



**WINTER- 14 EXAMINATION**

Subject Code:0816

**Model Answer**

Page No:1/29

**Important Instructions to examiners:**

- 1) The answers should be examined by key words and not as word-to-word as given in the model answer scheme.
- 2) The model answer and the answer written by candidate may vary but the examiner may try to assess the understanding level of the candidate.
- 3) The language errors such as grammatical, spelling errors should not be given more Importance (Not applicable for subject English and Communication Skills).
- 4) While assessing figures, examiner may give credit for principal components indicated in the figure. The figures drawn by candidate and model answer may vary. The examiner may give credit for any equivalent figure drawn.
- 5) Credits may be given step wise for numerical problems. In some cases, the assumed constant values may vary and there may be some difference in the candidate's answers and model answer.
- 6) In case of some questions credit may be given by judgement on part of examiner of relevant answer based on candidate's understanding.
- 7) For programming language papers, credit may be given to any other program based on equivalent concept.



**SUMMER – 14 EXAMINATION**

Subject Code: **0816**

**Model Answer**

Page No: 2/29

Q.1. Attempt any FIVE of the following: ( 5 X 4 marks)

**a) Give normal values and significance of (any two) (normal value-1 mark, Significance-1 mark)**

(i) Blood Cholesterol

Normal Value: 150-240 mg/dL or %

Significance:- Increased level indicates Coronary artery disease, hypothyroidism, Diabetes mellitus & Liver disorders

Decreased level indicates Pernicious anemia, acute infections & Hyperthyroidism

(ii) ESR

Normal Value:- Westergren Method: Male 5-15mm at end of one hour

Female 5-20 mm at end of one hour

Wintrobe Method : Male 0-9mm at end of one hour

Female 0-20mm at end of one hour

Significance:- Increase ESR suggests possible pathological conditions like rheumatoid arthritis, TB, pneumonia, allergy, malignant tumor, syphilis etc.

ESR decreases in polycythemia, sickle cell anemia, protein shock, burning case etc.

(iii) Sperm Count

Normal Value: 20-100 million/ml of seminal fluid

Significance:-Less than 20 million /ml indicates Oligospermia; infertility in male.



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**SUMMER – 14 EXAMINATION**

Subject Code:0816

Model Answer

Page No: 3/29

**b) What advice must be given to the patient using (any four) ( 1 mark each)**

- (i) MAO inhibitors:- Avoid cheese, chocolate, alcoholic beverages and liver or yeast extract.
- (ii) Aspirin- Do not take on empty stomach.
- (iii) Diazepam-This drug may cause drowsiness so do not work with dangerous machinery and do not drive a heavy vehicles and do not drink alcoholic beverages.
- (iv) Ampicillin-This medicine should be taken one hour before meal or two hour after meal. This drug sometimes causes diarrhea, call your doctor if it becomes severe. Complete the course of drug otherwise reoccurrences of disease take place.
- (v) Phenytoin-Expose yourself to sunlight in the morning.
- (vi) Boric Acid- Contraindicated in children under 12 years old. Not for internal use.

**c)Write one example of each of the following poison. ( any one example-1 mark)**

- (i) Corrosive –Sulphuric acid, nitric acid, hydrochloric acid, oxalic acid, Sodium hydroxide, Potassium hydroxide, carbonates of sodium, calcium, potassium.
- (ii)Organic-Vegetable poisons e.g. castor oil seeds, castor oil, croton oil, colocynth, Ergot, marking nut and aloes.  
  
Animal Source e.g. Snake venom, Scorpion venom, Cantharides and poisonous insects
- (iii)Inorganic- Non-metallic poisons e.g.phosphorus, chlorine, bromine, iodine, boron.,  
Metallic poisons e.g. arsenic,antimony, mercury, silver, iron, copper, bismuth lead.
- (iv)Cardiac-e.g. Digitalis, Stropanthus



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**SUMMER – 14 EXAMINATION**

Subject Code:0816

Model Answer

Page No: 4/29

**d) Define the following. (1 mark each)**

- (i) Teratogenicity- The administration of certain drugs to pregnant woman, specifically during the first trimester of pregnancy results in foetal abnormalities is called as Teratogenicity.
- (ii) Addison's disease-It is chronic disorder of adrenal cortex characterized by insufficiency of mineralocorticoids and glucocorticoids.
- (iii) Choleric agents- Agents which increases secretion of bile from liver cells.
- (iv) Drug Abuse- Drug abuse is defined as the consumption of a drug apart from medical need or in unnecessary quantities.

**e) Translate into English. (1 mark each)**

- (i) Dandus- to be given
- (ii) Semel in die-Once a day
- (iii) Tussis- Cough
- (iv) Charta-Powder

**f) Write use of following (any four).(1 mark each)**

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



**SUMMER – 14 EXAMINATION**

Subject Code: **0816**

**Model Answer**

Page No: 5/29

iii) Doppler echocardiography- It is used to determine the speed and direction of blood-flow in heart and blood vessels.

(iv) Sphygmomanometer- It is used to measure blood pressure

(v) Ultra-sound sonography- It is used to determine anatomical features of body parts with use of sound waves and imaging. It is helpful in gynecology to know the reasons of repeated abortions, fetal conditions, fetal abnormalities, fetal surgeries prior to birth.

(vi) Magnetic Resonance Imaging (MRI)- It is an aid to neurology for diagnosis of complicated cases. It is especially useful in neurological, musculoskeletal, cardiovascular

**g) Write the meaning of following abbreviations: (1 mark each)**

(i) LAL- Limulus Amebocyte Lysate

(ii) TPN- Total Parenteral Nutrition

(iii) SVP- Small Volume Parenteral

(iv) HEPA- High Efficiency Particulate Air filter.

**Q.2. Attempt any THREE of the following (3 X4 marks)**

**a) Define hospital. Write functions of hospital.** (Definition-1 mark. Any 6 functions-3 marks)

Hospital is a complex organization or institution of community health with a single purpose of restoration and maintenance of good health. It provides special facilities and trained personnel and physician with a single object of patient care.

Following are functions of hospital-

1. It raises the quality of care and general standards of medical practice.
2. It is a center of community health and contributes a great deal too preventive and social medicine.



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**SUMMER – 14 EXAMINATION**

Subject Code: **0816**

**Model Answer**

Page No: 6/29

3. It lowers the incidence of disease through early detection and immediate treatment.
4. It is a link between the general public and policy-makers.
5. It stimulates the growth of medical science. Doctors and nurses receive their training in large teaching hospitals.
6. Bigger hospitals co-operate with smaller hospitals. Specialty hospitals co-operate with general hospitals. Private hospitals co-operate with public hospitals. The whole trend is towards integration.

**b) Explain the process of dispensing drugs to outpatients in typical hospital.**

1. Patient in his first visit to OPD goes to registration counter .Take case paper after paying nominal fees .
2. Then patient goes to general check up counter –guided for medical department on the basis of clinical symptom .
3. Physician write prescription for patient and he submitted it to pharmacy dept. where Rx is compounded and dispensed by pharmacist.
4. Pharmacist number the Rx ,moniter it and assemble the materials and equipment for compounding.
5. Pharmacist give token to the patient so patient and Rx can be identified.
6. Compounded Rx filled in suitable container ,packaged, labelled and priced reasonably.
7. Pharmacist record Rx in a register for accounting purpose .
8. While dispencing and compounding the drug correct delivery is ensured by chaecking token number. For his next visit Rx is given back to the patient.



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**SUMMER – 14 EXAMINATION**

Subject Code:0816

Model Answer

Page No: 7/29

**c) Explain factors affecting make or buy decision in hospital manufacturing.**

Following factors affect make or buy decision in hospital manufacturing:

1. Quality 2.Quantity 3.Cost and 4.Service.

1) QUALITY-The quality of outside purchases & the quality that could be possibly achieved when manufactured within the hospital are compared. If there are no wide variations between these two, it is not an important consideration .if there is a wide variation, it becomes a crucial factor. If a better quality results from in-house manufacturing, the matter should be probed further. Why do the outsiders fail to come up to the desired quality level? Also, is the hospital competent to produce the desired quality? Does it have the necessary infrastructure?

Most of the times, as in case of large volume fluids, the hospital favours in-house manufacturing as it has a legitimate apprehension that an outsider may compromise with the quality of his supplies.

2) QUANTITY-Generally, those items whose orders are too small to purchase it from an outside supplier are manufactured within the hospital.

Similarly, items which are required every day for use in hospitals, in large quantities, are generally decided to be manufacture. Break-even analysis gives the hospital the break-even quantity of production. Break-even is at a point where there are no profits and no losses.

3) COST-Here we compare the costs of buying from outside with the cost of in-house manufacturing. The cost of manufacturing the items within the hospital is estimated by drawing up a cost-sheet. It is important to allocate over-heads correctly.

Cost and quantity together considered for making the decision.

4) SERVICE: Generally, a supply is more assured when a hospital makes an item then when it buys it.



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**SUMMER – 14 EXAMINATION**

Subject Code: **0816**

**Model Answer**

Page No: 8/29

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.

**d) Define hospital pharmacy. State objectives of hospital pharmacy.**

**(Definition-1 mark. Any 6 objectives-3 marks)**

Hospital Pharmacy-It is service department of hospital which receives drugs and supplies, stores, dispenses them to inpatients and outpatients under supervision of qualified registered pharmacist.

Objectives of Hospital Pharmacy:

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.





SUMMER – 14 EXAMINATION

Subject Code:0816

Model Answer

Page No: 9/29

11. To implement decisions of Pharmacy and Therapeutics Committee.
12. To co-ordinate and co-operate with other departments of a hospital.

e) Differentiate between drug addiction and drug habituation.(1 mark-each point)

Drug Addiction	Drug Habituation
1.It is a state of chronic or periodic intoxication due to repeated consumption of drug,	1.It is a state resulting from the repeated use of drug.
2.A <u>compulsion</u> to continue taking the drug or overpowering desire	2.A desire <u>but not compulsion</u> to continue taking the drug to improve a sense of well being .
3.A tendency to increase a dose of drug	3.Little or no tendency to increase a dose of drug
4. A psychic ,particularly physical, dependence shown by the individual on the effects of the drug ,.	4. Some degree of psychic dependence but absence of physical dependence
5.Withdrawl symptoms are observed	5.Withdrawl symptoms are not observed
Ex. Morphine ,Heroin ,Alcohol etc	Ex.Tea ,coffee. etc



**SUMMER – 14 EXAMINATION**

Subject Code:0816

**Model Answer**

Page No: 10/29

**Q.3 Attempt any Three of the following : (3 x 4 marks)**

**a) Define adverse drug reactions & write a note about idiosyncrasy. (1 mark for definition & 3 marks for note )**

Adverse Drug Reaction – The World Health Organisation defines an adverse drug reaction as “ any noxious & unintended effect of drug which occurs at doses normally used in man for the prophylaxis, diagnosis or therapy of the disease or for the modification of physiological function”.

Idiosyncrasy – It means unusual, bizarre or unexpected drug effects which can not be explained or predicted in an individual recipient. It includes genetically determined abnormal responses to a drug. It has been used to denote both qualitatively & quantitatively abnormal drug responses.

Ex. 1 Drug induced foetal abnormalities like Phocomelia which developed in the offsprings of mothers exposed to Thalidomide.

2. Analgesics may induce tumor of kidney in patients with renal diseases.

3.Long term therapy with immunosuppressives like Azathioprine , Cyclophosphamide may induce Lymphoid tumor.

4. Thyroid cancer in patients who have received I 131 therapy in past.

**b)Explain the role of computer in**

**i) Medication monitoring in Hospital ii) Purchasing & inventory control in Hospitals**

**( 2 marks for Medication monitoring & 2 marks for Purchasing & inventory control )**

**Role of Computer in**

i) Medication monitoring in Hospital- For medication monitoring pharmacist makes use of some pharmacokinetic & non-pharmacokinetic parameters. Thus here computer has two types of applications



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**SUMMER – 14 EXAMINATION**

Subject Code: **0816**

**Model Answer**

Page No: 11/29

1. Pharmacokinetic application- Here pharmacokinetic parameters are determined in an individual patient. It includes statistical calculation & graphical interpretations. It needs frequent blood samples from patient. By using computer program like NANOLIN the pharmacokinetic parameters are predicted easily. On the basis of which further Dosage pattern is decided for the patient. The parameters commonly determined are rate of excretion, volume of distribution, drug clearance, etc.

2. Non-pharmacokinetic parameters – It involves determination of Drug-drug interactions, Drug-disease interactions, Drug-laboratory interactions, Adverse drug reactions, etc. For such interaction screening computer program like MEDIPHOR ( monitoring & evaluation of drug interactions by pharmacy oriented reporting.)

ii) Purchasing & inventory control in Hospitals – By using computers it is done by

1. Periodic inventory control method- in this method quantities of drug available in stock are manually checked. These are then compared with the minimum stock level & maximum stock level maintained on the computer. When the drug level reaches the minimum stock level purchase orders are placed by using computer.

2. Perpetual inventory control method - in this method computer maintains running balance of all the drugs in stock. All the drugs are entered in database when new stock is received by pharmacy. Computer adds this to the initial stock & reflects current available stock. The quantities of drugs leaving the pharmacy are entered in the computer. Computer subtracts this from the initial stock & reflects current available stock. Whenever the drug level reaches the minimum stock level purchase orders are placed by using computer.

**c) Define( 1 mark for each definition)**

i) Bioavailability

ii) Bioequivalence



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**SUMMER – 14 EXAMINATION**

Subject Code: **0816**

**Model Answer**

Page No: 12/29

iii) Relative bioavailability

iv) Absolute bioavailability

i) Bioavailability – The amount of percentage of drug is absorbed from administered doses form that reaches the systemic circulation.

ii) Bioequivalence – It is a relative term which means comparison of one brand product with another of same drug under a set of established standards.

OR

When two or more similar doses form of same drug reaches to blood circulation at the same relative extend and to the same relative rate is called bioequivalence.

iii) Relative bioavailability – It is the availability of the drug from given dosage form as compared to reference standard.

iv) Absolute bioavailability - It is the 100% availability of the drug after intravenous administration.

**d) Define PTC. Describe role of PTC in drug safety. ( 1 mark for definition & 3 marks for any six PTC's role)**

Definition of PTC – Pharmacy Therapeutics Committee is a policy framing & recommending body on matters related to rational use of drugs in the hospital, comprising of members from various departments of the hospital.

Role of PTC in Drug safety - Drug safety is one of the major responsibility 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...



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**SUMMER – 14 EXAMINATION**

Subject Code: **0816**

**Model Answer**

Page No: 13/29

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.

**e) Define Surgical dressings. Describe any three tests to be performed to evaluate absorbent cotton wool IP. ( 1 mark for definition & 1 mark for any three test )**

Surgical dressings - Surgical dressings are the materials which are used for the dressing of wounds as coverings, absorbents, protective or supports for injured or diseased tissues.

Tests for evaluation of Absorbent cotton IP –

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



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**SUMMER – 14 EXAMINATION**

Subject Code: **0816**

**Model Answer**

Page No: 14/29

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

3. Surface active substances:

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

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

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

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

7. Water soluble substances : Not more than 0.5 %

8. Ether soluble substances: : Not more than 0.5 %

9. Sulphated ash: : Not more than 0.5 %

10. Loss on drying : : Not more than 8.0 %



**SUMMER – 14 EXAMINATION**

Subject Code:0816

Model Answer

Page No:15/29

**Q.4 Answer any Three of the followings : (3 x 4marks)**

**a) Explain pathophysiology, signs & symptoms of Tuberculosis.**

( 2 marks for pathophysiology & 2 marks for signs & symptoms)

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

Pathophysiology :- ( 2 marks )

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

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

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

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

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

Signs & Symptoms: (1 mark)

Primary Tuberculosis:

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

-Mild fever and malaise may occur.



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**SUMMER – 14 EXAMINATION**

Subject Code: **0816**

**Model Answer**

Page No: 16/29

Secondary or Pulmonary tuberculosis:

Fever up to 40°C in late afternoon or evening & sweat at night

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

Chronic/Miliary tuberculosis:

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

**b) Define drug information bulletin . Give the different sources of collecting drug information. ( 1 mark for definition & 3 marks for sources.)**

Definition of Drug information bulletin – DIC may publish a booklet/ journal /periodical for communicating recent information about new development of drug to all health profession in hospital is called as Drug information bulletin.

Different sources of drug information.

- 1) Primary sources – Information obtained from basic researches and developments which is published in brief for first time. Information on internet, website, c.d.
- 2) Secondary sources - Information in the form of abstracts, journals, periodicals, references and official books is called secondary sources.





**SUMMER – 14 EXAMINATION**

Subject Code: **0816**

**Model Answer**

Page No: 17/29

- i) Journals and periodicals – American journal of hospitals pharmacy, Indian journal of hospitals pharmacy, Journal of clinical pharmacology.
- ii) Text books – Text book of hospitals pharmacy, clinical toxicology.
- iii) Reference books- Remingtons pharmaceutical science, Merk index
- iv) Pharmacopoeias – The Indian Pharmacopoeia, British Pharmacopoeia
- v) Formularies – National formulary of Indian, National formulary of America.
- 3) Tertiary Sources - It include dictionaries, encyclopedias, desk references
- The Chemist and Druggist directory
  - Indian Pharmaceutical Guide- which gives the manufacturers or suppliers catalogues and price list.
  - Medical register and Directory of Pharmaceutical Chemists.
  - Statistical Table And Mathematical table to provide scientific data.

**c) Define Clinical pharmacy & describe its scope. ( 1 mark for definition & 3 marks for scope.)**

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

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.



**SUMMER – 14 EXAMINATION**

Subject Code: **0816**

**Model Answer**

Page No: 18/29

Scope of Clinical pharmacy –

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 center. The drug info. Is available at this center and utilized suitably. This data is send to physician as per their requirements.
5. Patient counseling- it involves providing information to the patient about drug therapy and illness. The pharmacist acts as resource for information about health promotion and disease prevention.
6. Participation in new drug investigation- clinical pharmacist along with physician participates in investigation of new drugs. Data of this investigation is compiled, analysed and maintained at drug information center.
7. ADR management- Along with physician clinical pharmacist's activity is involved in reporting of management of ADR.



**SUMMER – 14 EXAMINATION**

Subject Code:0816

Model Answer

Page No:19/29

**d) Explain the following drug interactions ( 2 marks for each interaction.)**

i) Folic acid & phenytoin      ii) Warfarin & phenobarbitone –

i) Folic acid & phenytoin drug interaction –

If Phenytoin is administered with folic acid it inhibits intestinal enzyme Conjugase and reduces absorption / conversion of Folic acid polyglutamate into Folic acid monoglutamate. This results in deficiency of folic acid that causes Anemia.

ii) Warfarin & phenobarbitone –

Phenobarbitone causes stimulation of hepatic enzymes, which leads to faster biotransformation of Warfarin giving decreased anticoagulant effect.

**e) Define Antidote. Give the formula & uses of Universal antidote. ( 1 mark for definition , 2 marks for formula & 1 mark for use.)**

Antidote – Antidotes are the substances which oppose the effects of poisons specifically or non-specifically.

Formula & uses of Universal antidote-

Ingredients	Quantity	Use
1. Powdered charcoal	2 parts	adsorbs alkaloids
2. Magnesium oxide	1 part	neutralizes acids
3. Tannic acid	1 part	precipitates alkaloids.

Universal antidote is used in cases where the nature of the poison is not known or a combination of poisons is administered.

It is administered in doses of a tablespoonful repeated once or twice.



**SUMMER – 14 EXAMINATION**

Subject Code:0816

Model Answer

Page No:20/29

**Q5. Attempt any THREE of the following (4 marks each)**

**a) Define non sterile manufacturing .Name the equipments required for manufacturing of tablets.(1 mark for definition, 3 marks for name of the equipments)**

Non sterile manufacturing-It is defined as manufacturing of all dosage forms which does not strict aseptic condition but manufacture it under hygienic condition and prevent any contamination in the process.

Equipments for compressed Tablets

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

- (a) Mixing, Granulation and Drying section
- (b) Tablet compression section.
- (c) Packaging section (strip/blister machine wherever required).
- (d) Coating section (wherever required).

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

- (a) Granulation-cum-Drying section
  - (1) Disintegrator and sifter
  - (2) Powder mixer
  - (3) Mass mixer/Planetary mixer/Rapid mixer granulator.
  - (4) Granulator
  - (5) Thermostatically controlled hot air oven with trays (preferably mounted on a trolley)/Fluid bed dryer.
  - (6) Weighing machines.
- (b) Compression section.



---

**SUMMER – 14 EXAMINATION**

Subject Code: **0816**

**Model Answer**

Page No: 21/29

- (1) Tablet compression machine, single/multi punch/rotatory.
  - (2) Punch and dies storage cabinets.
  - (3) Tablet de-duster
  - (4) Tablet Inspection unit/belt.
  - (5) Dissolution test apparatus
  - (6) In-process testing equipment like single pan electronic balance, hardness tester, friability and disintegration test apparatus.
  - (7) Air-conditioning and dehumidification arrangement (wherever necessary)
- (c) Packaging section.
- (1) Strip/blister packaging machine.
  - (2) Leak test apparatus (vacuum system)
  - (3) Tablet counters (wherever applicable)
  - (4) Air-conditioning and dehumidification arrangement (where ever applicable).
- (d) Coating section,
- (1) Jacketted kettle (steam, gas or electrically heated for preparing coating suspension).
  - (2) Coating pan (stainless steel)
  - (3) Polishing pan (where applicable)
  - (4) Exhaust system (including vacuum dust collector)
  - (5) Air-conditioning and dehumidification arrangement.
  - (6) Weighing balance.

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



**SUMMER – 14 EXAMINATION**

Subject Code:0816

Model Answer

Page No: 22/29

**b) Discuss the guiding principles of ‘Hospital Formulary System’.( 4 marks for any 8 points-1/2 mark each)**

**Guiding principle while using formulary**

1. The medical staff of the hospital shall appoint a P and T committee and outline its scope, purpose, organization, and function.
2. The formulary system will be sponsored by medical staff.
3. The medical staff shall adopt the written policies and procedures of the formulary system.
4. Drug should be included in the formulary by their nonproprietary names and should be prescribed by the same.
5. When there is no formulary then the pharmacist has to follow physician's prescription. They can consult the physician when the prescribed brand is not available.
6. The management of the hospital shall inform all the medical and nursing staff about the existence of the formulary system, procedure of operation.
7. Provision shall be made or the use of drugs not included in the formulary, by the medical staff.
8. The pharmacist shall be responsible for specification as to the quality, quantity, and source of supply of all drugs used in the diagnosis and treatment of patients.
9. Limiting the no of drugs available from pharmacy can produce proper patient care and financial benefits. These benefits can be greatly increased by using generic equivalents

**C) Explain Pathophysiology ,signs and symptoms of peptic ulcer.**

**Pathophysiology:** (Any 4 reasons- 2marks)

-Ulceration of GIT is due to parietal cell and gastrin secreting cell produces excess secretion of acid. If the parietal cell mass is increases then excess gastric acid releases during meal.

-If the mucosal barrier of stomach and intestine damage then acid diffuses through it and causes inflammation and lesion in the lining of stomach and duodenum.

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



**SUMMER – 14 EXAMINATION**

Subject Code:0816

**Model Answer**

Page No: 23/29

-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.

**Sign and symptoms: ( 2 marks)**

- 1) Pain or discomfort in the upper abdomen .
- 2) Loss of appetite , weight loss.
- 3) Nausea, vomiting
- 4) Burning , soreness, hunger , midmorning pain relieved after milk or food intake , day time pain , bloating ,nausea , vomiting .

**d) What do you mean by centralized and decentralized purchase? Describe to whom the copies of purchase order are given and why? (1 mark each for centralized and decentralized purchase ,2 marks for copies of purchase order)**

Centralized purchase :Purchasing is done for the entire hospital, of all essential items.It is controlled and co ordinated by a purchase officer or a purchase committee.

Decentralized purchase-In this method individual department do the purchasing .pharmacy is allowed to purchase drugs,medicines and essential supplies. The purchasing is done by different departments towards a centralized purchase department for requisition .one purchasing officer is appointed to oversee these purchases in the hospital.



**SUMMER – 14 EXAMINATION**

Subject Code: **0816**

**Model Answer**

Page No: 24/29

The purchasing agent after receiving the “Purchase Request” Prepares the “Purchase Order”. Purchase order must be prepared from the data of Purchase Request Form and in multiple copy for:-

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

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

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

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

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

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

**e) Explain the uses of following.(1 mark each)**

i) Aneurysm needle- It is used to collect CSF.

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

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

iii) Ryle’s tube:- This tubes are passes into stomach for decompression, sampling or delivery of food or drugs or for stomach wash in case of poisoning.

iv) Rubber catheter (any two uses)

1. Rubber catheters are used to drain the bladder.

2. To catheterize during labor.

3. to give bladder wash.





**SUMMER – 14 EXAMINATION**

Subject Code:0816

Model Answer

Page No: 25/29

**6. Attempt any THREE of the following . (4 marks each)**

a) Explain the terms (1 mark for each term)

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

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

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

iv) Ambulatory patient- He is the patient who visits the hospital for routine check up like blood pressure, heart rate etc. i.e they are capable of moving around by their own.

**b) Classify hospitals giving one example of each type on the basis of (2 marks each)**

i) Size

ii) Private ownership

i) Size

1. Large Hosp : (Beds 1000 and above)

e.g. J.J Groups of hospital in Mumbai have an intake of 1400 beds.

K.E.M, Bombay has 1600 beds.

2. Medium Hospital: (Beds 500 and 1000)

e.g. Bombay hospital, Mumbai 700 beds, Jaslok hospital, Bombay has 620 beds



**SUMMER – 14 EXAMINATION**

Subject Code:0816

**Model Answer**

Page No: 26/29

3.Small hospital (beds between 100-500)

e.g.Breach candy -130 beds,P.D Hinduja -175 beds.

4 very small hospitals (beds less than 100) e.g. any private nursing homes

ii) Private ownership

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

Bombay Hosp mumbai,Jaslok Hospital

ii)Religious bodies and order

Ramkrishna Hospital calcutta and

christian medical college hospital (banglore)

iii)Limited company

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

Apolo Hospital Ltd(Madras)

Medinova(baroda)

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

c) Describe the layout of sterile product area.(1 mark each for describing any 4 areas)

**Clean up area**:-In such area cleaning and steaming of packing materials and utensils is done therefore the walls and ceiling are constructed in such a way, that they withstand the effects of steam and chemicals. Generally ,epoxy or vinyl paint is coated to solve the purpose.

This area must be keep clean by washing it regularly.

Precaution must be taken to prevent the growth of micro organism and collection of dust.



**SUMMER – 14 EXAMINATION**

Subject Code:0816

**Model Answer**

Page No: 27/29

**Compounding area**:-It is nothing but a “preparation” area, where the formula is compounded, and not necessarily aseptic. There should be strict control it that these should not catch dust. The cabinets and counters should be of stainless steel. Ceiling wall and floor should be sealed and can be coated with Epoxy paint. Adequate sink and counter space should be provided.

**Aseptic Area**:- It is an entirely sealed area from outside atmosphere to keep aseptic environment free from physical and biological contamination.

Therefore, at the time of designing and constructing the aseptic area civil work can compose to HVAC (High ventilating and air conditioning) system including the electrical wire fittings and switches.

The walls facing outside should have double walled glass partition .The material used should protect the wall, flooring and ceiling from material handling ,routine SOP’s of equipments and chemicals which are used for fumigation of aseptic area, epoxy paints should be used.

Prevent wall, ceiling ,and floor from the accumulation of microorganisms

The personnel working in such area must follow the guideline and standards of behavior in aseptic area according to GMP. The personnel enter in this area through air lock door.

Movement should be minimum and restricted during filling procedure.

They should be good health and free from dermatological conditions

Uniform should be freshly laundered each day and sterile.

Uniform consist of hoods for covering the hair, face masks, plastic /gum boots, rubber gloves, goggles, etc.

**Quarantine area**

Approved batches from QC department can be kept here before labelling and packing. It must contain space that separates ‘Approved batches’ and ‘In process batches’. This area is only restricted to a responsible person.

**Labelling and packing area**-Adequate space is required for installation of printing devices and packaging machines In this area ,label printing and labelling can be take place.

**Storage and its disposal**- The finished product are stored under specified storage condition and dispensed off.



**SUMMER – 14 EXAMINATION**

Subject Code:0816

**Model Answer**

Page No: 28/29

**d) Explain the mechanisms of pharmacodynamics drug interactions.(1 mark each)**

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

- (i) Interaction enhancing the effect: e.g. synergistic effect of trimethoprim and sulphamethoxazole. MAOI and sympathomimetics enhance sympathetic activity.
- (ii) Interactions inhibiting the effect: e.g. Acetylcholine and atropine by competitive antagonism oppose the action of each other. E.g. Alcohol and amphetamine have opposite effects on CNS.
- (iii) Alteration of electrolyte levels: Drugs which cause alterations in fluid and electrolyte balance may modify the responses of tissues to drugs. e.g. Diuretics losing potassium, may cause hypokalemia, in turn making the heart more sensitive to digitalis.
- (iv) Drug interactions at receptor sites:
  - (a) Drug interactions at same receptors: Drugs that act at the same receptor site, if prescribed together, may produce additive effect or antagonize one another; e.g. respiratory depression and other central effects of morphine are antagonized by nalorphine.
  - (b) Drug interactions at different receptors: Drugs may interact on the same target organ, but at different receptor sites. E.g. Adrenaline activates adenylyclase system and causes an increase in cyclic 3-5 AMP which then acts as the mediator in a number of beta effects of adrenaline for relaxation of bronchial smooth muscles. Theophylline produces the same effect, an increase in cyclic 3-5 AMP, by inhibiting phosphodiesterase, and also causes bronchial smooth muscle relaxation. Thus, drugs that inhibit different enzymes may show synergistic effect.



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**SUMMER – 14 EXAMINATION**

Subject Code:0816

Model Answer

Page No: 29/29

**e)Describe any eight factors contributing to patient Non compliance.**

**Factors contributing to patient Non compliance (1/2 mark for each factor)**

- 1.In appropriate 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 prescription contain direction which are inadequate like take when required or use as directed that may produce confusion.
- 3.Multiple drug therapy: Greater the number of drugs patients is taking the higher is the risk of non compliance.
- 4.Asymptomatic nature of patient: In case of asymptomatic patient, it is difficult to convince a patient by explaining the value of drug therapy results in non compliance.
- 5.Measurement of medication: Many times there is confusion to the patient in measuring liquid preparations or number of tablets.
- 6.Cost of medication: Because of high cost of drugs ,poor patients are not purchase such drug
- 7.Frequency of medication: Regular schedule of dosage intake can not be followed due to work load.
- 8.Duration of therapy: Long duration treatment lead to patient non compliance.
- 9.Illness: The nature of patient's illness may contribute to non compliance like chronic hypertension, mental illness.