MODEL ANSWER

SUMMER – 17 EXAMINATION

Subject : 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 any equivalent figure drawn.
5) Credits may be given step wise for numerical problems. In some cases, the assumed constant values may vary and there may be some difference in the candidate's answers and model answer.
6) In case of some questions credit may be given by judgement on part of examiner of relevant answer based on candidate's understanding.
7) For programming language papers, credit may be given to any other program based on equivalent concept.

Q. No.	Sub Q. N.	Answer	Marking Scheme

MODEL ANSWER

SUMMER – 17 EXAMINATION

Subject : Hospital and clinical pharmacy Subject Code: 0816

Q.No	Sub Q. N.	Answer	Marking Scheme
1		**Solve any EIGHT: (2marks each)**	**8x2=16**
	a)	**Define (any two): (1mark each)** i) **ADR** : 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". **ii) Patient compliance**: WHO defines patient compliance as 'faithful adherence by the patient to prescriber's instructions. iii) **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.	
1.	**b)**	**Give the normal values of (any two): (1mark each)** **i) Creatinine :** 20-26mg/Kg/day ii) **Blood Cholesterol** : 150-240 mg/dL or % iii) **Sperm count** : 60 -150 million/ml of seminal fluid	
1.	**c)**	**Translate following terms in English(any two) : (1mark each)** **i) Utendus:** To be used ii) **Guttae** : drops iii) **Omni Mane**: every morning	

MODEL ANSWER

SUMMER – 17 EXAMINATION

Subject : Hospital and clinical pharmacy Subject Code: 0816

1.	**d)**	**Give the uses of (any two): (1mark each)** i) **ECG** – It is use to check functioning of heart. ii) **Aneurysm needle** – It is used for ligaturing. **iii) Ryle's tube – (any one use)** a) To give fluid or drugs to those patients who can't imbibe enough amount. b) To give stomach wash in case of poisoning. c) For gastric juice analysis.	
1.	**e)**	**Explain term first pass effect. (2 marks)** Orally administered drugs go to the systemic circulation via hepatic portal system, which first presents the drug to the liver. Thus the entire absorbed dose of drug 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 effect.	
1.	**f)**	**Define Hallucinogen. Write effects of LSD. (1 mark for definition and 1 mark for any 4 effects)** Hallucinogens are agents that act on CNS to produce a state of perception of matters/objects with no reality or feeling with no external cause. OR Hallucinogens are a group of naturally occurring and synthetic compounds capable of producing distortion of reality resulting in confusion, delirium, amnesia and loss of sense of direction, space and time. A person on LSD may experience physiological effects, including raised blood pressure and heart rate, dizziness, loss of appetite, dry mouth, sweating and tremors; but the drug's major effects are emotional and sensory. The user's emotions may shift rapidly from fear to euphoria, with transitions so rapid that the user may feel several things simultaneously,	

including panic and extreme terror. Panic and terror can lead a user to run across a busy street. LSD also has dramatic effects on the senses. Colors, smells, sounds and other sensations appear highly intensified.

1. g) Write the requirement of number of pharmacists in a Hospital Pharmacy. (2 marks)

Requirement of the Pharmacist as per the bed requirement

Bed strength	Number of Pharmacist required
Upto 50 beds	3
Upto 100 beds	5
Upto 200 beds	8
Upto 300 beds	10
Upto 500beds	15

1. h) What are Elite hospitals? (2 marks)

They are symbol of High-tech medical development. The hospital contains five star hotel facilities. The deluxe rooms are equipped with fridge, TV and telephone. Thus, the room charges are costly and the treatment cost is also high. But these hospitals reserve a particular percentage of their capacity for the poorer section and subsidize a particular percentage of their accommodation.

1. i) Give the objectives of inventory controls. (any 4- ½ mark each)

1. Minimization of the inventory investment.
2. Determination of the right level of customer service.
3. Balance of supply and demand.
4. Minimization of procurement costs and carrying costs.
5. Maintenance of an up to date inventory control system.

1. j) What advice must be given to the patient using (any two): (1 mark each)

i) **Tetracycline:** Do not take this medication with milk or antacid

ii) **Bisacodyl:** Do not take this medication with milk or antacid / Do not chew the tablet.

iii) Phenytoin: Expose yourself to sunlight in the morning.

MODEL ANSWER

SUMMER – 17 EXAMINATION

Subject : Hospital and clinical pharmacy Subject Code: 0816

1. k) What is BAL? Mention its use (2 marks)

British Ant-Lewisite:It is one of the physiological antidote / chelating agent used in the treatment of heavy metal poisoning.

1. l) Distinguish between small volume parenteral and large volume parenteral.(2 marks for any 2 points)

Small volume parenteral	**Large volume parenteral.**
1.They are injectable	1.They are generally intravenous fluids
2.Capacity is less than 100ml	2.Capacity is vary from 100ml – 500ml
3.SVP's are typically used for delivering medication at a controlled infusion rate	3.LVP's 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.

4x3=12

Attempt any FOUR of the following:

2. a) Define Clinical pharmacy .Draw a chart/diagram indicating role of clinical pharmacist in the hospital. (1 mark for definition, 2 marks – diagram/ chart)

Clinical pharmacy is a new born discipline that carries traditional hospital pharmacist from his product oriented approach to healthier patient oriented approach, so as to ensure maximum well-being of the patient while on drug therapy.

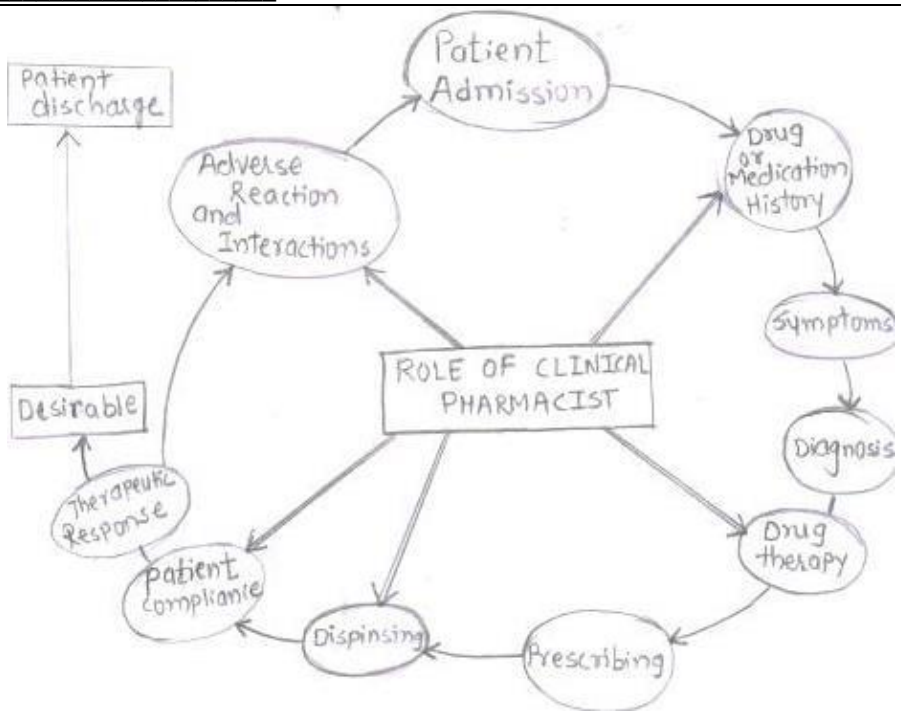
OR

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.

MODEL ANSWER

SUMMER – 17 EXAMINATION

Subject : Hospital and clinical pharmacy Subject Code: 0816

			
2.	**b)**	**State the objectives of Hospital pharmacy.(any 6 points -1/2 mark each)** 1. To professionalize the functioning of pharmaceutical services in a hospital. 2. To ensure the availability of the right medication at the right time, in the right dose, at the minimum possible cost. 3. To teach the hospital pharmacist about the philosophy and ethics of hospital pharmacy and guide them to take responsibility of professional practice. 4. To strengthen the management skills of hospital pharmacist working as the head of the department 5. To strengthen the scientific and professional aspects of practice of hospital pharmacy such as his consulting, teaching role and research activities. 6. To utilize the resources of hospital pharmacy for the development of profession. 7. To attract the greater number of pharmacist to work in the hospital. 8. To promote the payment of good salaries to pharmacist. 9. To establish drug information services 10. To participate in research projects carried out in hospital. 11. To implement decisions of Pharmacy and Therapeutics Committee	

MODEL ANSWER

SUMMER – 17 EXAMINATION

Subject : Hospital and clinical pharmacy Subject Code: 0816

2.	**c)**	**Write signs, symptoms and treatment of Opium poisoning. (1 ½ mark each for signs, symptoms and treatment)** The symptoms appear in three different stages. 1. **Excitement**: Pleasurable mental excitement with increase in heart rate. 2. **Stage of stupor:** Headache, giddiness, fatigue and drowsiness .The eye pupils are contracted leading to pinpoint .The face and lips are cyanosed. The pulse and respiration is normal. **3 Stage of coma:** No responses to deep pain .The muscles are relaxed and reflexes are lost. All secretions are depressed, lowered respiration ,froth from mouth and finally death **Treatment** 1. Stomach wash with $KmnO_4$ solution .1:1000. $KmnO_4$ oxidise morphine to less toxic substances. 2. Clear the passage by endotracheal tube .artificial respiration may be used. 3. Antagonist therapy :**Nalorphine** I.V in doses of 5-10mg every 15 mins should be given till respiration becomes normal. 4. Bowels should be kept clear by purgatives. 5. Symptomatic treatment :5% Glucose saline solution I.V.	
2.	**d)**	**Write the uses of : (1mark each)** **i) Crepe bandage** : **(any one use)** a) It is used to create localized pressure **b)** It used to treat muscle sprains and strains which can restrict swelling at the place of injury. c) Elastic bandages are also used to treat bone fractures . d) It is also used for correctional purpose and as compression over paste.	

		ii) Plaster of Paris Bandage: a) It is used for immobilization and splinting of fractures and for construction of body support. b) In orthopaedic surgery it is used for immobilization, support and correction splinting **iii) Zinc paste bandage:** a)It is used to support and prevent the swelling of fractured limbs after the removal of plaster. b)It is also used to support varicose veins and for the treatment of phlebitis(vein inflammation), ulcers, varicose eczemas and oedema of the legs.	
2.	**e)**	**Give the methods of estimating demand of products in hospital.(1 mark for each method)** There are three methods of estimation of demand of products in hospital: 1)**Judgmental-** These are the judgments of the clinical and pharmacy staff where they express an opinion based on their experience about a quantity of a particular pharmaceutical product that will be required. 2)**Extension of Past history**- In the long run, we believe that patterns tend to be extension of past ones. The past consumption of the hospitals is extended to the future by constructing time series and extrapolating it. 3)**Causal method-** Forecasts are released to several variables, e.g. demand for whole blood is related to the admissions in the casualty/emergency wards, demand for antibiotics is related to the no. of patients with infections amenable to that antibiotic, admitted every month	
2.	**f)**	**Enumerate the reasons for patient Non –compliance. (½ mark for any 6 reasons)** 1.**Inappropriate packaging** : Some time 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 labeling**: 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 noncompliance. **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 noncompliance like chronic hypertension, mental illness.	
3.	**a)**	**Attempt any FOUR of the following:** **Classify hospitals according to clinical parameters with examples. (3 marks)** A. On basis of Major diseases: 1. Psychiatric hospitals or Mental Hospitals 2. T.B. Hospitals 3. Leprosy Hospitals 4. Cancer hospitals B. On basis of Anatomical Specialization: 1. Ear, Nose and throat Hospitals	**4x3=12**

		2. Orthopaedic Hospitals 3. Eye hospitals 4. Kidney Hospitals C. On the basis of Client group: 1.Paediatric Hospitals 2. Maternity Hospitals for mothers D. On the basis of system of medicine 1. Allopathic hospital 2. Ayurvedic Hospitals 3. Unani Hospitals 4. Homeopathic hospitals 5. Nature cure and well centers 6. Physiotherapy centers	
3	b)	**Give the meaning of following terms (any three): (each carries 1 mark)** i) **Emetics**: Agents which induce vomiting. ii) **Cholagogue:** An agent that enhances the flow of bile into the intestine. OR An agent that produces evacuation of gall bladder. iii) **Gout:** Gout is a type of arthritis that causes inflammation in joints due to deposition of uric acid crystals in joints. iv) **Hypoxia**: A condition in which there is reduced oxygen content in the tissues.	
3.	c)	**Explain any three factors affecting bioavailability. (Explanation of any three factors 3 marks)** **1. pka -** 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. **2.Partition coefficient**:- It is the ratio of solubility at equilibrium in an aqueous solvent to its solubility in an non aqueous solvent. 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.

3.Particle size : 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.

4.Dosage form : Dosage form of a drug can affect bioavailability of the drug. It is dependent upon the particle size of the dosage form. The bioavailability of drugs from a dosage form is as follows

Solution >suspension>powder> capsules>Tablets. Small particle size is important for absorption of some drugs like Corticosteroids, antibiotics like Chloramphenicol and griseofulvin.

5.Manufacturing variables in formulation.(any 2 examples)

In manufacturing compression force may affect bioavailability from a given dosage form e.g addition of lubricants are generally hydrophobic in nature reduce wetting of the drug particles. This reduces rate of disintegration and affects bioavailability of drugs.

For formulation of pharmaceuticals, different additives like starch, lactose, gums, calcium phosphate are used. These additives greatly affect bioavailability of certain drugs, e.g. Phenytoin, digoxin, levodopa and warfarin.

Some excipients like wetting agents like lactose and polysorbate 80 enhance bioavailability of some drugs, by penetration of solvent. Excipients may interact with the drug and may affect bioavailability of the drug.

If too much binders are added disintegration is slow which in turn reduces bioavailability

6. Dissolution Rate: It is the rate at which the drug goes into solution. Particularly for tablet and capsule forms, of such type of drug bioavailability is measured. The absorption of drug takes place only when it is solution form. Hence if the drug after disintegration gets dissolve quickly, the absorption will be rapid and vice versa

7.Effect of GIT fluids-

-Acidic drugs are rapidly absorbed from stomach because in the acidic medium of stomach these remain in the unionized form.e.g. Salicylates and Barbiturates.

- Basic drugs are not absorbed from the stomach. The alkaline medium of small intestine enhances the absorption of these drugs because these remain in the unionized form e.g. Pethidine, Ephedrine.

-Mucin forms a thin layer over the gastric epithelium. It may form complexes with various drugs and reduce their bioavailability. E.g - Hypertensive and Anticholinergic drugs form complexes and hence are poorly absorbed.

8.G.I. transit time and gastric motility- (any 2 examples)

- Presence of food and the volume, viscosity and tonicity of gastric contents, can influence drug absorption by altering gastric emptying time.

- Some drugs show better bioavailability when they are given before meals.

- Some drugs like Salicylates, iron preparations are administered after food, because they cause GIT irritation.

- Increased peristaltic activity of stomach reduces bioavailability. E.g. sustained realesed drugs.

- Anti-cholinergic drugs, which promote gastric emptying time also reduce the bioavailability.

- Metoclopramide increases gastric emptying and so increases the absorption of ethanol, paracetamol, Tetracycline; while Propantheline reduce the absorption of riboflavin, sulfamethoxazole, ethanol and paracetamol.

9.First pass-effect-

First pass effect means the drug degradation occurring before the drug enters the systemic

		circulation. -It, means, all drugs taken orally, first pass through GIT and then through the portal system, before reaching systemic circulation. - Hence, bioavailability of such drugs decreases; and this diminishes the therapeutic response by first pass effect, e.g. levodopa, morphine, nitroglycerine, Isosorbide dinitrite and Propranolol have less bioavailability if given orally. **10.Diseased state- (any 2 examples)** - Absorption of drugs can be affected by diseased state of GIT, like malabsorption, thyrotoxicosis, achlorhydria, and liver cirrhosis. - In achlorhydric conditions of GIT, absorption of acidic drugs like aspirin increases. - Some drugs like amoxicillin show decreased bioavailability in diseased state. - In chronic inflammation of ileum absorption of trimethoprim decreases while that of sulphamethaxazole increases.	
3.	**d)**	**Explain with examples drug-food interactions. (at least 6 examples, 3 marks)** 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: 1) Food reduces the absorption of aspirin, isoniazide, tetracyclines, benzylpenicillin, amoxicillin, Ampicillin, levodopa and Rifampicin 2) Food increases the absorption of hydralazine, nitrofurantoin, lithium citrate, riboflavin, carbamazepine, metoprolol, propanolol, 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. Fat containing drug increases degree of ionization of Griseofulvin, so increases its absorption. 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 unchanged by food. 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. 9) Milk reduces absorption of tetracycline by forming an insoluble complex.	
3.	**e)**	**Describe the role of PTC in drug safety. (any 6 points, 3 marks)** 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 areas are looked into by PTC… 1. Employment of qualified registered pharmacist with at least B.Pharm degree holder as the chief pharmacist & rest are diploma holders. 2. Takes care that dispensing is done only by the pharmacist. 3. Sufficient number of pharmacists are employed. 4. Proper & adequate storage facilities are provided in pharmacy. 5. Poisonous material & non-poisonous material are stored separately. 6. Pharmacy should have adequate equipments. 7. External preparations are kept separately from internally used preparations. 8. Follow of GMP effectively in the in-house manufacturing unit. 9. Stock & issue of narcotic & psychotropic substances shall conform to the legal	

		requirements. 10. Hospital shall have a drug formulary which is periodically revised & kept up to date. 11. Expired & deteriorated drugs are physically separated. 12. Providing a library & documentation facility.	
3.	**f)**	**What is rheumatoid arthritis? Describe the pathophysiology of RA.** **Rheumatoid arthritis (1 mark)** Rheumatoid arthritis is a chronic inflammatory disease that affects mainly the joints but sometimes other organs and tissues in the body.. **<u>Pathophysiology: (2 marks)</u>** Rheumatoid arthritis is an autoimmune disease. In this disease, 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 immunoglobulin (IgG) as the antigen and produces antibodies against them, known as 'Rheumatoid factor". 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.	
4.		**Attempt any FOUR of the following:**	**4x3=12**
	a)	**Define parenterals. Describe the following test for evaluation of parenteral solution: Sterility test OR Pyrogen test.(definition- 1 mark, any one test description 2 marks)** **Parenterals** are sterile formulations that are administered into the body by routes other than oral route which includes injection, infusion and implantation. **STERILITY TEST:-**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. Products containing antimicrobials gives false negative test. Hence such product is diluted to make the bacteriostatic agent ineffective and then the test is carried out.	

Product containing antimicrobial drugs such as penicillin, sulfa drugs have to be tested in presence of antagonistic materials e.g. penicillin in presence of penicillinase and sulfa drugs in presence of PABA.

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 of thrice to check for accidental contamination. If again the test fails the product is non-sterile.

The test is performed under aseptic conditions under laminar air flow.

Tests for sterility may be carried out by:

1. Membrane filtration method
2. Direct inoculation method

The culture media used are:

1. Fluid thioglycollate medium for anaerobic bacteria
2. Soyabean-casein digest medium for fungi and aerobic bacteria

PYROGEN TEST

Pyrogens are metabolic product of living or dead micro-organisms. Chemically pyrogens are lipopolysaccharides, which cause rise in body temp after injection.

Pyrogen are thermostable and soluble in water .They are unaffected by the bactericide and can pass through bacteria proof filter.

The I.P pyrogen test is done on selected healthy rabbits of either sex. It is performed in 2 stages.

1) Preliminary test: It is known as "SHAM TEST" carried on rabbits, which are being used for pyrogen test for first time or the animal not used from previous 2 weeks. Is done to

		condition the rabbits. It is performed for 1-3 days by giving a warmed solution of either SWFI or sterile saline at a dose of 10ml/kg body wt. Recording of body temp prior to 90 min for 3 hrs is done. If any rabbit shows a difference of 0.6^{o}c or more then it is not used for the test. 2) **Main test:-** It is performed initially on a group of three rabbits. They are placed into animal holder box. A thermometer is inserted into the rectum. The product being tested is warmed at 38^{o}C then it is injected in in the marginal vein of the ear of the rabbit. Before the administration of the product the initial temp, which is the mean temp recorded at 60 and 90 min is recorded. The recording is continued to further 3 hrs at an interval of 30 mins . The max temp is recorded; finally response is calculated by subtracting the initial temp from max temp shown by the animal. **OR** **LAL TEST** **Limulus amebocyte lysate** (**LAL**) is an aqueous extract of blood cells (amoebocytes) from the horseshoe crab, Limulus polyphemus. LAL reacts with bacterial endotoxin or lipopolysaccharide (LPS), which is a membrane component of Gram negative bacteria. If pyrogen or bacterial endotoxins present in the sample to be tested then it is combined with Lysate of horse shoe crab to form coagulase. Coagulase hydrolyzes a specific bond of coagulogen protein, present in the blood and produces clot.	
4.	**b)**	**How drug abuse is treated? (3 marks)** **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.	
4.	**c)**	**Write sources of collection of drug information at DIC.** **1.Primary sources – (1 mark)** Information obtained from basic researches and developments which is published in brief for first time. Information on internet, website, c.d. **2.Secondary sources – (1 mark)** Information in the form of abstracts, journals, periodicals, references and official books is called secondary sources. i) Journals and periodicals – American journal of hospitals pharmacy, Indian journal of hospitals pharmacy, Journal of clinical pharmacology. ii) Text books – Text book of hospitals pharmacy, clinical toxicology. iii) Reference books- Remington's pharmaceutical science, Merck index iv) Pharmacopoeias – The Indian Pharmacopoeia, British Pharmacopoeia v) Formularies – National formulary of India, National formulary of America. **3) Tertiary Sources - (1 mark)** It include dictionaries, encyclopedias, desk references The Chemist and Druggist directory	

		Indian Pharmaceutical Guide- which gives the manufacturers or suppliers catalogues and price list. Medical register and Directory of Pharmaceutical Chemists. -Statistical Table and Mathematical table to provide scientific data.	
4.	**d)**	**Explain the use of computer in inventory control in hospital pharmacy.(3 marks)** The computer can be effectively used for inventory control in the hospital pharmacy as follows: **i) Periodic inventory control system**- In this system, inventory of goods is manually checked, the amount of stock in hand, minimum and maximum, can be found out by feeding the data to the computer. Once the stock is entered in the computer, it is helpful for placement of order to each supplier. **ii) Perpetual inventory control- In** this system, computer maintains running balance of all drugs in the stock. All drugs are entered into the database. When they arrive in the pharmacy, they are added in the initial stock, so as to update the current stock. The current level of each drug is found out by subtraction from the inventory balance. Thus, the computer cal list out minimum order quantity of each drug. In this way computer can help in inventory control- - 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.	

4.	**e)**	**Explain the term: 'Teratogen'. Give any two examples of teratogenic drugs along with its teratogenic effects.(explanation 1 mark, 2 examples 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.	

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.

4. f) What is (i) Lithotripsy,(ii) Lane's tissue forceps. (iii) MRI? (each 1 mark)

(i)Lithotripsy- It is a non-invasive technique used to disintegrate the urinary stone by laser beam after locating calculi perfectly.

(ii)Lane's tissue forceps: These are used to hold the tissue for traction. The holes in the blade allow bulging of the tissue, thereby a better grip and minimum damage to the tissue.

(iii)MRI: Magnetic Resonance Imaging scanners use strong magnetic field and radio waves to form images of the body. It is used to diagnose degenerative disease, strokes, musculoskeletal disorders, tumours, etc.

MODEL ANSWER

SUMMER – 17 EXAMINATION

Subject : Hospital and clinical pharmacy Subject Code: 0816

5.		**Attempt any FOUR of the following:**	**4x3=12**
	a)	**Describe the processing of Parenterals. (3 marks)** Following steps are involved in processing of parenterals- **1) Procurement and selection of component-** The initial processing step is procurement of acceptable component. Majority of these components are taken from their approved stock and only few like WFI are manufactured inside the unit.WFI is prepared by distillation. **2) Cleaning containers and equipments-** All equipments used for parenterals should be disassembled to provide internal structure of equipment. All parts should be cleaned using a effective detergent and should be protected from contamination. A variety of devices are available for cleaning of containers from a single jet tube to complex automatic washers which cleans the container by using distilled water. **3) Sterilization of containers-**Generally sterilization of containers and closures is done by moist heat sterilization. The sterilized container and closures should be stored in closed container or equipment until they get ready to use. **4) Product preparation-**It consists of the following steps- • Weighing of ingredients. • Dissolving ingredients in sequence in the vehicle. • Adjustment of volume and pH. • Filtration of solution. **5) Filling Procedure-** During filling of container with the product the most stringent requirement must be exercised to prevent contamination particularly in product that has been sterilized by filtration. Thus this operation should be carried out in the aseptic filling area. The liquid products are more readily subdivided uniformly than the solid product. A	

		means is provided for repetitively forcing a measured volume of liquid through the orifice of delivery tube which is introduced to a container. **6) Sealing Procedure**-Sealing of the filled container should be done immediately by Tip sealing or Pull sealing to prevent the product contamination. The vials and bottles are closed by rubber closures aseptically. The rubber closures may held in place by means of aluminum cap. **7) Terminal sterilization**-The parenteral product should be sterilized immediately after its sealing. Thermolabile substances are sterilized by non-thermal process like filtration. Since dry heat may affect the substance it is of limited value, moist heat sterilization (Autoclaving) is most widely used sterilization process for aqueous solution and substance which can withstand high penetration of steam.	
5.	**b)**	**Write pathophysiology of heart attack. Write the clinical manifestations of it.(1 mark for pathophysiology , 2marks for clinical manifestations)** **Pathophysiology-**Infracted myocardium is a dead muscle which results from obstructed coronary artery due to formation of thrombosis (formation of blood clot) in which there is continuous decreased blood supply to heart as a result the coronary arteries continuously get efficient oxygen due to which dead muscles are created in the heart results into the condition known as Myocardial Infarction due to poor supply of blood to the heart. **Clinical Manifestations-** 1. Severe pain in the chest. 2. Feeling of heavy pressure on chest. 3. Pain may continue for hours or days and there may be extreme shortness of breath and possibly nausea, vomiting followed by extreme weakness and fatigue. 4.WBC count of person may increases to 15,000/mm^3	

		5. Skin becomes pale and cold. 6. Pulse is weak and slow and may be irregular.	
5.	**c)**	**What is the role of Nursing department in hospitals? (any 3 roles – 3 marks)** Nursing is the vital prime need of the health care system. It has following roles in the hospital- 1. Nursing department gives general assistance to out- patients, inpatient area and wards. 2. It gives assistance to the labor wards and Operation Theater. 3. It is the integral part of the hospital which keeps coordination with all other departments of the hospital 4. Maintaining Nursing records and record of quality of service given to the patient. 5. Arranging training programs for staff of the Nursing department. 6. Nursing department encompasses health promotion, patients care, prevention of disease, rehabilitation, teaching, counselling and emotional support. 7. Nursing department respect individuality, dignity and rights of every person regardless of race, colour and social and economical status.	
5.	**d)**	**Discuss the guiding principles of Hospital formulary system.(any 6 points – 3 marks)** The following principles will serve as guide to all those utilizing the formulary system: 1. The medical staff of the hospital shall appoint P and T Committee and outline its scope, purpose, organization and function. 2. The formulary system will be sponsored by medical staff based upon recommendations of P and T Committee.	

		3. The medical staff shall adopt the written policies and procedures of the formulary system. 4. Drugs should be included in the formulary by their nonproprietary names and should be prescribed by the same name. 5. Limiting the number of drugs available from pharmacy can produce substantial patient care and financial benefits. These benefits can be greatly increased by using generic equivalents. Generic equivalent- The drugs containing identical active compounds. E.g Two brands of tetracycline. Therapeutic equivalent- The drugs differing in composition but having very similar pharmacological or therapeutic effects. E.g.: two different antacid products. 6. The management of the hospital shall inform all the medical and nursing staff about the existence of. 7. Provision shall be made for the use of drugs not included in the formulary, by the medical staff. 8. The pharmacist shall be responsible for specification as to quality, quantity, and source of supply of all the drugs used in the diagnosis and treatment of patients.	
5.	**e)**	**List the withdrawal symptoms and write treatment of morphine dependence.(1 ½ marks each for withdrawal symptoms and treatment)** **Withdrawal symptoms-** Sudden withdrawal of Morphine develops the symptoms as below- After 8 hours-Yawning, Sweating, Crying, Anxiety. 20 hrs – Chills, Sweating. 24-48 hrs- Nausea and vomiting, Diarrhea, fever, hypertension.	

		Up to 1week- Muscle cramps. Up to several months- Insomnia. **Treatment-** It involves psychological or pharmacological method or combination of both. 1. **Psychological Method**- Dosage reduction of morphine with appropriate psychotherapy and social counseling of patient. 2. **Pharmacological method-** The symptoms can de suppressed by substitution of another narcotic for opiate e.g.-Methadone (20 mg in divided doses for first 3 days and then 10mg for 3days. A narcotic antagonist Naltrexone is given orally it blocks the action of Morphine.	
5.	**f)**	**Explain terms (Any three) (1mark for each)** **i)Bioavailability ii) Relative Bioavailability** **iii)Clinical eguivalence iv)Therapeutic equivalence** **i)Bioavailability-** It is defined as extent to which the active ingredients in the drug product is taken up by body in the form it is physiologically active. **OR** Bioavailability is the rate at which and extent at which the drug reaches to systemic circuiation in its active form. **ii) Relative Bioavailability-**It is the availability of drug from dosage form as compaired to reference standard. **iii) Clinical equivalence-** When the clinical effect of a drug from different formulations is same ,then it is called as Clinical equivalence.	

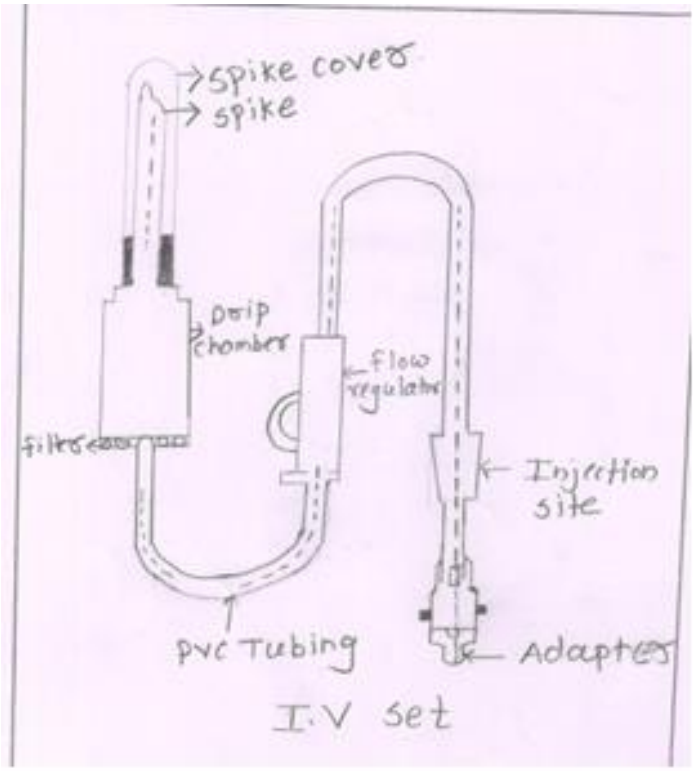
		iv)Therapeutic equivalence- If two or more similar dosage form of same drug reaches to the blood circulation at the same relative extent and to the same relative rate and produces same therapeutic effect the it is called as Therapeutic equivalence.	**4x4=16**
6.		**Attempt any FOUR of the following:**	
	a)	**Define Drug Interaction. Explain what will happen when following drugs administered together: (1 mark for Definition , 1 mark each for interaction)**	
		i) Folic acid with Phenytoin.	
		ii)Digitalis with Diuretic	
		iii)Alcohol with Disulfiram	
		Drug Interaction is a defined as alteration of pharmacological effect of one drug by prior or concurrent administration of another drug.	
		i) Folic acid with phenytoin- Serum folate decreases if phenytoin is administered with it so it will leads to folate deficiency (Anemia).	
		ii) Digitalis with Diuretic- Diuretic causes loss of potassium from body results in hypokalemia and if digitalis is administered it may produce digitalis toxicity.	
		iii) Alcohol with 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)	

MODEL ANSWER

SUMMER – 17 EXAMINATION

Subject : Hospital and clinical pharmacy Subject Code: 0816

6.	**b)**	**Draw the diagram of I.V set. Describe the functions of its components.(2 marks – diagram, 2 marks for any 4 components)**	



Functions of Components of IV Set-

1. Spike cover: It protects the spike and maintains its sterility from external environment.

2. Spike: It helps in piercing.the closure or cap of the bottle.

3. Drip chamber: It acts as a small reservoir for solution. It is transparent and squeezable. This property helps in preventing air bubbles from entering the fluid path.

4. Filter: It is placed at the bottom of drip chamber. It is made up of nylon having pore size of 15 micron

5 PVC Tubing: The tube is colorless, soft and transparent, having a length of 150 cm. with an internal diameter of 2.7 mm. It acts as pathway.

		6. Flow Regulator: It has two parts namely: (a) Body, (b) Wheel. Body supports the movement of the wheel. This controls the flow rate. 7. Injection site: It is made up latex. SVP can be given to the patient via this site. 8. Adapter: It is the distal end connection site for needle. It is made of PP plastic	
6.	**c)**	**Write a note on : (2marks each)** **(i)DIB** **(ii)Satellite pharmacy** **(i)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 of DIB-** 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 detail analysis of drug information to the physician. 6. It also publishes matter in question –Answer session /column in the bulletin. **(ii) Satellite pharmacy**- 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 nursing station. **Location:** Satellite pharmacies are located on each floor of the hospital. This concept is being adopted	

		in very big hospitals which have multistoried separate buildings in a single premises. **Advantages:** 1.Availability of pharmacist to the patient and nursing for counseling 2.Pharmacist at nursing station take patient drug history and monitor patient for drug reaction 3. Drug distributed efficiently. 4. Drug distribution time can be reduced. 5.No error in drug distribution	
6.	**d)**	**Discuss economic factors governing manufacture and purchase decision in production in Hospital pharmacy.(4 marks for 4 factors)** Following factors affect make or buy decision in hospital manufacturing: 1. Quality 2.Quantity 3.Cost and 4.Service. 1) **QUALITY-**The quality of outside purchases & the quality that could be possibly achieved when manufactured within the hospital are compared. If there are no wide variations between these two, it is not an important consideration .if there is a wide variation, it becomes crucial factor. If a better quality results from in-house manufacturing, the matter should be probed further. Why do the outsiders fail to come up to the desired quality level? Also, is the hospital competent to produce the desired quality? Does it have the necessary infrastructure? Most of the times, as in case of large volume fluids, the hospital favors 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.	
6.	**e)**	**Write the dose and uses of Dimercaprol and Desferrioxamine in toxicology.(1 mark for dose and 1 mark for use)** **i)Dimercaprol-** **Dose-**It is administered in a dose of 3-5mg/kg I.M at the interval of 4 hours for first 2 days, interval of 4 to 6 hours for additional 2 days and interval of 6 to 12 hours for additional 7days. **Uses-** It is a chelating agent used in Heavy metal poisoning. ii) **Desferrioxamine-** **Dose-**Oral 8 to 12 grams in 40 to 60 ml distilled water I.V.2 gram in 5% laevulose solution. **Uses-** It is used in Acute Iron poisoning.	
6.	**f)**	**How is dispensing of charged floor stock carried out? Write any two advantages and disadvantages of complete floor stock system.(2 marks for dispensing , 1 mark each for advantages and disadvantages)** **Dispensing of charge floor stock drugs (Envelope method)** The patients are charged mostly because of high cost of the drugs. These include injections or other single dose preparations. An envelope is used to dispense the drug to the nursing station which is used as charge ticket. The pre- labeled envelops are filled with specific drugs in specified quantity and placed at the disposal of nursing unit. When the drug is administered, the patient's name and room number is entered on the envelope and sent to the pharmacy where it is priced & forwarded to account department for billing.	

		Advantages of floor stock system- (any 2 points -1 mark) 1. The drugs are easily available at the wards and Nursing units. 2. Elimination/Minimization of drug returns. 3. Reduction in Number of drug prescription orders. 4. Reduction in the number of pharmacist required. **Disadvantages of floor stock system-(any 2 points -1 mark)** 1. Chances of medication error may increase. **2.** Increased drug inventory at wards and nursing units. **3.** Wastage of drugs due to insufficient storage facility. 4. Increased hazards associated with drug deterioration.	