feet, and the writs, larger joints may also be involved. 3. Morning stiffness is a common symptom. The stiffness generally lasts more than 30 minutes and may last for many hours. 4. Chronic inflammation of joints results in erosion at the margins of the bones. 5. Deformities may develop, mainly of the fingers and neck etc. Joints may ankylosed with complete loss of motion. 6. Around 20- 30 % patients show formation of rheumatoid nodules. They occur commonly in the elbow or along the extensor surface of forearm. 7. Inflammation of organs than joints like heart, lungs, eyes, may also occur.	
3	**f)**	**Write any two pharmacodynamic drug interactions of drugs.** **(each example carries 1 ½ marks)** **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 increases activity. 2) Interaction inhibiting the effect:- E.g ACH and atropine by competitive antagonism oppose the action of each other. Alcohol and amphetamines have opposite effects on CNS. 3)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 hypokalaemia, in turn making the heart more sensitive to digitalis. 4) 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	**3M**

nalorphine.

5). 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.

4 **Solve any FOUR: (3marks each)** **12M**

4 a) **Differentiate between SVP and LVP. (any 6 points, 3 marks)** **3M**

SVP	**LVP**
1.They are injectables	1.They are generally intravenous fluids
2.Capacity is less than 100ml	2.Capacity is vary from 100ml – 500ml
3.SVPs are typically used for delivering medication at a controlled infusion rate	3.LVPs provide electrolytes ,supply nutrients such as vitamins and glucose
4. SVP contains necessarily the medicament which is potent.	4. LVPs contain one or more electrolytes.
5.Administration with syringes and needles	5. Administration with I.V sets.
6.Vehicle used is WFI , oils or PEGs	6. Only WFI is used as a vehicle.
7. Container used for packaging Glass ampoules and vials	7. Containers used generally plastic bottles.
8. Preservatives, anti-oxidants, buffers, etc added	8. No added substances

4 b) **Discuss factors affecting make or buy decision. (any 3 factors- 1 mark each)** **3M**

Following factors affect make or buy decision in hospital manufacturing:

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. 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	**c)**	**Define ADR. Write drug induced liver disorders.** **Definition- (1 mark) 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". **Drug-induced liver disorders (2 marks):** As liver is a major site of metabolism of drugs, it is a common site for adverse effect of drugs. Drugs are responsible for 2 to 10% of jaundice and acute hepatitis. **1.** Drugs causing direct liver damage: These drugs act as hepatotoxins due to their specific chemical structure and show predictable, dose-dependent liver damage. They may be causing specific interference in metabolism. Examples of hepatotoxins are isoniazid, methotrexate, tetracycline, methyl testosterone, C-17 substituted steroids, overdose of acetaminophen. Slow acetylators of isoniazid are susceptible to polyneuropathy and fast acetylators to hepatotoxicity. IV administration of tetracycline has shown fatty metamorphosis of the liver.	**3M**

2. Hypersensitivity-type hepatic drug reactions: These are common unpredictable reactions occurring in a small fraction of population exposed to the drug. Hepatic injury is associated with rash, fever and eosinophilia. This type of liver damage may be caused by halothane, sulphonamides, MAO inhibitors.

Anorexia, malaise, fever and jaundice occurs with phenothaizines, chlorpropamide, hydrochlorthiazide, methyldopa, tricyclic amtidepressants, erythromycin estolate, etc.

OR

Liver disease	Responsible drugs
1. Acute hepatotoxicity	Cimetidine, Rifampicin, phenylbutazone, methyldopa, INH, PAS, erythromycin, halogenated anaesthetics
2. Chronic drug-induced diseases	
a. Cirrhosis	Diethylstilbesterol
b. Phospholipidosis	Antiarrhythmic drugs
c. Vascular injuries	Anabolic steroids, alcohol, anticancer drugs
d. Hepatic glaucoma	Sulphonamides, penicillin, allopurinol
e. Hepatoportal sclerosis	Arsenicals, vinyl chloride, Vitamin A
f. Hepatic neoplasms	Oral contraceptives, anabolic steroids

4 d) Write pathophysiology, signs and symptoms of peptic ulcer. **3M**

Pathophysiology.(any 3 points, 1 ½ marks)

-Helicobacter 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

		lining 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. **Signs and symptoms of peptic ulcer (any 3 points, 1 ½ marks):** 1. There is steady burning pain in the mid-epigastrium which is relieved by ingestion of food or antacids in ulcer. 2. Duodenal ulcer pain may awaken the patient at night whereas gastric pain generally does not occur at night. 3. Patient may show iron deficiency anaemia. 4. Complications of peptic ulcer include peritonitis, sepsis and pancreatitis.	
4	**e)**	**Explain the importance of computer in medication monitoring in hospital. (3 marks)** To evaluate therapeutic action and adverse effects of any drug, the hospital pharmacist takes the help of pharmacokinetic and non-pharmacokinetic parameters. This drug monitoring is essential in geriatrics and pediatrics and for drugs having the tendency to interact with each other. The drug monitoring computer has 2 types of functions- 1. Pharmacokinetic function: It includes the collection of pharmacokinetic parameters, statistical calculation and graphical interpretation. With the help of computer programming like NONLIN, the pharmacokinetic parameters can be predicted easily. According to these parameters, the dose can be adjusted to keep the drug level within the therapeutic range. This type of application has been widely used for drugs like theophylline, aminoglycoside antibiotics, phenytoin, digoxin, etc. some common parameters are rate of absorption, volume of distribution, clearance rate, etc 2. Non-pharmacokinetic function: It includes drug-drug interaction, drug-laboratory, drug allergy, drug-disease interaction and adverse effects detection. For drug interaction screening, computer programs like MEDIPHOR (Monitoring and Evaluation of Drug	**3M**

		Interactions by a Pharmacy Oriented Reporting) and PAD (Pharmacy Automated Drug Interaction Screening) can be used which increases the efficiency of clinical services provided by the hospital pharmacist.	
4	**f)**	**Define teratogen. Explain teratogenicity with examples. (definition 1 mark, explanation 2 marks)** 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. 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. True teratogens cause abnormalities in doses lower than are necessary to cause toxic effect on mother or foetus. **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.	**3M**
5		**Solve any FOUR of the followings :(3marks each)**	**12M**
5	**a)**	**Write in short about (1 ½ mark each)** **i) Ryle's tube** **ii) Crepe bandage** **i) Ryle's tube** It is a thin tube having the length of about 30 inches (25 cm). Distally there is an oral bulb, which provides the swallowing of the tube. Above the bulb there are "4" small holes through which liquid can be poured into the stomach or aspirated from it. a) To give fluid or drugs to those patients who can't imbibe enough amount.	**3M**

b) To give stomach wash in case of poisoning.

c) For gastric juice analysis.

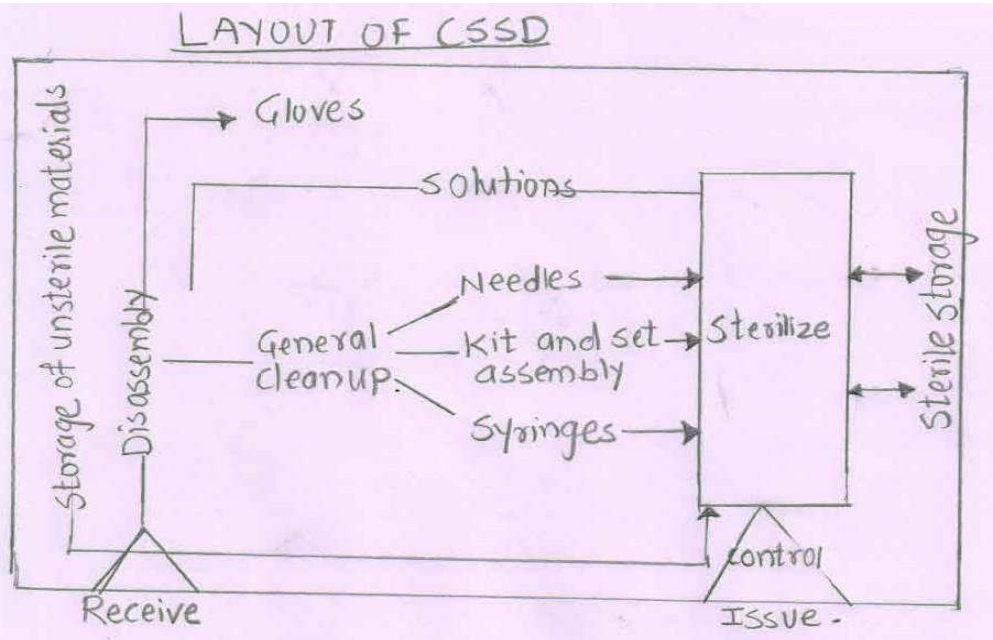
ii) Crepe bandage: It consists of fabric of plain weave in which the warp is of cotton and wool threads and weft is of cotton threads. Its elasticity due to special weave structure. It stretches twice its length even after repeated washing.

a) It used to treat muscle sprains and strains which can restrict swelling at the place of injury.
b) It is also used for correctional purpose and as compression over paste bandages for varicose veins.

5 b) Discuss any three examples of analgesic drug interactions. (any 3 examples -1 mark each) **3M**

The following drugs interact with analgesic drug such as Aspirin.

Interacting drug	Mechanism of interaction
1.Alcohol	Aspirin damages the mucosa of stomach causing bleeding that results into excessive faecal blood loss
2.Anticoagulant e.g. Heparin, Warfarin, Dicoumarol	Aspirin potentiates anticoagulant activity by displacing coumarins from binding sites and reducing plasma prothrombin .It also decreases platelet and causes gastric mucosal bleeding
3.Corticosteroids	Corticosteroids decrease the blood aspirin level by increasing GFR. When steroid dose is reduced it causes increase in blood aspirin which results in salicylism.
4.Insulin and Oral hypoglycemic agents	Aspirin can lower blood glucose level by displacing oral hypoglycemic agents from their binding sites.
5.Phenylbutazone	Phenylbutazone inhibits the uricosuric effect of aspirin .Aspirin also competes with

			phenylbutazone for plasma protein binding.	
			6.Probenecid	Aspirin inhibits the uricosoric action of probenecid.
			7. PABA (Paraaminobenzoic acid)	PABA blocks the formation of salicyluric acid from salicylic acid causing incresesd blood salicylate level.
			8.Sulphonamide	Aspirin displaces sulphonamide from protein binding site and potentiates the effects of sulphonamide
			9.IUDs	The inflammatory activity of IUD may be inhibited by aspirin if used by aspirin if used chronically
5	**c)**	**Where should the central sterile service department be located in a hospital? Draw the layout of CSSD.(location -1 mark, for layout 2 marks)** **Location**: 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 the work of this department. The store and laundry should be very near.  	**3M**

5	**d)**	**What is drug food interaction? Explain with examples.** **(Drug –food interaction- 1 mark, for any 2 examples -1 marks each)** Food affects the absorption of the drug. It may be attributed to 1) Dilution of the drug 2) Adsorption or complexation of drug 3) The alteration of gastric emptying Examples- i) Milk reduces absorption of tetracycline by forming an insoluble complex. ii) Solubility of Griseofulvin increases when it is taken with milk or fatty food, because ionization of Griseofulvin is high in presence of fatty food. iii) Mono amine oxidase(MAO) is an enzyme which breaks down catecholamines such as Nor-epinephrine. When the enzyme is inhibited, there are increased level of Nor-epinephrine. Thus MAO- inhibitors are used as antihypertensives. if MAO inhibitors administered with tyramine containing food like cheese and butter, alcoholic beverages. Tyramine is metabolized by MAO. When patient being treated with MAO- inhibitors also take tyramine containing food, tyramine reaches systemic circulation causing severe hypertension. iv) If drugs like Oral contraceptives/Phenytoin taken with Folic acid they inhibit 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 (Anaemia) v) Absorption of some drugs reduces in presence of food e.g. ampicillin, Rifampicin, Aspirin, Isoniazid, Tetracycline, Benzyl penicillin, Levodopa. Iron absorption is reduced if food has been taken within the previous two hours. If Iron is taken on empty stomach it can cause nausea. Therefore Iron tablets are often given with food. vi) Absorption of drugs like- riboflavin, spironolactone, Lithium citrate, Carbamazepine increase in presence of food. Nitrofurantoin is given with food to avoid GIT irritation this also increases drug absorption.	**3M**

5	**e)**	**What is DIB? Give its importance.(1 mark –DIB, any 4 importance-2 marks ½ mark each))** **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". **Importance (2 marks)** 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 professional. 3. 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 detailed analysis of drug information to the physician. 6. It also publishes matter in question –Answer session /column in the bulletin.	**3M**
5	**f)**	**Discuss about the general steps involved in treatment of poisoning.** The general steps involved in treatment of poisoning are: 1. Removal of unabsorbed poison 2 Use of antidote 3.Supportive care 4. Treatment of general symptoms **1.Removal of unabsorbed poison:** Ingested Poison a).Gastrointestinal Decontamination	**3M**

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

b)Contact Poison

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

c)Injected Poison

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

2.Use of Antidote:

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

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

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

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

Stabilisation of vital centres like cardiac, Vasomotor and Respiratory centre.

Good nursing care is required to maintain general condition of victim

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

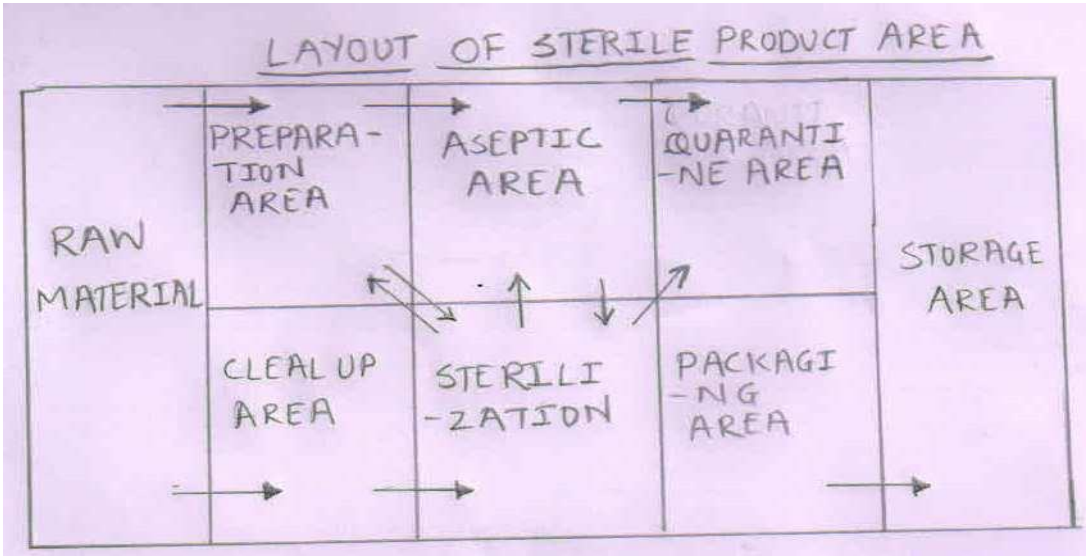
Symptoms	Treatment
Pain	Morphine
Dehydration	ORS saline

		Respiratory Failure — Oxygen therapy Cardiac depression — Cardiotonics.	
6		**Solve any FOUR :(4 marks each)**	**16M**
6	**a)**	**What is Floor Stock Distribution System? Discuss its merits and demerits.** **(2 marks for description, 1 mark each for any 2 merits and demerits)** The medicines or drugs are stored in pharmacy and supplied or distributed to the wards or rooms on order and kept under the supervision of registered nurse at nursing station are called floor stock drugs. It is classified further into- **a) Charge floor stock drug**:- Drugs which are stocked on the nursing station at all time and are charged to the patient account .An envelope is used to dispense the drugs to the nursing station. **b) Non Charge floor stock drug**:- Drugs which are placed at the nursing station at all time and for which there may not be direct charge to patient's account. The cost is calculated in the per day cost of hospital room. Drug basket method or Mobile dispensing unit is used to dispense the drugs to the nursing station. **Merits: (any 2)** 1. The deteriorated, out dated and non-approved drugs and drug samples may be removed quickly through the routine checking of the cabinets. 2. The nursing station drug cabinets are under the continuous supervision of the pharmacist. 3. Less number of pharmacy staff is required. 4. Ready availability of required drugs. 5. Minimization in patient prescription orders at pharmacy. **Demerits: (any-2)** 1. It consumes nursing personnel time. 2. There are chances of medication errors because personally, pharmacist cannot take	**4M**

		review of requirement of medications. 3. Increase in drug inventory at nursing stations. 4. Special facilities are required in nursing stations for storage of drugs. 5. Chances of misuse of drugs which leads to financial loss.	
6	**b)**	**What is PTC? Write its role in ADR. (2 mark for description , 2 marks – Role of PTC)** Pharmacy and Therapeutic Committee- The hospital as an organization, responds to rational use of drugs by constituting a committee, which formulates the policies regarding the therapeutic use of the drugs. The committee recommends to adopt the policies or helps in the preparation of policies regarding evaluation, selection and therapeutic use of drugs. The committee helps in the preparation of programmes through which the professional staff gets complete current knowledge on matters related to drug and their use. The P and T committee should be composed of at least 3 physicians, a pharmacist, a nursing representative and the administrator. **Role of PTC in ADR** 1) ADR reporting form is designed by PTC. 2) Attending physician complete ADR report form. 3) ADR report form forwarded to clinical pharmacologist or PTC. 4) ADR should be listed in medical record as a diagnosis whenever such applies. 5) PTC further send data of ADR to government authorities like FDA & FDA gather information on drug effect & it's ADR.	**4M**
6	**c)**	**Classify poisons with examples.** **Classification- (any 4 class of the following -1 mark each)** Depending upon mechanism of action of poison, these are classified as **1) Corrosives-** a) Strong acids- sulphuric acid, nitric acid, hydrochloric acid	**4M**

		b) Organic acids- oxalic acid , carbolic acid c) Concentrated alkalies- caustic potash, caustic soda, carbonates of sodium, calcium and potassium 2**) Irritants -** 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**- a) Cerebral poison- opium , sedatives and hypnotics, insecticides, cocaine and hyoscyamus b) Spinal poisons- Nux vomica c) Peripheral poisons- curare alkaloids, conium 4) **Cardiac**- 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.	
6	**d)**	**Write physiochemical factors affecting on bioavailability. Explain any two physiochemical factors with examples. (1mark for factors, 1 ½ mark for explanation of any 2 physiochemical factors)** Physiochemical factors affecting bioavailability are: • a) pKa • b) Partition coefficient • c) Particle size • d) Physical state **a) pka affect bio availability-** Non ionized, lipid soluble drugs are better absorbed while strongly acidic or basic drugs or highly ionized drugs show reduced bioavailability from GIT. The extent of ionization depends upon pka value.	**4M**

		b) Partition coefficient affects bio availability- It is the ratio of solubility at equilibrium in an aqueous solvent to its solubility in an non aqueous solvent. • Hydrophilic drug means soluble in water. Lipophillic drugs means that is miscible with oil or lipid. • Non-ionized form of a drug is more lipophillic than ionized form. • Hydrophillic drugs have higher water solubility so its dissolution rate is more rapid than lipophillic drugs. But in aqueous fluid, its non-ionised form is better absorbed, because the biological membrane is lipoidal in nature. **c) <u>Physical state of drug:-</u>** Liquids are better absorbed than solid medicaments. Aqueous solutions are more quickly absorbed than oily solution. Soluble medicaments like insulin suspension is more readily absorbed than insoluble protamine zinc insulin suspension. **<u>d)Particle size</u> :-** Smaller particle size provides greater surface area of drug thus improving its absorption. Small particle size is useful in absorption of corticosteroids and antibiotics like chloramphenicol, griseofulvin and oral anticoagulants.	
6	**e)**	**Classify hospital on the basis of bed capacity and clinical parameter with examples. (2 marks each)** **Classification of hospital on the basis of bed capacity –(2 mark)** **i)Large Hospitals**: Beds available 1000 or above 1000, e.g. J.J.group of hospital, K.E.M. hospital ii) **Medium hospitals**: Beds available 500-1000, e.g, Bombay hospital (700 bed hospital) iii) **Small Hospital**: Beds available 100-500, e.g.- Breach Candy hospital and Hinduja hospital. **iv)Very small hospital**: Beds less than 100.e.g Private ownership hospital/ Nursing home. **Classification of hospital according to clinical parameters with examples (2 marks)** A. On basis of Major diseases: 1. Psychiatric hospitals or Mental Hospitals	**4M**

		2. T.B. Hospitals 3. Leprosy Hospitals 4. Cancer hospitals B. On basis of Anatomical Specialization: 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 centres 6. Physiotherapy centres	
6	**f)**	**Draw the layout of sterile product area. Write about 'Aseptic area" for the manufacture of sterile products. (2 marks – layout, 2 marks – for Aseptic area)**  	**4M**

		Aseptic area: Air in aseptic area should be free from fibres,dust and microbes. Such clean air can be achieved by using HEPA filter which are placed in laminar air flow bench/hood. This area must be sealed so that it may be washed and sanitized with a disinfectant. All electricity, ventilation and utility services fitting should be in the walls or ceilings to eliminate the joints for the accumalation of dust and dirt. The mechanical equipment to be placed in this area should be kept within stainless steel cabinet.UV rays is used to reduce microbes on the surface and wall. Routine environmental control tests are conducted.The entry of personnel in aseptic area should be through air lock system.	