



Important Instructions to examiners:

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

**MODEL ANSWER****SUMMER - 18 EXAMINATION**

Subject Title: Hospital and clinical pharmacy

Subject Code: **0816**

| Q. No. | Sub Q. N. | Answer | Marking Scheme |
|--------|-----------|--|----------------|
| 1 | | Solve any <u>EIGHT</u>: (2marks each) | 16M |
| 1 | a) | Define the following terms: (any two) (1 mark each) i) <u>Drug dependence</u> : A state of psychic and also sometimes physical resulting in which the user has a compelling desire to continue taking the drug either to experience its effect or to avoid the discomfort of its absence”. ii) <u>Bioavailability</u> : Bioavailability may be defined the amount or percentage of drug is absorbed from the administered dosage form, that reaches to the systemic circulation. OR The extent to which the active ingredient in the drug product is taken by the body in the form in which it is physiologically active. iii) <u>Patient compliance</u> : WHO defines patient compliance as ‘faithful adherence by the patient to prescriber’s instructions. | 2M |
| 1 | b) | What are surgical dressings? Write any two ideal properties. (1 mark for definition and 1 mark for any 2 properties.) Surgical dressings are the materials which are used for the dressing of wounds as coverings, absorbents, protective or supports for injured or diseased tissues. <u>Ideal properties : (any two)</u> 1.It should be non-adherent to skin surface. 2.It should have the maximum absorbing capacity. 3.It should be cheap and non-inflammable. 4.It should be porous to water vapour, otherwise the sweat from the surrounding skin will accumulate and delay the healing. 5.It should be free from foreign substances that cause tissue reactions such as allergy or hypersensitivity. | 2M |



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| | | <p>6.It should be capable of being sterilized by conventional methods.</p> <p>7.It should be unaffected by industrial solvent such detergents and oils.</p> <p>8.It should have sufficient tensile strength.</p> <p>9.It should be smooth on both the surfaces</p> <p>10.It should have constant physical properties under normal conditions of storage and use.</p> | |
| 1 | c) | <p>What advice will you give to patient taking: (any two) (1 mark each)</p> <p>i) Diazepam :‘This drug may cause drowsiness so do not work with dangerous machinery and do not drive vehicle’.</p> <p>ii) MAO inhibitors: Avoid cheese, chocolate, alcoholic beverages and liver or yeast extract.</p> <p>iii) Boric acid: Contraindicated in children under 12 years old. Not for internal use.</p> | 2M |
| 1 | d) | <p>Write the normal values with their significance: (any two) (½ mark each for normal value and significance)</p> <p>i) ESR:</p> <p>Normal Value: Westergren Method: Male 0-15mm at end of one hour</p> <p style="text-align: center;">Female 0-20 mm at end of one hour</p> <p style="text-align: center;">Wintrobe Method : Male 0-9mm at end of one hour</p> <p style="text-align: center;">Female 0-20mm at end of one hour</p> <p>Significance: - Increase in ESR suggests possible pathological conditions like rheumatoid arthritis, TB, pneumonia, allergy, malignant tumor, syphilis etc.</p> <p>ESR decreases in polycythaemia, sickle cell anaemia, protein shock, burning case etc.</p> <p>ii) Blood pressure: 120/80mmHg</p> | 2M |

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| | | <p>Significance:</p> <p>Diastolic B.P represents a state of peripheral resistance which determines the strain on vascular system.</p> <p>Systolic B.P decreases in case of Shock, peripheral vasodilation and anemia.</p> <p>iii) Hamoglobin : Normal values-</p> <p style="padding-left: 40px;">Male :15.5 +/- 2.5 gm%</p> <p style="padding-left: 40px;">Female :14 +/- 2.5 gm%</p> <p>Significance- Values below normal indicates anaemia and leukaemia and values above normal level indicate dehydration & polycythemia.</p> | | | | | | | | | |
|----------------------|----------|--|-------------|----------|----------------------|---------|--------------------|--------|----------------|--------|----|
| 1 | e) | <p>What is universal antidote? Give its composition. (1 mark each for universal antidote and composition)</p> <p>Universal antidote is used in cases where the nature of the poison is not known or a combination of poisons is administered.</p> <table><thead><tr><th>Ingredients</th><th>Quantity</th></tr></thead><tbody><tr><td>1. Powdered charcoal</td><td>2 parts</td></tr><tr><td>2. Magnesium oxide</td><td>1 part</td></tr><tr><td>3. Tannic acid</td><td>1 part</td></tr></tbody></table> | Ingredients | Quantity | 1. Powdered charcoal | 2 parts | 2. Magnesium oxide | 1 part | 3. Tannic acid | 1 part | 2M |
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| 3. Tannic acid | 1 part | | | | | | | | | | |
| 1 | f) | <p>Mention the suitable method for sterilization of (any two) (1 mark each)</p> <p>i) Sutures : Moist heat method</p> <p>ii) Hand gloves : Moist heat method / Ionisation radiation</p> <p>iii) Surgical dressing : Moist heat method</p> | 2M | | | | | | | | |
| 1 | g) | <p>Give the use of (any two) (1 mark each)</p> <p>i)Lumber puncture needle: To withdraw CSF (cerebrospinal fluid).</p> <p>ii) Scalpel : Scalpels are used to make an incision</p> <p>iii)ECG : It is use to check functioning of heart by recording electrical changes in cardiac muscles.</p> | 2M | | | | | | | | |



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| 1 | h) | What is Elite hospital? 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. | 2M |
| 1 | i) | State the meaning of : (any 2) (1 mark each) i) Lithotripsy: It is a non-invasive technique used to disintegrate the urinary stone by laser beam after locating calculi perfectly. ii) Relative Bioavailability: It is the availability of drug from dosage form as compared to reference standard. iii) Cholagogues: An agent that enhances the flow of bile into the intestine. OR An agent that produces evacuation of gall bladder. | 2M |
| 1 | j) | Translate following terms into English (any four) (½ mark each) i) Auristillae - Ear drops ii) Capiondus – To be taken iii) Nocte – At night iv) Fortis – Strong v) Unguentum – An ointment | 2M |
| 1 | k) | Define sterilization .Write the principle of autoclaving. (1 mark each for definition and principle of sterilization) Sterilization: It is the process of complete destruction of all microorganisms present in a system. OR It is define as the process that eliminates, removes, kills, or deactivates all forms of life and other biological agents. Principle: Autoclave is used to carry out steam sterilization. It works on the principle of utilization of saturated steam under pressure. The steam has more penetrating power and thermal capacity than dry heat. Saturated steam under pressure causes coagulation of cell | 2M |

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| | | protein leading to the destruction of microorganisms. The steam penetrates in the spores and capsules of bacteria, ruptures it and escape the protoplasm which is coagulated. | |
| 1 | 1) | Write the composition of PTC. The P and T committee should be composed of i. At least 3 physicians ii. A pharmacist iii. A nurse representative iv. Administrator | 2M |
| 2 | | Solve any <u>FOUR</u>:(3marks each) | 12M |
| 2 | a) | Define Hospital. Classify it on the basis of clinical parameter. (1 mark for definition and 2 marks for classification with example) Definition: The hospital is complex organization utilizing specialized scientific equipment and functioning through a group of trained people educated to the problems of modern medical sciences. All these are co-ordinate together for the common purpose of restoration and maintenance of good health. <u>Classification of hospital on clinical basis:</u> A. On basis of Major diseases: 1. Psychiatric hospitals or Mental Hospitals 2. T.B. Hospitals 3. Leprosy Hospitals 4. Cancer hospitals B. On basis of Anatomical Specialisation: 1. Ear, Nose and throat Hospitals 2. Orthopaedic Hospitals 3. Eye hospitals 4. Kidney Hospitals C. On the basis of Client group: 1.Paediatric Hospitals 2. Maternity Hospitals for mothers D. on the basis of system of medicine 1. Allopathic hospital | 3 M |



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| | | <ol style="list-style-type: none">2. Ayurvedic Hospitals3. Unani Hospitals4. Homeopathic hospitals5. Nature cure and well centres6. Physiotherapy centres | |
| 2 | b) | <p>Discuss the alcohol withdrawal symptoms and treatment.(1 ½ mark each)</p> <p>Withdrawal symptoms- Hangover, delirium, anxiety, course termers, weakness, sweating, insomnia, headache, muscle twitching, tachycardia, hallucination, disorientation and seizures, G.I disturbances like chronic gastritis, pancreatitis. The termination of alcohol can lead to fever, tremors, tachycardia, and agitation .It also results in myopathy, bone marrow suppression and gout.</p> <p><u>Treatment:</u></p> <ol style="list-style-type: none">1. Antidote treatment- Use of Disulfiram in a dose of 500mg daily.2. For nutritional deficiencies- Vitamin B complex or thiamine injections are given.3. Use of sedatives: Effective medical supportive therapy, like Alcoholic Anonymous and psychological counselling is effective.4. Emetin or apomorphine is given together with alcoholic drink to make the patient vomit.5. Phenobarbitone is given to prevent tremors.6. Behaviour therapy – It gives relaxation training, assertiveness training and self-control skills. | 3M |
| 2 | c) | <p>Write the pathophysiology and manifestations of TB. (1 ½ mark each)</p> <p>Pathophysiology :</p> <p>The bacillus that causes TB is tiny rod shaped germ. These germs are protected by an outer layer of wax which prevents the normal defence of the body from destroying them. TB may attack any part of the body such as bones, joints, glands, lymph nodes, eyes, kidney etc. but it especially attack on lungs causing pulmonary TB. These germs can live for months in any place especially in a damp area.</p> | 3M |



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

When the germs are entered into the lungs, the body defence, i.e. W.B.C surround the germs and swallow them .But because of waxy coat, many germs continue to live for months. The larger WBCs then move in building a wall of resistance against the invaders. This is known as 'tubercle'. Reactivation of bacilli due to decreased immunity, as in malnutrition or old age.

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

Signs & Symptoms:**Primary Tuberculosis:**

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

Mild fever and malaise may occur.

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 dyspnoea.
- If pulmonary artery in tubercular region ruptures,-massive haemorrhage.
- The infection may spread to pericardium. It causes inflammation and restriction in motion that may lead to heart failure.

Chronic/Miliary tuberculosis:

In this case lesions are found at lymph node kidney, meninges, spleen, bone marrow and



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| | | other organ. Difficulty in breathing, weight loss, fatigue and GIT disturbances. | |
| 2 | d) | <p>Define DIC. Write sources of drug information.(1 mark for DIC and 2 marks for sources)</p> <p>DIC: This centre provide bank of information on the drug by abstracting information about them from standard text book ,journals literatures ,research papers ,formularies and pharmacopoeia etc.</p> <p>1.Primary sources –</p> <p>Information obtained from basic researches and developments which is published in brief for first time. Information on internet, website, c.d.</p> <p>2.Secondary sources – (any 2 examples)</p> <p>Information in the form of abstracts, journals, periodicals, references and official books is called secondary sources.</p> <p>i) Journals and periodicals – American journal of hospitals pharmacy, Indian journal of hospitals pharmacy, Journal of clinical pharmacology.</p> <p>ii) Text books – Text book of hospitals pharmacy, clinical toxicology.</p> <p>iii) Reference books- Remington’s pharmaceutical science, Merck index</p> <p>iv) Pharmacopoeias – The Indian Pharmacopoeia, British Pharmacopoeia</p> <p>v) Formularies – National formulary of India, National formulary of America.</p> <p>3) Tertiary Sources - (any 2 examples)</p> <p>It include dictionaries, encyclopaedias, desk references</p> <p>The Chemist and Druggist directory</p> <p>Indian Pharmaceutical Guide- which gives the manufacturers or suppliers catalogues and price list.</p> <p>Medical register and Directory of Pharmaceutical Chemists.</p> | 3M |



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| | | -Statistical Table and Mathematical table to provide scientific data. | |
| 2 | e) | <p>What is hospital formulary? Discuss the contents of hospital formulary. (1mark for Hospital formulary and 2 marks for contents)</p> <p><u>Hospital formulary-</u> Hospital formulary is revised compilation of pharmaceutical preparations and ancillary drugs which reflects current clinical judgment of medical staff of the hospital.</p> <p><u>Contents of the Formulary:</u></p> <p>1)<u>Information of drug product:</u> Include list of branded & generic drugs With their formulation, dosage strength, route of administration, cost information etc.</p> <p>2) <u>Index to drug product listing:</u> a) For branded & generic drugs index- Proper reference to page number in each entry. b) Therapeutic/ Pharmacological index—According to Therapeutic category.</p> <p>3) Name & titles of members of PTC.</p> <p>4) Details of hospital policies & procedure regarding drug use, & request for entry of new drug in formulary.</p> <p>5) List of approved product used in hospital.</p> <p>6) Prescription writing-important section for young physicians.</p> <p>7) Appendix:</p> <p>a) Normogram of Body weight, height, BP. b) Posological table. c) List of items from CSS d) List of poisons & their antidotes e) List of emergency drugs f) Tables of DI. g) ADR report. h) Pharmacokinetic dosing & monitoring information. i) Metric conversion scales & tables.</p> | 3M |
| 2. | f) | <p>Define the following terms: (any three) (1 mark each)</p> <p>i) <u>Etiology:</u>A description of the etiology of disease includes identification of factors that provoke the particular disease <u>OR</u> Reasons or causes of disease</p> <p>ii) <u>Ischemia:</u> An inadequate blood supply to an organ or part of the body.</p> | 3M |



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| | | <p>iii) Phocomelia: It is the condition in which the hands or feet are attached close to the trunk, the limbs being grossly underdeveloped or absent.</p> <p>iv) Absolute Bioavailability: It is the amount of drug from a formulation that reaches the systemic circulation relative to an intravenous (IV) dose.</p> | |
| 3 | | Solve any <u>FOUR</u> : (3 marks each) | 12M |
| 3 | a) | <p>Attempt the following (Any four)</p> <p>Define Clinical Pharmacy describe its scope.(1 Mark definition,2 Marks for any 4 points in scope)</p> <p>Definition of Clinical pharmacy – Clinical pharmacy is a new born discipline that carries traditional hospital pharmacist from his product oriented approach to more healthier patient oriented approach, so as to ensure maximum well-being of the patient while on drug therapy.</p> <p style="text-align: center;">OR</p> <p>It is the branch of pharmacy which is concerned with various aspects of patient care & deals not only with dispensing of drug but also advising the patients on safe & rational use of drugs.</p> <p>Scope of clinical pharmacy—</p> <p>1. Medication history- it includes past and present of prescription and non – prescription drug, dietary supplements, dietary habits, drug and estimate of patient compliance with the drug therapy.</p> <p>2. Monitoring drug therapy- it includes evaluation of patient pharmacokinetics and pharmacodynamics parameters, lab. Findings, medical problems and communicating relevant findings to physician.</p> <p>3. Participation in ward rounds- The clinical pharmacist with physicians should participate in ward rounds, observe individual patient and decide the drug therapy.</p> <p>4. Drug information- The clinical pharmacist establish drug information center. The drug info. Is available at this centre and utilized suitably. This data is send to physician as per their requirements.</p> <p>5. Patient counselling- it involves providing information to the patient about drug therapy and illness. The pharmacist acts as resource for information about health promotion and</p> | 3M |



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| | | <p>disease prevention.</p> <p>6. Participation in new drug investigation- clinical pharmacist along with physician participates in investigation of new drugs. Data of this investigation is compiled, analysed and maintained at drug information centre.</p> <p>7. ADR management- Along with physician clinical pharmacist's activity is involved in reporting of management of ADR.</p> <p>8. Educational Programme- clinical pharmacist organized educational programs for nursing and education related to safe and effective use of drugs.</p> <p>9. Tailoring drug therapy- the clinical pharmacist after the diagnosis of physician formulates drug therapy to need of patient.</p> | |
| 3 | b) | <p>Define Unit dose dispensing? Discuss UDDS.(1 Mark definition, 2 Marks explanation)</p> <p>Unit dose dispensing-</p> <p>Those medications which are ordered, packed, handled, administered, charged in the form of single dose containing a predetermined amount of drug after application or administration the method of dispensing of such drugs is called as Unit dose dispensing.</p> <p>UDDS-</p> <p>The concept of UDD is introduced in 2 ways-</p> <p>1) Centralized Unit dose dispensing system</p> <p>All inpatients are dispensed in unit doses. The drugs which are included under unit dose system are stored in centrally located pharmacy and are dispensed at the time of dose to be administered by the patient. This system which provides unit dose drugs to the patients from central pharmacy of the hospital then it is known as Centralized Unit dose dispensing system.</p> <p>2) Satellite Pharmacies for decentralized Unit dose dispensing system(DUDDS)-</p> <p>Satellite pharmacies are located on each floor of the hospital. The main pharmacy in this</p> | 3M |



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| | | system is also a central pharmacy but the drugs are stored and delivered from Satellite Pharmacies which are located on each floor of the hospital. This type of system can be used for hospitals with number of floors. | |
| 3 | c) | <p>Explain physiological factors affecting bioavailability.(Any 3 factors 3Marks)</p> <p>1) Effect of GIT fluid: Any disturbances of pH of GIT fluid affect absorption which in turn changes the bioavailability. E.g. Salicylate and barbiturates (acidic drug) remain in unionized form in stomach, in acidic PH of stomach, they are rapidly absorbed. Basic drugs like pethidine, ephedrine are only absorbed in small intestine, as these drugs exist in un-ionized form in alkaline environment.</p> <p>2) G.I. Transit time: The motility of the stomach is important to the rate at which orally administer drug is passed on to the intestine. Delayed gastric emptying reduces absorption of orally administered aspirin. Food also affects gastric emptying time. Absorption of amoxicillin, ampicillin and cephalexin reduced in presence of food. This is due to enhanced gastric emptying.</p> <p>3) First –pass effect: Orally administered drugs go to the systemic circulation via hepatic portal system, which first present the drugs to the liver. Thus the entire absorbed dose of the drugs is exposed to the liver during first pass through the body. The drug, if it is rapidly metabolized in the liver, a small fraction only will reach the systemic circulation. This is known as first-pass affect and may cause significant reduction in bioavailability. Route of administration highly affects first-pass metabolism effect. Bioavailability of propranolol, oxyphenbutazone, chlorpromazine, and aspirin undergo first pass effect.</p> <p>4) Diseased state: Absorption of drug may be affected by certain conditions like mal absorption, achlorhydria, cirrhosis of liver, thyrotoxicosis.</p> | 3M |
| 3 | d) | <p>Discuss the methods of estimation of demand.</p> <p>There are three methods of estimation of demand-</p> <p>1) Judgmental Method-</p> <p>This is a method which depends upon the judgment of clinical and pharmacy staff where</p> | 3M |



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| | | <p>they express an opinion based on experiences about name and quantity of product that will be required majorly in the hospital.</p> <p>2) Experience of Past -</p> <p>The experience and consumption of drugs in the past helps in deciding the requirement of drugs in future.</p> <p>3) Causal Method-</p> <p>In this method by assessing medical record of the hospital one can estimate the demand for specific drug based on specific criteria.</p> <p>e.g. - i) Antibiotic drugs –No of patients admitted every month for whom the specific antibiotic is used.</p> <p>ii) Insulin- No of diabetic patients admitted inside the hospital.</p> <p>iii) Demand of whole blood- Is estimated on the basis of no of patients admitted in Emergency wards.</p> | |
| 3 | e) | <p>Define patient counselling. Discuss the role of pharmacist in patient counselling.</p> <p>(1Mark for definition,2 Marks for any 4 points of role)</p> <p>Definition-</p> <p>It is the part of clinical pharmacy practice to give maximum benefits to the patient. It includes the instruction or advice given by the pharmacist to the patient for use of prescribed drug.</p> <p>Role of Pharmacist in patient counselling-</p> <p>1) Name of the drug and its action- The pharmacist should inform the patient about not only the name of drug but also its other name .He must explain the use of that drug and action on the body. In brief he has to explain how the drug acts?</p> <p>2) Route of administration- It is important for the pharmacist to inform the patient about the route of administration of drug. Whether the drug is to be taken orally or it is to be</p> | 3M |



applied locally or to be used into eye, ear or nose or inserted rectally or vaginally. The pharmacist should be sure that the patient understands how to use ophthalmic preparations and suppositories.

3) Time of administration- The pharmacist should instruct the patient when to take the medication e.g. some drugs should be taken on empty stomach i.e. about 1 hour before meal or 2-3 hours after meal to ensure adequate absorption of drug. The patient should be provided for the medication calendar.

4) Duration of therapy- The pharmacist should encourage the patient to continue taking the medicine for the prescribed duration of the treatment. He should explain that the course of treatment must be completed to achieve best results.

5) Storage of drugs- The pharmacist should instruct the patient regarding storage of drugs those these are labelled on the container. The patient should advise to store the drugs in a separate cabinet where children will not reach.

6) Adverse effects of drugs- The patient should be informed about the adverse effects of the drugs, but it not necessary to inform about all the side effects e.g. .Headache. The patient should be informed of those side effects which will allay fears and help him to avoid injury to himself e.g. change in colour of urine, drowsiness.

7) Restrictions- The patient should be informed well that he should avoid certain drugs and foods during the therapy.

E.g. Restriction of Tyramine containing food in patients on MAO inhibitor therapy

8) Allergic reactions- Before dispensing the drugs like penicillin or sulphonamide, the pharmacist should ask the patient about his allergic reactions in the past. It helps in avoid in further complications of treatment.

9) Removal of drug from package- The patient is not familiar with the packing of the product as the pharmacist. Hence, the pharmacist should demonstrate the method of removal of drug from the package to the patient so that he can handle it properly.

10) Refill information- The patient should be informed the patient verbally, whether the prescription is refillable, or not. If it is, then for how many times it may be refilled and length of time during which it may be refilled. If it is not refillable, he should be instructed such, so that he may contact the physician for the same drug if needed.



| 3 | f) | <p>Differentiate between psychological drug dependence and physical drug dependence.</p> <table border="1" data-bbox="242 465 1417 1653"> <thead> <tr> <th data-bbox="242 465 831 546">Psychological drug dependence</th> <th data-bbox="831 465 1417 546">Physical drug dependence.</th> </tr> </thead> <tbody> <tr> <td data-bbox="242 546 831 741">i) It is state characterized by emotional or mental desire to continue taking a drug.</td> <td data-bbox="831 546 1417 741">i) It is state which shows itself by intense physical disturbances in Case the drug is not administered.</td> </tr> <tr> <td data-bbox="242 741 831 880">ii) No compulsion to take the Drug</td> <td data-bbox="831 741 1417 880">ii)There is compulsion to take the drug</td> </tr> <tr> <td data-bbox="242 880 831 1046">iii) Withdrawal symptoms are not observed or very minor</td> <td data-bbox="831 880 1417 1046">iii)Withdrawal symptoms or abstinence are observed</td> </tr> <tr> <td data-bbox="242 1046 831 1211">iv) No need of specific drug to treat withdrawal symptoms</td> <td data-bbox="831 1046 1417 1211">iv)Specific antagonist with supportive therapy is needed</td> </tr> <tr> <td data-bbox="242 1211 831 1377">v) No need of specific drug to treat withdrawal symptoms</td> <td data-bbox="831 1211 1417 1377">v)Specific antagonist with supportive therapy is needed</td> </tr> <tr> <td data-bbox="242 1377 831 1543">vi) It is not necessary to develop tolerance or physical dependence</td> <td data-bbox="831 1377 1417 1543">vi)Withdrawal symptoms are life threatening & severe</td> </tr> <tr> <td data-bbox="242 1543 831 1653">vii) E.g. nicotine, caffeine</td> <td data-bbox="831 1543 1417 1653">vii)E.g. opiate, alcohol</td> </tr> </tbody> </table> | Psychological drug dependence | Physical drug dependence. | i) It is state characterized by emotional or mental desire to continue taking a drug. | i) It is state which shows itself by intense physical disturbances in Case the drug is not administered. | ii) No compulsion to take the Drug | ii)There is compulsion to take the drug | iii) Withdrawal symptoms are not observed or very minor | iii)Withdrawal symptoms or abstinence are observed | iv) No need of specific drug to treat withdrawal symptoms | iv)Specific antagonist with supportive therapy is needed | v) No need of specific drug to treat withdrawal symptoms | v)Specific antagonist with supportive therapy is needed | vi) It is not necessary to develop tolerance or physical dependence | vi)Withdrawal symptoms are life threatening & severe | vii) E.g. nicotine, caffeine | vii)E.g. opiate, alcohol | 3M |
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| 4 | | Solve any <u>FOUR</u>: (3marks each) | 12M | | | | | | | | | | | | | | | | |
| 4 | a) | <p>Discuss the application of computer in medication monitoring.</p> <p>To evaluate therapeutic action and adverse effects of any drug, the hospital pharmacist takes the help of pharmacokinetic and non-pharmacokinetic parameters. This drug monitoring is essential in geriatrics and paediatrics and for drugs having the tendency to interact with each other. The drug monitoring computer has 2 types of functions-</p> <p>1. Pharmacokinetic function: It includes the collection of pharmacokinetic parameters,</p> | 3M | | | | | | | | | | | | | | | | |



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| | | <p>statistical calculation and graphical interpretation. With the help of computer programming like NONLIN, the pharmacokinetic parameters can be predicted easily. According to these parameters, the dose can be adjusted to keep the drug level within the therapeutic range. This type of application has been widely used for drugs like theophylline, amino glycoside antibiotics, phenytoin, digoxin, etc. some common parameters are rate of absorption, volume of distribution, clearance rate, etc</p> <p>2. Non-pharmacokinetic function: It includes drug-drug interaction, drug-laboratory, drug allergy, drug-disease interaction and adverse effects detection. For drug interaction screening, computer programs like MEDIPHOR (Monitoring and Evaluation of Drug Interactions by a Pharmacy Oriented Reporting) and PAD (Pharmacy Automated Drug Interaction Screening) can be used which increases the efficiency of clinical services provided by the hospital pharmacist.</p> | |
| 4 | b) | <p>Write pathophysiology, signs and symptoms of ‘Hypertension’ or ‘Rheumatoid arthritis’.(1 ½ marks each for pathophysiology and sign and symptoms)</p> <p>Hypertension-</p> <p>Pathophysiology- It may cause damage to various organs like kidney, eyes, heart and brain. It causes deposition of fibrin in the glomeruli of nephron which may leads to renal failure. In case of eyes it may produce visual disturbances. In hypertension work imposed on heart is increased many times due to increased blood flow, due to this increased load function of left ventricles deteriorates leading to left ventricular failure. Thrombosis and haemorrhage are the common damages to the brain.</p> <p>signs and symptoms- (any 3 points)</p> <ol style="list-style-type: none">1) Is usually an asymptomatic disease. Although headache, tinnitus, epistaxis are the common symptoms.2) Dizziness occurs when diastolic blood pressure exceeds 110 mmHg.3) Occipital headache in the morning.4) Retinopathy causes blurred vision followed by blindness. | 3M |



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| | | <p>5) Light headedness, dizziness, vertigo etc.</p> <p>6) Renal failure may occur.</p> <p>Rheumatoid arthritis-</p> <p>Pathophysiology:</p> <p>Rheumatoid arthritis is an autoimmune disease. In these diseases, body's immune system no longer accepts certain body proteins and reacts as if they were foreign antigen and produces antibodies against them. It is observed that patient's body considers human gamma globulin (IgG) as the antigen and produces antibodies against them, known as 'Rheumatoid factors'. The antigen reacts with antibody to form immune complex, which then reacts with complement. Complement is a series of proteins, which helps to stimulate the inflammatory process. Thus, the immune complex reacts with the complement in the joints, which leads to the inflammatory response Rheumatoid arthritis is a chronic disorder characterized by inflammation of connective tissues.</p> <p>Signs and Symptoms- (any 3 points)</p> <p>1) Fatigue, anorexia, weight loss and fever</p> <p>2) Inflammation of peripheral joints, most frequently the small joints of hand and feet, and the wrists, larger joints may also be involved.</p> <p>3) Morning stiffness is a common symptom. The stiffness generally lasts more than 30 minutes and may last for many hours.</p> <p>4) Chronic inflammation of joints results in erosion at the margins of the bones.</p> <p>5) Deformities may develop, mainly of the fingers and neck etc. Joints may ankylosed with complete loss of motion.</p> <p>6) Around 20- 30 % patients show formation of rheumatoid nodules. They occur commonly in the elbow or along the extensor surface of forearm.</p> <p>7) Inflammation of organs than joints like heart, lungs, eyes, may also occur.</p> | |
| 4 | c) | <p>Write uses of- (1Mark each)</p> <p>i) CT scan</p> | 3M |



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| | | <p>ii) HEPA</p> <p>iii) Ryle's tube</p> <p>i) CT scan-</p> <p>It is an advanced technique used for morphological examination of neurological organs, head, eyes, neck, spinal cord etc.</p> <p>ii) HEPA-</p> <p>The air in the aseptic area should be free from fibres, dust and microbes. This can be achieved by the use of HEPA filter.</p> <p>iii) Ryle's tube : (any 2)</p> <p>i) To give fluid or drugs to those patients who can't imbibe enough amount.</p> <p>ii) To give stomach wash in case of poisoning.</p> <p>iii) For gastric juice analysis.</p> | |
| 4 | d) | <p>Define and classify ADR.(1Mark definition, 2 Marks classification)</p> <p>Definition- Adverse drug reactions (ADR) - "Any response to a drug which is noxious and unintended, and which occurs at doses used in man for prophylaxis, diagnosis or therapy".</p> <p>Classification of ADRs:</p> <p>A) Predictable ADRs:</p> <ol style="list-style-type: none">1. Excessive Pharmacological effect.2. Secondary Pharmacological Effects.3. Rebound response on discontinuation. <p>B)Unpredictable ADRs:</p> <ol style="list-style-type: none">1. Allergic drug reaction and Anaphylaxis.2. Idiosyncrasy.3. Genetically determined Toxicities.4. Toxicity following drug withdrawal. | 3M |



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| 4 | e) | <p>Give requirements and list technical abilities of hospital pharmacist.</p> <p>(1 ½ Marks each for requirements and technical abilities)</p> <p>Requirements:</p> <ol style="list-style-type: none">1. Administrative ability2. Technical ability3. Manufacturing ability4. Research ability5. Teaching/Training ability6. Ability to Control <p>Technical abilities Hospital pharmacist - (any 3)</p> <ol style="list-style-type: none">1) Hospital pharmacist must have ability to use his basic knowledge of effect of drug on biological systems, in assessing drug absorption, distribution, metabolism and Excretion.2) Hospital pharmacist must be knowledgeable in pharmacology, toxicology, Pathophysiology, and therapeutics and patient care techniques.3) He must have adequate knowledge and technical background to manufacture Different dosage forms. He must be aware about the source of the drugs, costing etc.4) He must have knowledge for testing of raw material, finished product. by using Various instruments like HPLC, HPTLC, pH meter etc.5) He must know storage of drugs and their stability.6) He must have ability to perform different pharmacological and toxicological Experiments on compounds under investigation | 3M |



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| 4 | f) | <p>Write about nursing services in a hospital.</p> <p>Nursing is the vital prime need of the health care system. The primary aim of the nursing service is to provide nursing care to patients. Nursing constituted single largest group of employees in the hospital. Nursing director is the in charge of Nursing service. Nursing director is responsible to administrator. Nursing department consist of nursing units such as operating room, recovery room, labour room, central supplies room etc. Each area has a in charge called Head Nurse.</p> <p>It has following roles in the hospital-</p> <ul style="list-style-type: none">• Nursing department gives general assistance to outpatients, inpatient area and wards.• It gives assistance to the labour wards and Operation Theatre.• It is the integral part of the hospital which keeps coordination with all other departments of the hospital• Maintaining Nursing records and record of quality of service given to the patient.• Arranging training programmes for staff of the Nursing department.• Nursing department encompasses health promotion, patients care, prevention Of disease, rehabilitation, teaching, counselling and emotional support.• Nursing department respect individuality, dignity and rights of every person regardless of race, colour and social and economic status. | 3M |
| 5 | | Attempt the following:((Any FOUR) (3marks each) | 12M |
| 5 | a) | <p>Define Drug Interaction. Discuss any two drug-food interaction with examples. (definition 1 mark, any 2 examples 2 marks)</p> <p>Drug Interaction is a defined as alteration of pharmacological effect of one drug by prior or concurrent administration of another drug.</p> <p>Examples-</p> <ol style="list-style-type: none">i) Milk reduces absorption of tetracycline by forming an insoluble complex.ii) Solubility of Griseofulvin increases when it is taken with milk or fatty food, | 3M |



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| | | <p>because ionization of Griseofulvin is high in presence of fatty food.</p> <p>iii) Mono amine oxidase(MAO) is an enzyme which breaks down catecholamines such as Nor-epinephrine. When the enzyme is inhibited, there are increased level of Nor-epinephrine. Thus MAO- inhibitors are used as antihypertensives. if MAO inhibitors administered with tyramine containing food like cheese and butter, alcoholic beverages. Tyramine is metabolized by MAO. When patient being treated with MAO- inhibitors also take tyramine containing food, tyramine reaches systemic circulation causing severe hypertension.</p> <p>iv) If drugs like Oral contraceptives/Phenytoin taken with Folic acid they inhibit the enzyme intestinal conjugate which is responsible for conversion of poorly absorbed form of folic acid i.e polyglutamate into readily absorbed form of folic acid .i.e monoglutamate. This results into deficiency of Folic acid (Anaemia)</p> <p>v) Absorption of some drugs reduces in presence of food e.g. ampicillin, Rifampicin, Aspirin, Isoniazid, Tetracycline, Benzyl penicillin, Levodopa. Iron absorption is reduced if food has been taken within the previous two hours. If Iron is taken on empty stomach it can cause nausea. Therefore Iron tablets are often given with food.</p> <p>vi) Absorption of drugs like- riboflavin, spironolactone, Lithium citrate, Carbamazepine increase in presence of food.</p> <p>vii) Nitrofurantoin is given with food to avoid GIT irritation this also increases drug absorption.</p> | |
| 5 | b) | <p>Define and classify poisons. (definition 1 mark, classification 2 marks)</p> <p>Poison is any substance taken in the body by ingestion, inhalation, injection or absorption that interferes with normal physiological function.</p> <p>OR</p> <p>A poison can be defined as a chemical substance which when administered, inhaled or swallowed is capable of producing harmful or lethal effect on the body.</p> <p><u>Classification-</u></p> <p>Depending upon mechanism of action of poison, these are classified as</p> <p>1) Corrosives-</p> | 3M |

**MODEL ANSWER****SUMMER - 18 EXAMINATION**

Subject Title: Hospital and clinical pharmacy

Subject Code: 0816

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| | | <p>a) Strong acids- sulphuric acid, nitric acid, hydrochloric acid</p> <p>b) Organic acids- oxalic acid , carbolic acid</p> <p>c) Concentrated alkalies- caustic potash, caustic soda, carbonates of sodium, calcium and potassium</p> <p>2) Irritants -</p> <p>a) Inorganic: 1. Non- metallic- Phosphorous, chlorine , bromine, Iodine 2. Metallic- Lead, Mercury, copper, zinc, arsenic , manganese</p> <p>b) Organic: 1. Animal origin- Snake, scorpion, Insects, Cantherides 2. Vegetable origin- Ergot aloe, capsicum, castor oil seeds etc.</p> <p>c) Mechanical- Powdered glass</p> <p>3) Neurotics-</p> <p>a) Cerebral poison- opium , sedatives and hypnotics, insecticides, cocaine and hyoscyamus</p> <p>b) Spinal poisons- Nux vomica</p> <p>c) Peripheral poisons- curare alkaloids, conium</p> <p>4) Cardiac- e.g. Digitalis , stropanthus, aconite, tobacco</p> <p>5) Pulmonary depressants- Substances acting on lungs e.g. Gases such as carbonmonooxide, coal gas</p> <p>6) Miscellaneous- Analgesics, antipyretics, stimulants, antidepressants, antihistamines, hallucinogens</p> | |
| 5 | c) | <p>What are the various reasons for ADR? (any 6 reasons 3 marks)</p> <p><u>Reasons for ADR:</u></p> <p>1.Medication errors:</p> <ul style="list-style-type: none">• Self medication of OTC drugs by patient leads to over use or misuse of drug. It may result into excess pharmacological action or complications.• Over prescribing of potent medicament to the patient e.g oral hypoglycemic, antihypertensivess etc. <p>2.Inadequate monitoring of the patient:</p> <p>Drugs like cardiotonics, Diuretics, corticosteroids needs therapeutic monitoring with continuing the administration beyond therapeutic end point which leads into adverse</p> | 3M |



reactions.

3.Sudden withdrawal of drugs: Therapy with drugs like corticosteroids and hormones cannot be suddenly stopped. Such drugs therapy is gradually stopped by decreasing the dose.

4.Bio-availability variations: There are number of brands of the same drug which leads to variations in bio-availability of drugs.

5.New potent drugs : The ever increasing number of new potent drugs along with brands ,may cause hypersensitivity reactions in particular individuals.

6.Drug interaction and drug food interaction: This type of interaction occurs when two or more drugs or presence of food may inactivate or alter the absorption of drug results in inactivation.

7.Some drug having narrow margin of safety: Difference between therapeutic dose and toxic dose is very narrow in some drugs,e.g- .Digitalis if not prescribed carefully leads to its toxicity.

8.Patient factors:

a) Age: Young and old patients are more susceptible to adverse drug reactions as compare to the adults, because of pharmacokinetics pattern at this age.

b) Disease state: Mainly patients with hepatic or renal dysfunction are prone to adverse effect of drugs.

c) Genetic factors: Some people are sensitive to even low doses of drugs, while others are not. This may be due to defects into either enzyme deficiency, or abnormal enzyme system.

Ex. In people with Glucose -6 –phosphate dehydrogenase (G-6PD) deficiency, antimalarial therapy can develop hemolytic anemia.

9.Discontinuation of therapy /treatment due to :High cost of medicine, Lack of faith on physician or Noncompliance.



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| 5 | d) | <p>Discuss factors affecting ‘Make or Buy’ decision.(any 3 factors, 3 marks)</p> <p>Following factors affect make or buy decision in hospital manufacturing:</p> <p>1. Quality 2.Quantity 3.Cost and 4.Service.</p> <p>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.</p> <p>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.</p> <p>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.</p> <p>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.</p> | 3M |
| 5 | e) | <p>Explain the drug interactions of the following: (Any two) (1 ½ mark each)</p> <p>i) Folic acid and phenytoin: Phenytoin inhibits the intestinal conjugase enzyme and prevent the conversion of polyglutamate form of folic acid to monoglutamate form of folic acid, leading to decreased absorption of folic acid</p> | 3M |

**MODEL ANSWER****SUMMER - 18 EXAMINATION**

Subject Title: Hospital and clinical pharmacy

Subject Code: 0816

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| | | <p>so it will lead to folate deficiency (Anaemia).</p> <p>ii) Diuretics and antidiabetic agent: Diuretics elevate blood sugar level. If diuretics are combined with insulin or oral hypoglycemic agents, the effects of antidiabetic agents is suppressed and dose adjustment is required.</p> <p>iii) Phenyl butazone and warfarin: Phenyl butazone displaces the warfarin from its binding sites resulting in increased amount of free form of warfarin causing haemorrhage.</p> | |
| 5 | f) | <p>Discuss floor stock distribution system in hospital. (2 marks for floor stock drug distribution, 1 mark for merits and demerits)</p> <p>The medicines or drugs are stored in pharmacy and supplied or distributed to the wards or rooms on order and kept under the supervision of registered nurse at nursing station are called floor stock drugs. It is classified further into-</p> <p>a) Charge floor stock drug:- Drugs which are stocked on the nursing station at all time and are charged to the patient account .An envelope is used to dispense the drugs to the nursing station.</p> <p>b) Non Charge floor stock drug:- Drugs which are placed at the nursing station at all time and for which there may not be direct charge to patient's account. The cost is calculated in the per day cost of hospital room. Drug basket method or Mobile dispensing unit is used to dispense the drugs to the nursing station.</p> <p>Merits:</p> <ol style="list-style-type: none">1. The deteriorated, out dated and non-approved drugs and drug samples may be removed quickly through the routine checking of the cabinets.2. The nursing station drug cabinets are under the continuous supervision of the pharmacist.3. Less number of pharmacy staff is required.4. Ready availability of required drugs.5. Minimization in patient prescription orders at pharmacy. | 3M |



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| | | <u>Demerits:</u> 1. It consumes nursing personnel time. 2. There are chances of medication errors because personally, pharmacist cannot take review of requirement of medications. 3. Increase in drug inventory at nursing stations. 4. Special facilities are required in nursing stations for storage of drug. | |
| 6 | | Attempt the following (Any FOUR) 4 marks each | 16M |
| 6 | a) | Describe the following tests for evaluation of parenteral solution: i) Sterility test: (3 marks): The product to be tested is transferred aseptically in sterile nutrient media and incubated for a specific period of time at an optimum temperature. If living microbes are present, growth takes place in the media and if absent no growth. Product containing antimicrobial drugs such as penicillin, sulpha drugs have to be tested in presence of antagonistic materials e.g. penicillin in presence of penicillinase and sulpha drugs in presence of PABA. The nutrient medium must be sterile and able to produce microbial growth. If the test for sterility shows no microbial growth, the product is considered to be sterile. If the test shows microbial growth, the test is repeated twice or thrice to check for accidental contamination. If again the test fails the product is non-sterile. The test is performed under aseptic conditions under laminar air flow. Tests for sterility may be carried out by: Membrane filtration method Direct inoculation method The culture media used are: Fluid thioglycollate medium for anaerobic bacteria | 4M |



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| | | <p>Soyabean-casein digest medium for fungi and aerobic bacteria</p> <p>ii) Leaker test: (1 mark)</p> <p>It is performed by producing a negative pressure within an incompletely sealed ampoule while the ampoule is entirely submerged in a deep coloured dye solution. A 1% Methylene blue solution is usually used. After releasing the vacuum; the colored dye solution enters the incompletely sealed ampoules. All such ampoules are discarded.</p> | |
| 6 | b) | <p>What is PTC? Describe the role of PTC in drug safety. (1 mark for PTC, 3 marks, any 6 guidelines –in drug safety)</p> <p>Pharmacy and Therapeutic Committee- The hospital as an organization, responds to rational use of drugs by constituting a committee, which formulates the policies regarding the therapeutic use of the drugs in the hospital.</p> <p>Drug safety is one of the major responsibilities of hospital pharmacist. The PTC can play an effective role in ensuring drug safety on a continuous basis by creating safety awareness in all departments of the hospital. For this following guidelines are provided by PTC.</p> <ol style="list-style-type: none">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. | 4M |



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| 6 | c) | <p>Define drug abuse. How the drug abuse is treated? (definition 1 mark, treatment 3 marks)</p> <p>Drug abuse: It is an inappropriate and persistent use of drugs beyond medical need.</p> <p>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.</p> <p>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.</p> <p>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.</p> | 4M |
| 6 | d) | <p>What is patient compliance? Discuss the reasons for patient non-compliance. (definition 1 mark, any 6 reasons 3 marks)</p> <p>Patient compliance is faithful adherence by the patient to prescriber's instructions.</p> <p>Reasons for patient non-compliance:</p> <p>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.</p> <p>2. Poor labelling: Poorly hand written label are difficult to read or follow for the patient/pharmacist. Many prescriptions contain direction which are inadequate like take when required or use as directed that may produce confusion.</p> <p>3. Multiple drug therapy: Greater the number of drugs patients is taking the higher is the risk of non-compliance.</p> <p>4. Asymptomatic nature of patient: In case of asymptomatic patient, it is difficult to</p> | 4M |



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| | | <p>convenience a patient by explaining the value of drug therapy results in noncompliance.</p> <p>5. Measurement of medication: Many times there is confusion to the patient in measuring liquid preparations or number of tablets.</p> <p>6. Cost of medication: Because of high cost of drugs ,poor patients are not purchase such drug</p> <p>7. Frequency of medication: Regular schedule of dosage intake cannot be followed due to work load.</p> <p>8. Duration of therapy: Long duration treatment lead to patient noncompliance.</p> <p>9. Illness: The nature of patient's illness may contribute to noncompliance like chronic hypertension, mental illness.</p> | |
| 6 | e) | <p>Give objectives of inventory control. Explain procedure of purchasing.(objectives any 2 points 1 mark, procedure 3 marks)</p> <p>Objectives of inventory control</p> <ol style="list-style-type: none">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. <p>Procedure of purchasing:</p> <p>1. Purchase request form/purchase requisition-Pharmacist or person authorized by him prepares and fills purchase request form. This form provides information to purchase dept. regarding description, packaging, specifications, price, quantity needed; inventory balanced and anticipated monthly use.</p> <p>The original copy of this form is sent to administrator for approval. After his approval it is forwarded to purchasing officer. A copy of this form is retained by pharmacist for his record to indicate that the process of procurement is going on.</p> <p>2. Quotation invitation-On the receipt of purchase request form, purchasing officer invites quotations from different suppliers.</p> | 4M |



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

Seven copies of purchase order are prepared –

- 1) a copy for the supplier for supply of materials
- 2) a copy for the account section for audit
- 3) a copy for the purchase section for filing
- 4) a copy for the department from where purchase requisition originated
- 5) Two copies for the receipt section of stores out of which one is used once the goods arrive for checking and the other when the goods are returned
- 6) a copy for history with the purchase section to ascertain the rates and other information in future.

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

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

5. Release of payment to supplier.