CINEC CAMPUS
Beyond A Graduate

PAST PAPERS

Faculty	*Department / Section/Division*
Not Applicable	*Learning Resource Centre*

Past Papers

Faculty of health science

Bachelor of Science honours in Industrial Pharmaceutical Sciences

Year 3 – Semester II

Document Control & Approving Authority	*Senior Director – Quality Management & Administration*

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CINEC CAMPUS
Beyond A Graduate

Faculty of Health Sciences

Bachelor of Science Honours in Industrial Pharmaceutical Sciences

IPS 3233 – Advanced Medicinal Chemistry II

Batch – 04

3rd year 2nd semester

End Semester SEQ Examination

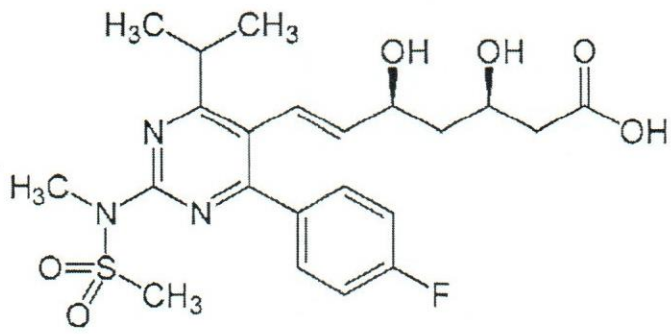
Date : **11th September 2023**
Time : **09.00 a.m. – 12.00 p.m. (Three hours)**

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **SIX** questions.
- Answer **ALL** questions.
- You should write legibly in black or blue ink.

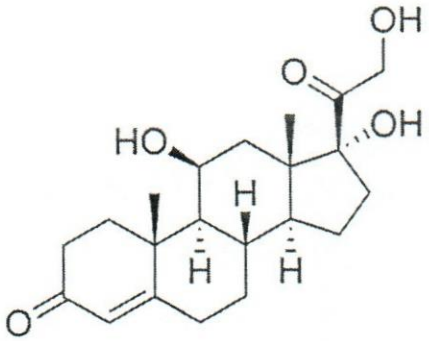
01. **(100 marks)**

1.1. This molecule has a high affinity to the liver cells to reduce the lipid concentration in the blood.



1.1.1. Identify the given chemical structure. (20 marks)
1.1.2. What is the reason for the high affinity to the liver? (30 marks)

1.2.

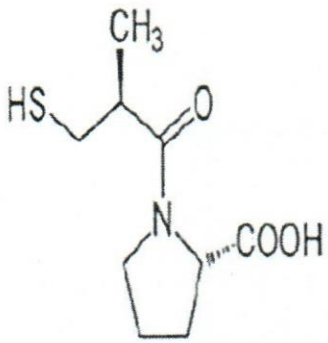


1.2.1. Draw the chemical structure of prednisolone by using the given pharmacophore. (20 marks)

1.2.2. Describe the glucocorticoid and mineralocorticoid activities of the betamethasone drug with the specific chemical modifications from the given pharmacophore. (30 marks)

02 **(100 marks)**

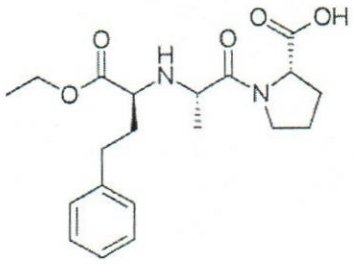
2.1. Captopril is a angiotensin convertinng enzyeme inhibitor used in the treatment of hypertension. Briefly explain the structure activity relationship of Captopril. (25 marks)



Captopril

2.2. Structural modification of Captopril resulted in a more potent drug than Captopril. State the structural modifications done to develop Captopril. (25 marks)

2.3. Figure below shows the structure of Enalapril. Enalapril is a prodrug.



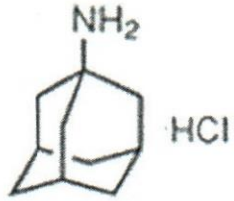
2.3.1. What is a prodrug. (10 marks)

2.3.2. Draw the chemical structure and name the active drug of enalapril. (20 marks)

2.3.3. State why enalapril is administered orally as a prodrug. (20 marks)

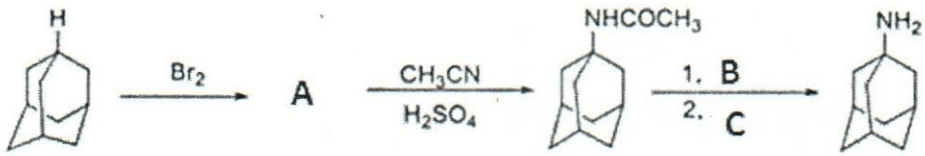
03. **(100 marks)**

3.1. Identify the following antiviral drug given below. (10 marks)



3.2. Describe the mechanism of action of the above mentioned molecule in 3.1. (30 marks)

3.3. Identify the chemical structures and chemicals (A, B, C) needed to produce the drug molecule mentioned in 3.1. (30 marks)



3.4. Comment the reason for the discoloration of Vitamin C. (30 marks)

04 **(100 marks)**

4.1. Draw the general structure of penicillin and label the β-lactam ring. (20 marks)

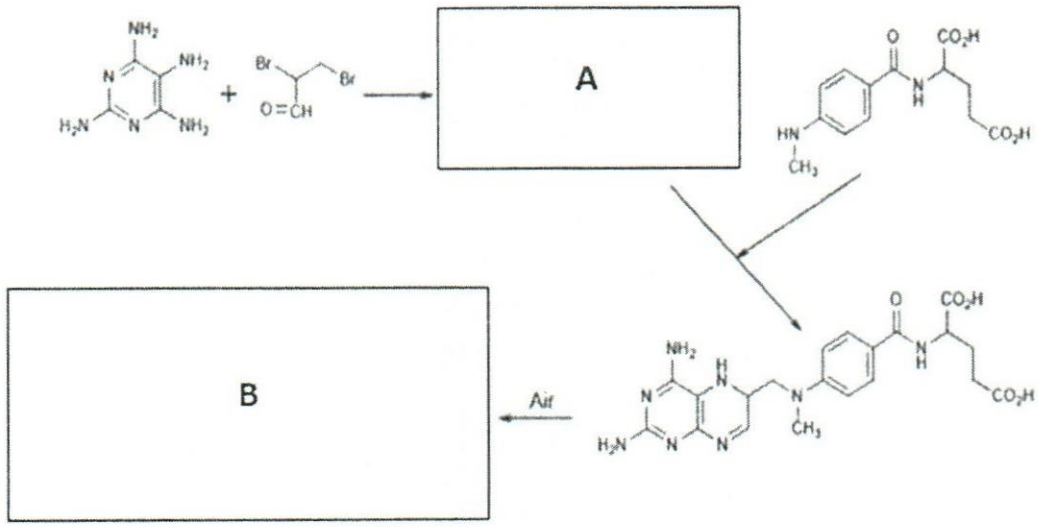
4.2. Explain the mechanism of action of Penicillin antibiotics. (30 marks)

4.3.Outline the action of β-lactamase on Clavulanic Acid by giving reasons. (25 marks)

4.4. Briefly describe the structure activity relationship of Chloramphenicol. (25 marks)

05. **(100 marks)**

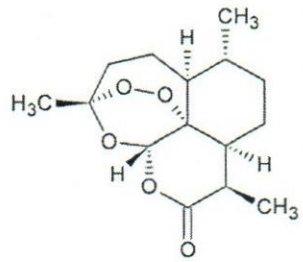
5.1.Draw the suitable chemical structures (A and B) to complete the synthesis pathway of methotrexate. (30 marks)



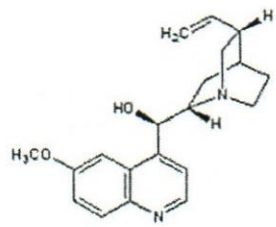
5.2. Draw the mechanism of alkylating agent on Guanine nucleotide shown below. (40 marks)

5.3. Identify the chemical structures given below. (30 marks)

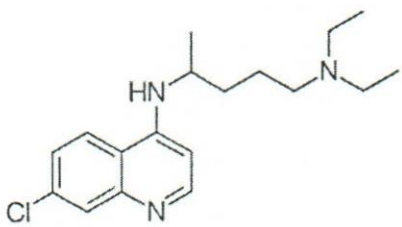
5.3.1.



5.3.2.

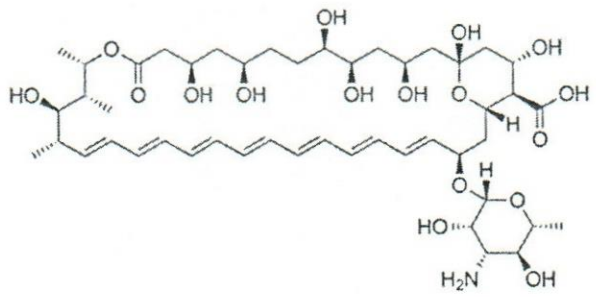


5.3.3.



06 **(100 marks)**

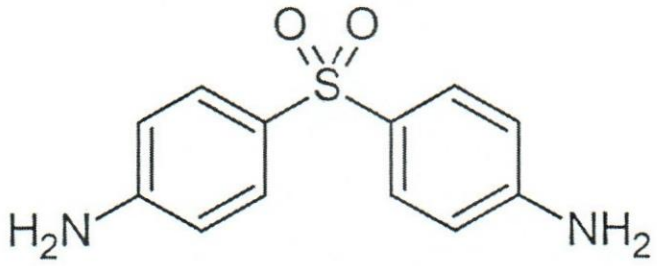
6.1. The chemical structure of amphotericin B is given below.



6.1.1. What is the cellular target of this drug. (10 marks)

6.1.2. Briefly describe the reason for this drug is contraindicated with ketoconazole. (30 marks)

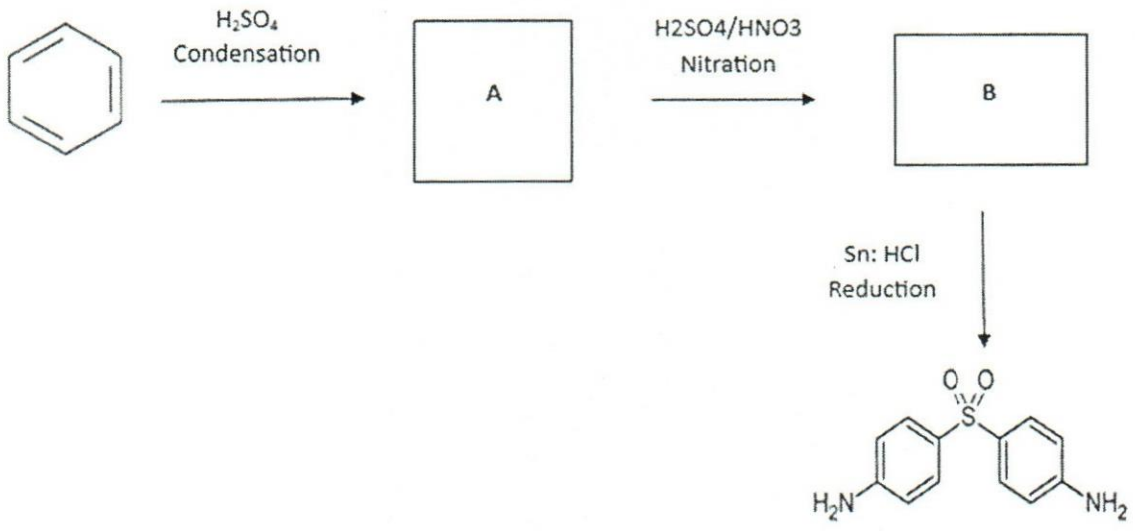
6.2.



6.2.1. Identify the chemical structure given above. (10 marks)

6.2.2. What is the therapeutic use of this drug? (10 marks)

6.2.3. Identify the chemical structures (**A** and **B**) required to synthesize this drug molecule. (40 marks)



CINEC CAMPUS
Beyond A Graduate

Faculty of Health Sciences

BSc. (Hons) in Industrial Pharmaceutical Science

IPS 3253– Drug Release and Novel Drug Delivery System

Batch 04

3rd year 2nd semester

End Semester SEQ Examination

Date : **08th of September 2023**
Time : **09.00 a.m. – 12.00 p.m.**

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **SIX** questions.
- Answer **ALL** questions.
- You should write the answers legibly in black or blue ink.

Question 01 **(100 marks)**

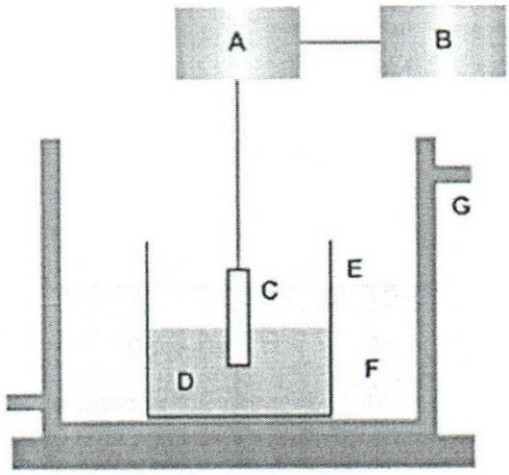
1.1. State the rationale for developing novel drug delivery systems. (15 marks)
1.2. What are the characteristics of drug molecules unsuitable for consider in controlled drug release dosing? (20 marks)
1.3. Write short notes on the following.
  1.3.1. Dissolution control drug delivery systems. (20 marks)
  1.3.2. Hydrogels. (20 marks)
1.4. Outline the criteria to be considered when registering a modified drug delivery system. (25 marks)

Question 02 **(100 marks)**

2.1. State **05** ideal characteristics of mucoadhesive polymers. (15 marks)

2.2. Briefly describe **05** advantages of mucoadhesion drug delivery systems. (25 marks)

2.3. There are several *in vitro* methods to analyze the mucoadhesion. The figure below shows an apparatus used for this purpose.



2.3.1. Identify the above given apparatus. (10 marks)
2.3.2. What is the purpose of this apparatus? (20 marks)

2.4. Describe the mechanism of mucoadhesion. (30 marks)

Question 03 **(100 marks)**

3.1.State the mechanism of chemical enhancers used in transdermal drug delivery systems (TDDs). (20 marks)
3.2.Briefly describe the importance of each layer of TDDs. (20 marks)
3.3.Write a descriptive account on how below mentioned factors affecting for the drug permeation in TDDs.

3.3.1. Physicochemical attraction to the skin. (15 marks)
3.3.2. Hydration of the skin. (15 marks)
3.3.3. Molecular weight. (15 marks)
3.3.4. Drug concentration. (15 marks)

Question 04 **(100 marks)**

4.1. List **05** biological properties of oral controlled drug delivery systems. (20 marks)
4.2. Briefly describe **02** factors mentioned in .1. (20 marks)
4.3. State the properties are used to classify the polymers for medication delivery. (20 marks)
4.4. Hydrogels are three-dimensional hydrophilic cross-linked polymers used in the manufacturing of novel drug delivery systems. Describe the reasons for using hydrogels in novel drug delivery systems. (40 marks)

Question 05 **(100 marks)**

5.1. State **03** unique properties of a liposome. (15 marks)

5.2. Outline the structure of liposome (20 marks)

5.3. Describe the advantages and disadvantages of liposome as a pharmaceutical drug carrier. (30 marks)

5.4. Discuss the different types of stability evaluation parameters to be considered when developing a liposome as a drug carrier. (35 marks)

Question 06 **(100 marks)**

6.1. Figure A shows a formulation strategy used in the development of oral controlled drug delivery system.

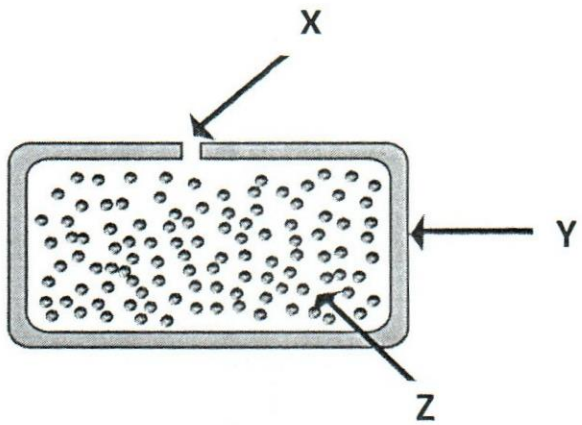


Figure A

6.1.1. Identify the formulation strategy given in figure A. (10 marks)

6.1.2. Name the X, Y, Z parts shown in figure A. (15 marks)

6.1.3. Describe the strategy used in the above system to achieve controlled drug delivery. (35 marks)

6.2. Discuss the *in vitro* characterization methods used in resealing erythrocytes as drug carriers. (40 marks)

CINEC CAMPUS
Beyond A Graduate

Faculty of Health Sciences
BSc. (HONS) in Industrial Pharmaceutical Science
IPS 3253 – Drug Release and Novel Drug Delivery System

Batch – 02 and 03
3rd year 2nd semester
End Semester SEQ Examination

Date	**: 20th January 2023**
Time	**: 09.00 a.m. – 12.00 p.m.**

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **SIX** questions.
- Answer **ALL** questions.
- You should write the answers legibly in black or blue ink.
- You are not allowed to take out the examination papers.

Question 01 **(100 marks)**

1.1. Sate **03** possible reasons for occurring dose dumping. (15 marks)

1.2. State **05** characteristics of drug molecules that are not suitable for controlled release dosage forms. (20 marks)

1.3. Illustrate the drug releasing mechanism through an orifice of a novel drug delivery system due to osmotic pressure. (30 marks)

1.4. Describe both diffusion and dissolution control systems involve in new drug design. (35 marks)

Question 02 **(100 marks)**

2.1. List **02** methods to modify the release of an active pharmaceutical ingredient. (10 marks)

2.2. The controlled dosage forms are preferred over the conventional dosage forms. Briefly describe this statement. (20 marks)

2.3. State the limitations of the conventional dosage forms. (30 marks)

2.4. "Altering the density of the dosage form can be used to develop controlled release dosage forms" Explain this statement. (40 marks)

Question 03 **(100 marks)**

3.1. State 05 advantages of mucoadhesion drug delivery systems. (10 marks)

3.2. What is the difference between first-generation and second-generation mucoadhesive polymers? (20 marks)

3.3. What are the **03** tests used to measure mucoadhesive strength and write **01** instruments used for each test. (30 marks)

3.4. Describe the mechanism of mucoadhesion. (40 marks)

Question 04 **(100 marks)**

4.1. List **04** advantages of hydrogels used in the controlled drug delivery. (20 marks)

4.2. State the reasons to favor the biodegradable polymers over the other polymers in the drug delivery. (15 marks)

4.3. Briefly describe the advantages and disadvantages of reservoir system used in oral controlled drug delivery. (25 marks)

4.4. Describe the hydrophilic and hydrophobic matrix systems. (40 marks)

05 **(100 marks)**

5.1. State **04** unique properties of a liposome. (10 marks)

5.2. Briefly describe the mechanism of formation of liposomes. (20 marks)

5.3. State **03** types of passive loading techniques used in preparation of liposomes and briefly describe one of them. (25 marks)

5.4. Outline the factors to be considered for getting the regulatory approval for a newly design liposome. (45 marks)

06 **(100 marks)**

6.1. List 05 advantages of hydrogels. (20 marks)

6.2. Briefly describe the interpenetrating network polymer system used in manufacturing hydrogels. (30 marks)

6.3. Differentiate between topical and TDDS. (15 marks)

6.4. Describe **05** factors that affect for percutaneous absorption. (35 marks)

Library.

CINEC CAMPUS
Beyond A Graduate

Faculty of Health Sciences

Bachelor of Science Honours in Industrial Pharmaceutical Science

Pharmaceutical Engineering II

IPS 3224

Batch 02 and 03

3rd year 2nd Semester

End Semester SEQ Examination

Date: 18th January 2023
Time: 9.00 am – 12.00 pm (Three Hours)

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **SIX** questions.
- Answer **all** questions.
- You should write legibly in black or blue ink.
- You are not allowed to take out the examination papers.

MATERIALS REQUIRED

- You may use a scientific calculator. This must not be programmable and may be inspected during the examination. Programmable calculators, PDAs and mobile phones are not permitted in the examinations.

01. **(100 marks)**

1.1.Define the term levigation. (10 marks)

1.2.What are the objectives of particle size reduction? (20 marks)

1.3.There are main **04** mechanisms of particle size reduction, and they are applied to the milling equipment.

1.3.1. List the main mechanisms in size reduction. (10 marks)

1.3.2. Fill in the following table. (10 marks)

Milling equipment	Mechanism(s)
1. Hammer mill	
2. Fluid jet mill	
3. Cutting mill	
4. Jaw crushers	

1.4.

1.4.1. Write Von-Rittinger's law. (10 marks)

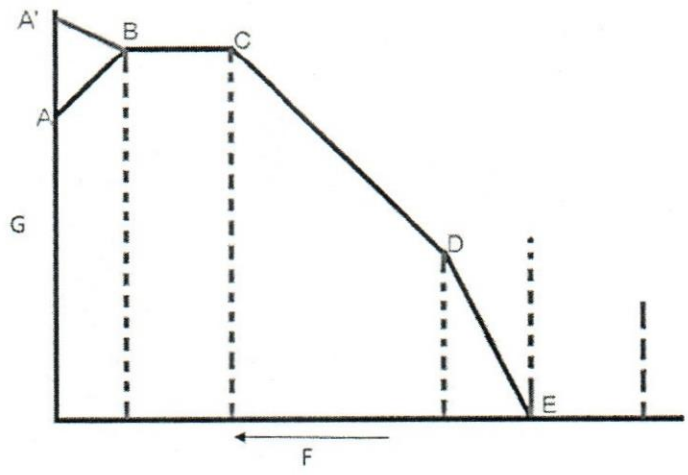
1.4.2. The energy consumed to crush a material with 1cm particles in a gyratory crusher into 0.3cm is 11kJkg^{-1}. Estimate the energy required to reduce the same particles from a diameter of 0.1cm to 0.01cm. (20 marks)

1.4.3 State the particle size range and type of materials that are applicable to Rittinger's law. (20 marks)

02. **(100 marks)**

The drying-rate curve is shown in the below figure.

2.1. Identify the following areas. (15 marks)



2.1.1. A-B

2.1.2. B-C

2.1.3. C-D

2.1.4. D-E

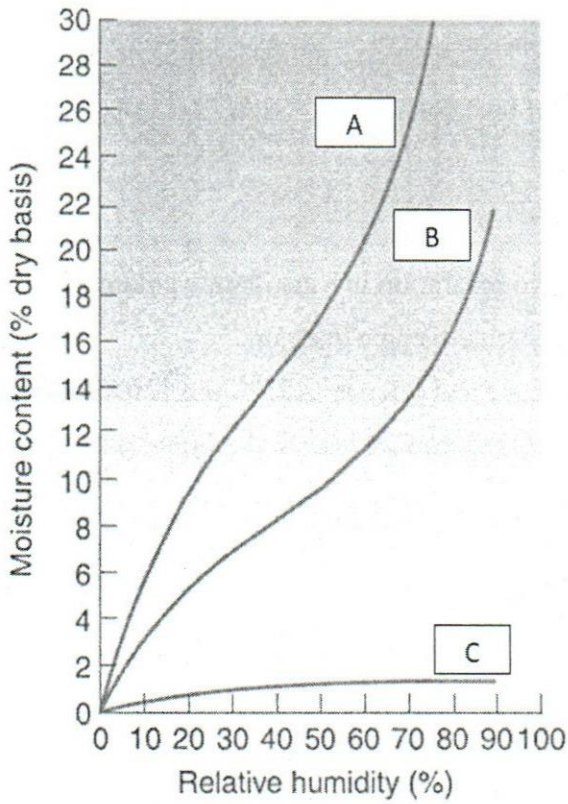
2.1.5. C

2.1.6. D

2.1.7. E

2.2. Briefly describe each period of the drying-rate curve. (20 marks)

2.3. Typical equilibrium moisture content of kaolin, fibrous material, and starch are shown in below graph.



2.3.1. Identify A, B, and C. (30 marks)

2.4. Describe the **04** steps of the freeze-drying process. (35 marks)

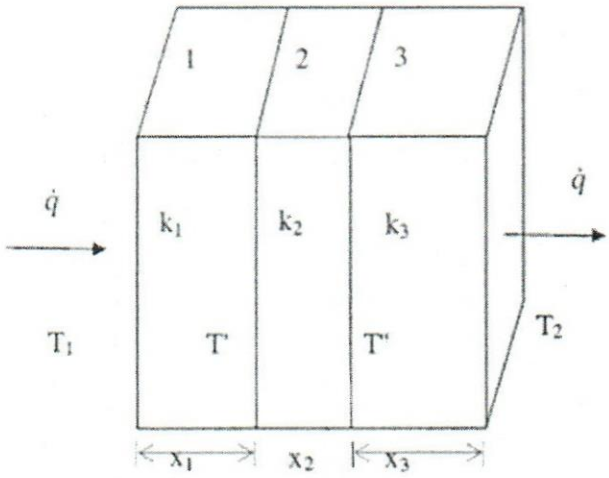
03 **(100 marks)**

3.1. List **04** equipments used in industry for the heating purpose of fluids. (20 marks)

3.2. Describe **02** applications of steam in the industry. (20 marks)

3.3. Derive an equation for the overall heat transfer coefficient for the below composite medium.

(60 marks)



Hint - Fourier's law of heat conduction = -kA(T2-T1)/L

04 **(100 marks)**

4.1. State **02** factors that affect the separation in a distillation column. (20 marks)

4.2. State the steam distillation process using a diagram. (20 marks)

4.3. The vapor pressures of benzene and toluene at 25°C are 120 kN/m^2 and 79 kN/m^2 respectively. What are the mole fractions of benzene and toluene in the liquid phase, if the total pressure is 150 kN/m^2? Assume that the mixer demonstrates ideal gas behavior. (60 marks)

Hint

PT = PA + PB (Dalton's Law)

PA = XAP0 A (Raoults's Law)

PB = XBP0 B (Raoults's Law)

05 **(100 marks)**

5.1. State **05** factors that affect evaporation. (10 marks)

5.2. Briefly describe the function of a rising film evaporator. (30 marks)

5.3. Two rising film evaporators are used to produce condensed milk in a dairy food processing plant. During that process, the first evaporator is heated up to 120°C and the second evaporator is heated up to 150°C. The concentration of milk received from the milk supplier is 8%. The outlet flow rate of concentrated milk from the first evaporator is 10kg/s. When the milk leaves the first evaporator, the concentration increases from 8% to 42%, and when it leaves the second evaporator, the concentration further increases by 20%.

5.3.1. Calculate the liquid inlet flow rate and the vapour outlet flow rate of the first evaporator. (20 marks)

5.3.2. Calculate the concentrated milk outlet flow rate and vapour outlet flow rate of the second evaporator. (20 marks)

5.3.3. State the assumptions by using a diagram. (20 marks)

06 **(100 marks)**

6.1. Mention **03** agitator types that are used in the industry. (15 marks)

6.2. Mention **05** applications of mixing in the pharmaceutical industry. (20 marks)

6.3. State **05** factors that affect mixing. (20 marks)

6.4. Describe the function of a double cone blender using a suitable cross-functional diagram with **02** advantages, **02** disadvantages, and **02** applications in the industry. (45 marks)

CINEC CAMPUS
Beyond A Graduate

Faculty of Health Sciences

Bachelor of Science Honours in Industrial Pharmaceutical Sciences

IPS 3233 – Advanced Medicinal Chemistry II

Batch - 01

3rd year 2nd semester

End Semester SEQ Examination

INDEX NUMBER: .....

Date : **21st of February 2022**
Time : **09.00 a.m. – 12.00 p.m. (Three hours)**

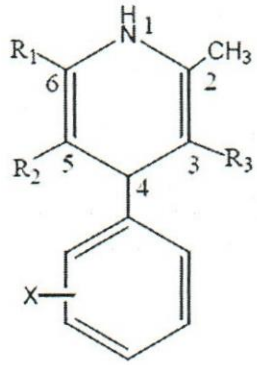
INSTRUCTIONS TO CANDIDATES

- This question paper consists of **SIX** questions.
- Answer **ALL** questions.
- You should write legibly in black or blue ink.
- You are not allowed to take out the examination papers.

Question 01 **(100 marks)**

1.1. Describe the mechanism of action of Nicorandil as an antianginal drug. (20 Marks)

1.2. Identify the class of the given key structure. Briefly describe the alteration of the activity when the phenyl ring (X) is substituted at the ortho, para and meta positions. (20 Marks)

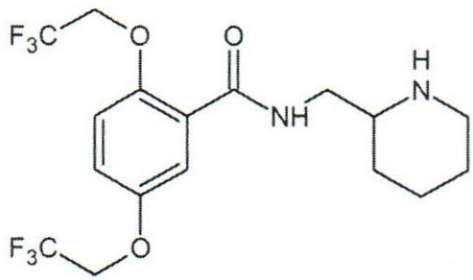


Key to general structure:

1.3. Describe the structure-activity relationship of thiazide providing its general structure. (25 Marks)

1.4. Provide the steps involved in the chemical synthesis of frusemide from 2,4-Dichlorobenzoic acid. (25 Marks)

1.5. The structure given below is Flecainide, a Class I-C antiarrhythmic drug. Give two structural characteristics it possesses to exert potential activity. (10 Marks)

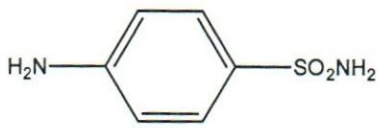


Question 02 **(100 marks)**

2.1. Classify the antihyperlipidemic drugs based on the structural features. (15 marks)

2.2. What are the structural and potency differences between clofibrate and fenofibrate? (draw the chemical structures). (25 marks)

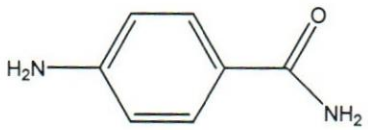
2.3. Following is the structure of sulphonamide



2.3.1. What are the structural requirements for the antibacterial activity of sulphonamide? (10 marks)

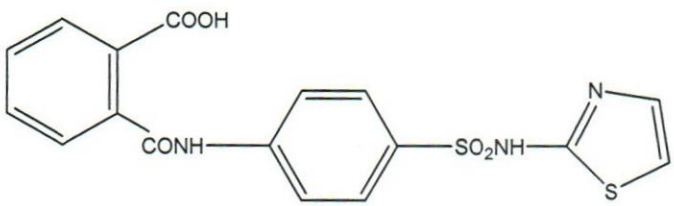
2.3.2. Comment on the effect of activity of replace benzene ring with any other ring system. (10 marks)

2.3.3. As a medicinal chemist, you have synthesized the following analogue of sulphonamide. What will be the alteration of activity after this structural modification? (10 marks)



analogue of sulphonamide

2.4.Phthlyl sulphathiazole is a prodrug.



2.4.1. What is a prodrug and why it is important in medicinal chemistry? (20 marks)

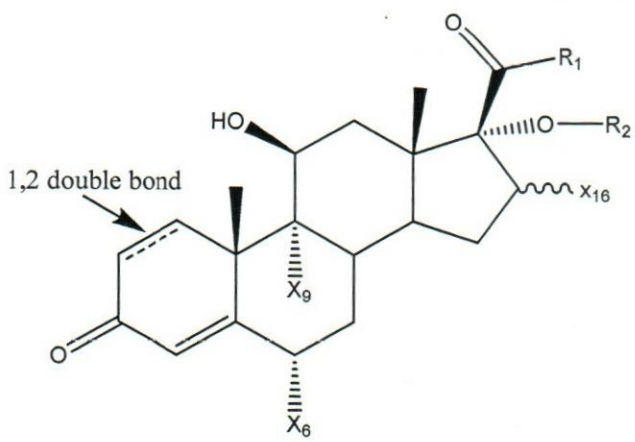
2.4.2. Draw the chemical structure of drug and the byproducts after activation of Phthlyl sulphathiazole . (10 marks)

Question 03 **(100 marks)**

2.1.What are the structural features of steroidal core structure? (15 marks)

2.2.Briefly describe how steroids are metabolized in our biological system. (20 marks)

2.3.Steroids have the following structure-activity relationship.



1,2 double bond – Increases glucocorticoid activity
11 beta-hydroxy group – required for the glucocorticoid activity
R1 – substitution with -OH group required for the mineralocorticoid activity
X16 – Decrease the mineralocorticoid activity
X6 and X9 substitution with Halogen - enhance the activity
Presence of keto (C=O) group and a double bond between C4 and C5 - essential for both glucocorticoid and mineralocorticoid activities.

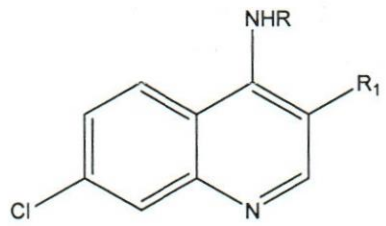
2.3.1. Betamethasone is categorized under the class of corticosteroids. Briefly describe the structure-activity relationship of betamethasone. (25 marks)

2.3.2. Prednisolone has high anti-inflammatory activity compared to hydrocortisone. Justify your answer by drawing the structures of prednisolone and hydrocortisone. (30 marks)

2.4.Classify the drugs used as antimalarial drugs based on their structural features. (10 marks)

Question 04 **(100 marks)**

4.1.Following are the structure-activity relationship of antimalarial drugs.



R group – 4-diethylaminomethylbutyl side chain that optimal for activity,
-OH substitution of 4-diethylaminomethylbutyl reduces the toxicity.
Unsaturated double bod in the side chai is not affecting the activity.

C_7 chloro grop – Optimal for activity.

R group – Methyl substitution reduces the activity.

C_8 – Methyl substitution; stop the activity.

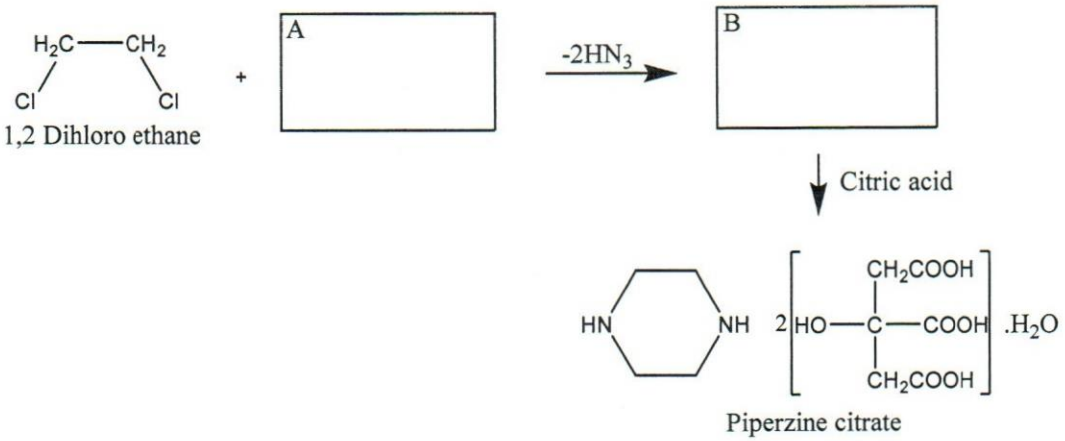
4.1.1. Compare the activity and the toxicity of chloroquine and hydroxychloroquine by giving reason. (30 marks)

4.2.Classify antifungal agents based on the chemical structure. (15 marks)

4.3.Ketoconazole is a racemic compound. Briefly describe the effect of isomerism in drug action and the potency. (25 marks)

4.4.Amphotericin B is soluble in both acidic and basic environments. Justify your answer. (10 marks)

4.5. Piperizine citrate is a piperazine derivative. Following is the synthesis of piperazine citrate from the starting materials. Complete the reaction by filling A and B. (20 marks)



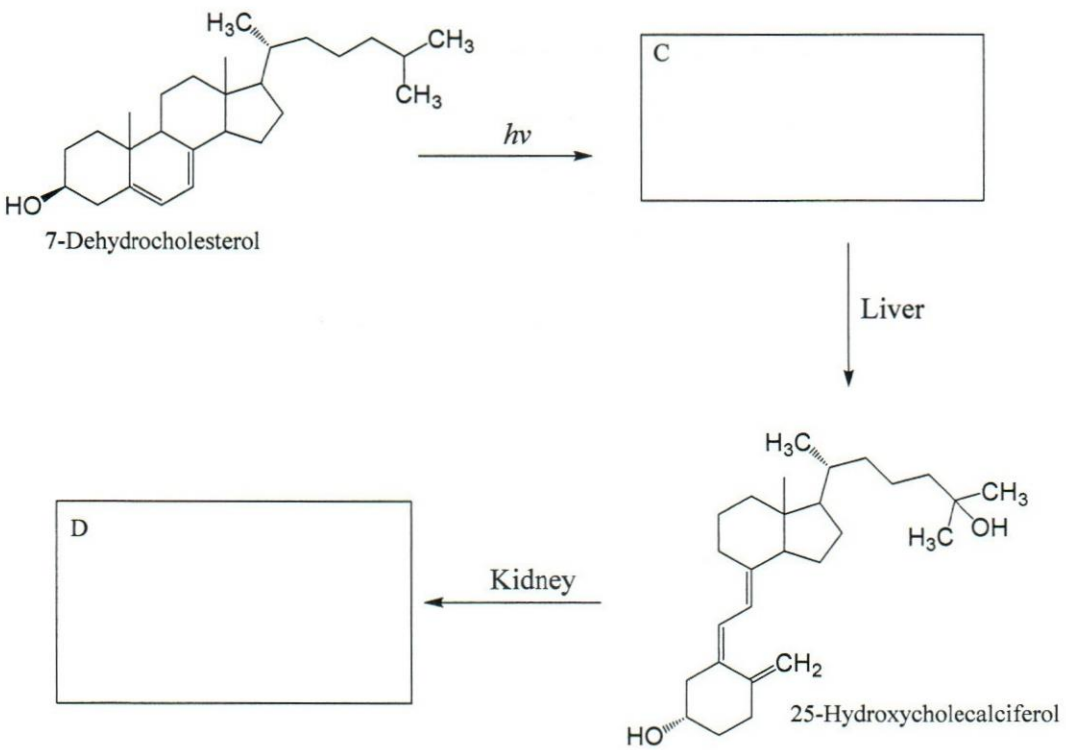
Piperzine citrate

Question 05 **(100 marks)**

5.1. What are the two types of vitamins? Give examples for each. (10 marks)

5.2. Beta carotene is a good source of retinol. Justify your answer. (10 marks)

5.3. Following is the biosynthesis and Bioactivation pathway of vitamin D (1,25-Dihydroxycholecalciferol). Complete the reaction by drawing the structure of C and D. (20 marks)



7-Dehydrocholesterol

5.3. Why vitamin C shows acidity in a water solution? (10 marks)

5.4.Illustrate the general structure of penicillin and label the β-lactam ring (10 marks)

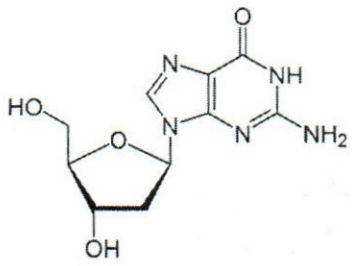
5.5.Compare the structure of Cephalosporin with Penicillin (10 marks)

5.6.Briefly describe the methods which can improve the stability of the Penicillin toward β-lactamase enzyme (15 marks)

5.7.Dairy products such as milk affect the oral absorption of tetracycline. Explain this statement (15 marks)

Question 06 **(100 marks)**

6.1.The following figure shows the structure of the deoxyguanosine molecule. The synthetic analogue of this molecule provides the antiviral activity.



6.1.1. Identify the structure of the drug molecule derived from modifying the structure of the above molecule. (10 marks)

6.1.2. Describe the mechanism of action of the above mentioned molecule in 6.1.1. (40 marks)

6.2.Identify the class of antibiotics which Azithromycin and Clarithromycin belong. (05 marks)

6.3.Illustrate the common chemical structure of the above-mentioned class of antibiotics. (20 marks)

6.4.Briefly explain how the structures of Azithromycin and Clarithromycin are modified to provide the desired therapeutic effects. (25 marks)

CINEC CAMPUS
Beyond A Graduate

Faculty of Health Sciences
BSc Honours in Industrial Pharmaceutical Science

IPS 3213
Pharmacology II

3rd Year 2nd Semester
Batch 01

End Semester SEQ Examination

INDEX NUMBER: .....

Date: 14th of February 2022

Time: 09.00 am – 12.00 pm (Three Hours)

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **SIX** questions.
- Answer **ALL** questions.
- You should write legibly in black or blue ink.
- You are not allowed to take out the examination papers.

Question 01 **(100 marks)**

1.1. Briefly describe the action and uses of,

1.1.1. Frusemide (10 marks)

1.1.2. Atorvastatin (10 marks)

1.2. List the drug groups used as an antiarrhythmic agent. (20 marks)

1.3. Briefly indicate the,

1.3.1. Antihypertensive effects of verapamil. (15 marks)

1.3.2. Antianginal effects of glyceryl trinitrate. (15 marks)

1.4. What is the drug used,

1.4.1. to reduce pain in myocardial infarction. (05 marks)

1.4.2. to reduce fluid in pulmonary oedema. (05 marks)

1.4.3. to destroy the thrombus in myocardial infarction. (05 marks)

1.4.4. to reduce platelet aggregation in coronary syndrome. (05 marks)

1.5. List the advantage of using ACE inhibitors in heart failure. (10 marks)

Question 02 **(100 marks)**

2.1. Briefly describe the clinical uses of serotonin receptor antagonists. (15 marks)

2.2. Compare different types of insulin used in the clinical practice. (20 marks)

2.3. List the drugs and state the mode of action of,

2.3.1. sulphonylurea (15 marks)

2.3.2. biguanides (15 marks)

2.3.3. DPP 4 inhibitors (15 marks)

2.4. Name the drugs used for hyperthyroidism and describe mode of action of one drug you mentioned. (10 marks)

2.5. List two drugs used to inhibit prolactin. (10 marks)

Question 03 **(100 marks)**

3.1. List two steroidal drugs used for,

3.1.1. bronchial asthma inhalation. (10 marks)

3.1.2. topical application. (10 marks)

3.1.3. oral administration. (10 marks)

3.2. What is the mode of action of oral steroid preparation? (10 marks)

3.3. Name the parenteral steroid used in the acute severe asthma. (10 marks)

3.4. Describe the pharmacological effects of using sumatriptan in migraine. (20 marks)

3.5. List the drugs used in Parkinsonism. (10 marks)

3.6. What is the rationale in combining levodopa with carbidopa? (20 marks)

Question 04 **(100 marks)**

4.1. List the drugs used for acne. (15 marks)

4.2. Describe therapeutic effects of one drug you mentioned in 4.1. (25 marks)

4.3. Briefly indicate keratolytic effects of salicylic acid. (20 marks)

4.4 List the topical antibiotics, antifungal drugs used in clinical practice. (20 marks)

4.5. Indicate pharmacological basis of using acitretin in Psoriasis. (20 marks)

Question 05 **(100 marks)**

5.1. Describe the drugs used for emergency contraception. (25 marks)

5.2. List the examples for anti-estrogens and indicate the clinical uses. (10 marks)

5.3. Describe contraindications of oral contraceptive pills. (20 marks)

5.4. Briefly describe the advice you give to a patient who needs a combined oral contraceptive pills. (25 marks)

5.5. Indicate mode of action and clinical indication of,

5.5.1. flutamide (10 marks)

5.5.2. testosterone (10 marks)

Question 06 **(100 marks)**

6.1. List the drug groups used for the treatment of depression. (20 marks)

6.2. Compare therapeutic effects of two drug groups you mentioned in 6.1. (20 marks)

6.3. Describe the clinical uses of,

6.3.1. diazepam (15 marks)

6.3.2. risperidone (15 marks)

6.3.3. morphine (15 marks)

6.3.4. lignocaine (15 marks)

CINEC CAMPUS
Beyond A Graduate

Faculty of Health Sciences
Bachelor of Science Honours in Industrial Pharmaceutical Sciences
IPS 3233 – Advanced Medicinal Chemistry II

Batch – 02 and 03
3rd year 2nd semester
End Semester SEQ Examination

Date	**: 25th of January 2022**
Time	**: 09.00 a.m. – 12.00 p.m. (Three hours)**

INSTRUCTIONS TO CANDIDATES

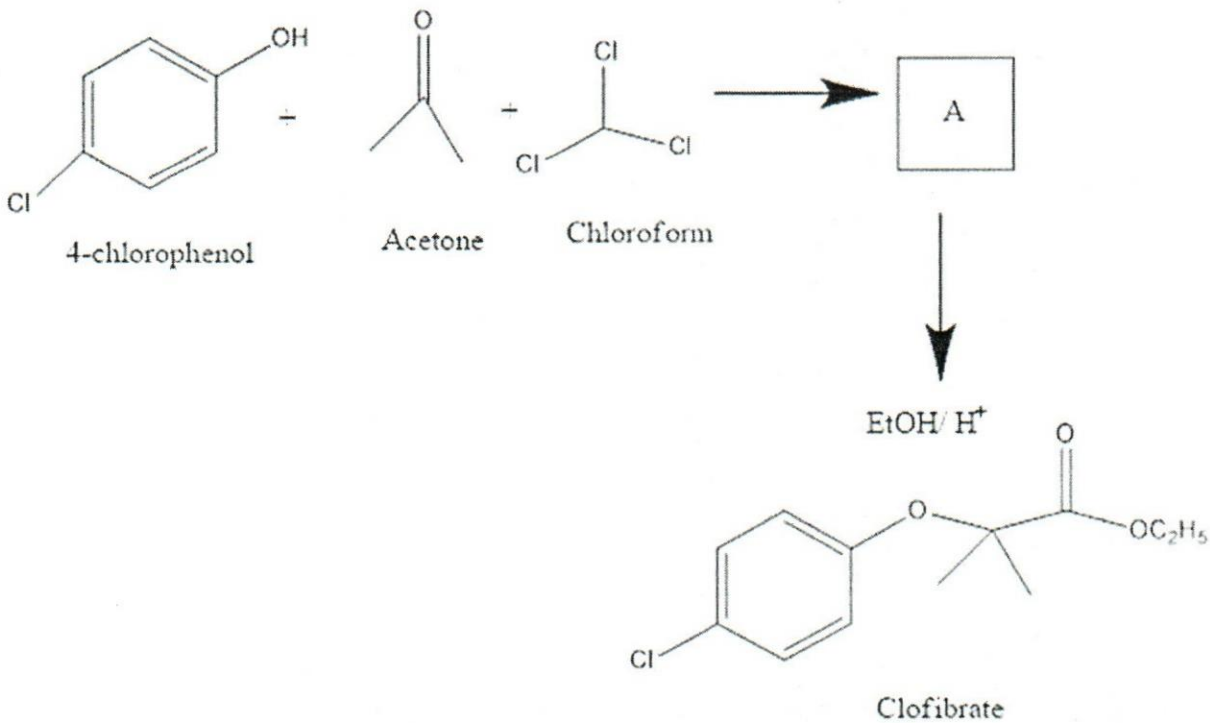
- This question paper consists of **SIX** questions.
- Answer **ALL** questions.
- You should write legibly in black or blue ink.
- You are not allowed to take out the examination papers.

Question 01 **(100 marks)**

1.1 What are the major lipids in blood stream? (20 marks)

1.2 Draw and briefly describe the lipoprotein structure. (20 marks)

1.3 Following is the synthesis of Clofibrate from the starting materials. Complete the reaction by filing A. (20 marks)



4-chlorophenol Acetone Chloroform

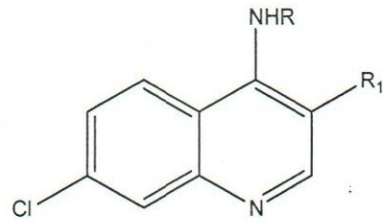
Clofibrate

1.4 Draw the structure and number the steroid nucleus. (20 marks)

1.5 Name and draw the two different configurational isomers of steroids? (20 marks)

Question 02 **(100 marks)**

2.1. Following are the structure-activity relationship of antimalarial drugs.



R group – 4-diethylaminomethylbutyl side chain that optimal for activity,

OH substitution of 4-diethylaminomethylbutyl reduces the toxicity.

Unsaturated double bod in the side chai is not affecting the activity.

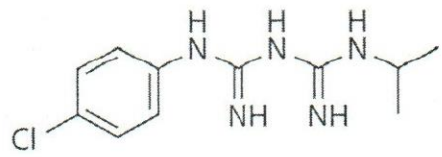
C_7 chloro grop – Optimal for activity.

R group – Methyl substitution reduces the activity.

C_8 – Methyl substitution; stop the activity.

Compare the activity and the toxicity of chloroquine and amodiaquine by giving reason. (30 marks)

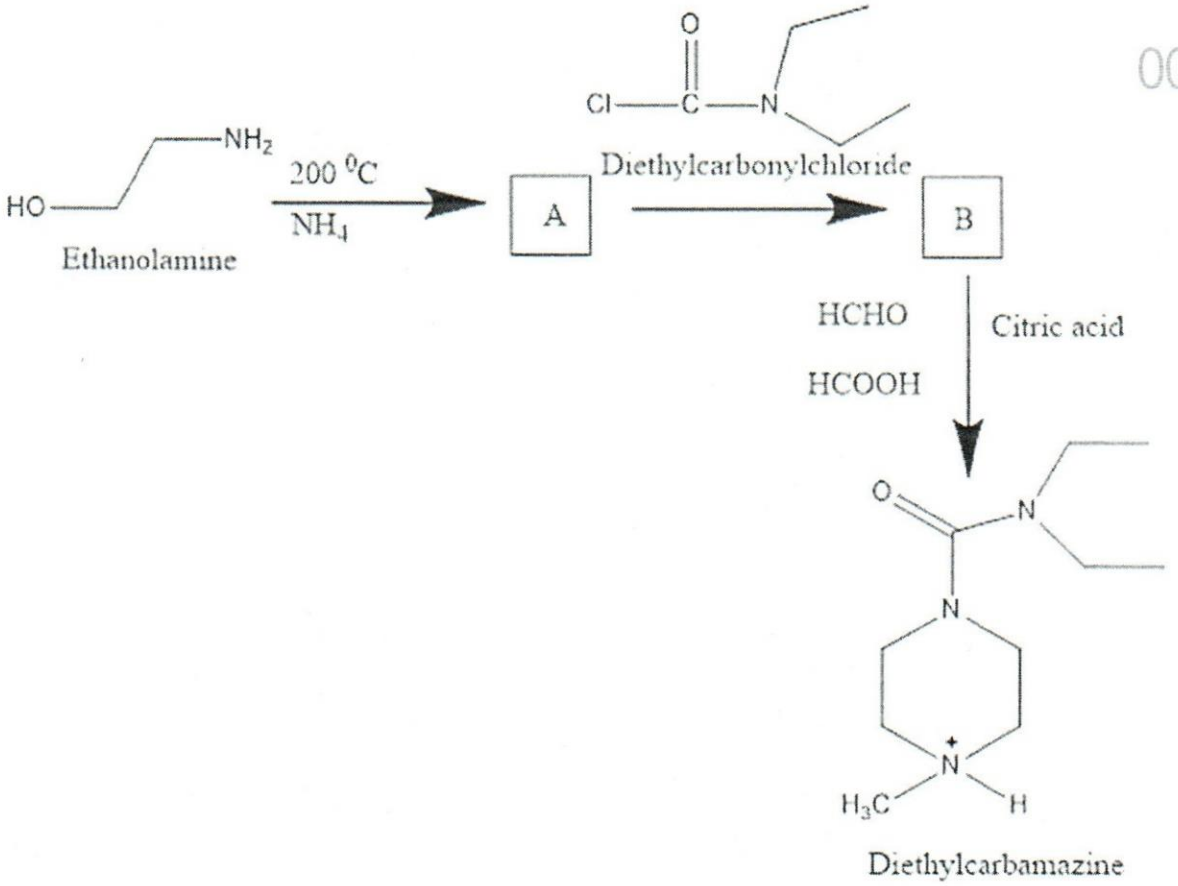
2.2. Proguanil is a prodrug.



2.2.1. What is a prodrug and why it is important in medicinal chemistry? (10 marks)

2.2.2. Draw the chemical structure and name of drug after activation of Proguanil. (20 marks)

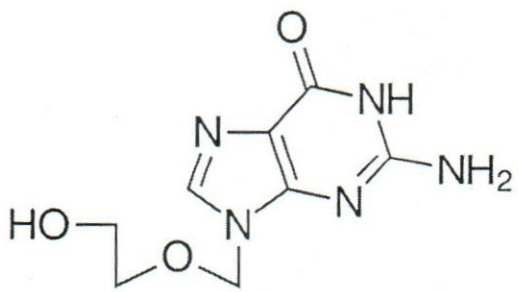
2.3. Following is the synthesis of Diethylcarbamazine from the starting materials. Complete the reaction by filing A and B. (20 marks)



2.4. What is the 5 classification of antifungals on the basis of Chemical structure, action and source? Give one antifungal agents example for each. (20 marks)

Question 03 **(100 marks)**

3.1. Identify the following antiviral drug given below. (10 marks)



3.2. Describe the mechanism of action of the above mentioned molecule in 3.1. (30 marks)

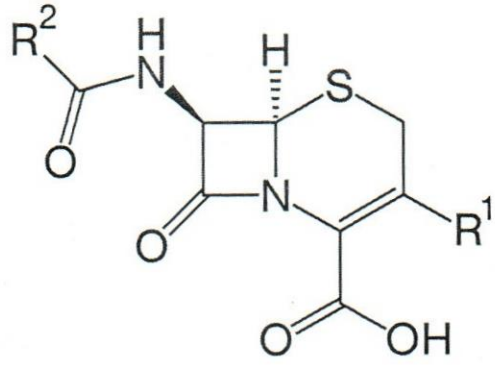
3.3. Compare and contrast Amantadine and Rimantadine giving their structures. (20 marks)

3.4. Explain the structure activity relationship of non sugar moiety of the cardiac glycosides. (40 marks)

Question 04 **(100 marks)**

4.1. Compare the structure of Cephalosporin with Penicillin (20 marks)

4.2. State the structure activity relationship of the given structure of Cephalosporin. (25 marks)



4.3. Briefly describe the methods which can improve the stability of the Penicillin toward β-lactamase enzyme (15 marks)

4.4. The addition of clavulanic acid imporoves the atability of amoxicillin. Explain this statemenet giving appropriate structures. (40 marks)

Question 05 **(100 marks)**

5.1. What are the two types of vitamins? Give examples for each. (10 marks)

5.2. "Vitamin C shows acidity in water solution." Briefly explain this statement. (20 marks)

5.3. State the reason for discoloration of vitamin C. (20 marks)

5.4. Dairy products such as milk affect the oral absorption of tetracycline. Explain this statement (30 marks)

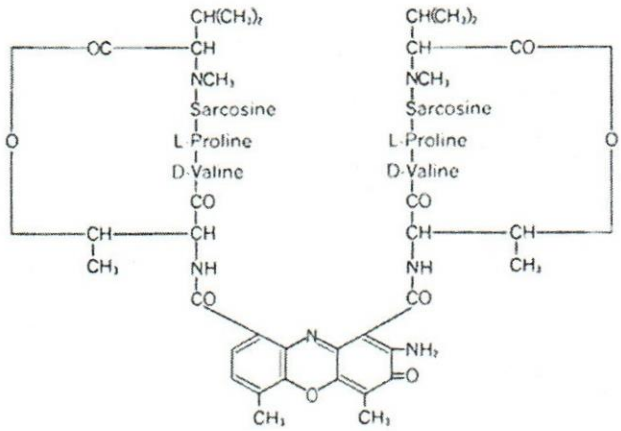
5.5. Illustrate the common chemical structure of the chemical class of the antibiotics which Azithromycin belongs. (20 marks)

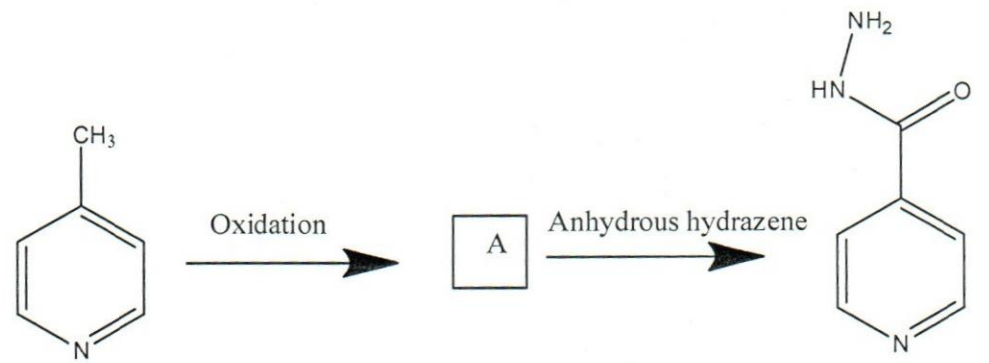
Question 06 **(100 marks)**

6.1 Structure of Dactinomycin given below, Briefly describe the structure-activity relationship of Dactinomycin? (20 marks)

6.2. List 5 categories of antitubercular agents according to chemical moiety. (20 marks)

6.3. Following is the synthesis of isoniazid from the starting materials. Complete the reaction by filing A. (20 marks)

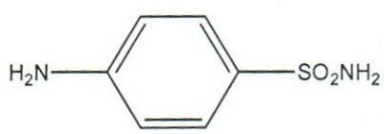




4-Methyl pyridine

INH
(Isoniazid)

6.4. Following is the structure of sulphonamide



6.4.1. What are the structural requirements for the antibacterial activity of sulphonamide? (20 marks)

6.5. Consider Clofazimine molecule.

6.5.1. Which Structural moiety is essential for the activity? (10 marks)

6.5.2. Which substitutions enhances the activity? (10 marks)

CINEC CAMPUS
Beyond A Graduate

Faculty of Health Sciences

BSc. (Hons) in Industrial Pharmaceutical Science

IPS 3253– Drug Release and Novel Drug Delivery System

Batch - 01

3rd year 2nd semester

End Semester SEQ Examination

INDEX NUMBER: .....

Date : **25th of February 2022**
Time : **09.00 a.m. – 12.00 p.m. (Three Hours)**

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **SIX** questions.
- Answer **ALL** questions.
- You should write the answers legibly in black or blue ink.
- You are not allowed to take out the examination papers.

Question 01 **(100 marks)**

1.1. List three (02) oral controlled dosage forms. (10 marks)
1.2. The Controlled Dosage forms are preferred over the Conventional dosage forms. Briefly describe this statement. (20 marks)
1.3. Compare the difference in Controlled release dosage forms and sustained release dosage forms. (30 marks)
1.4. Describe the hydrophobic and hydrophilic matrix tables used in matrix system. (40 marks)

Question 02 **(100 marks)**

2.1. State the rationale for controlled drug delivery systems. (10 marks)
2.2. "Protein binding is a one type of a physicochemical property that affects for the drug release profile of the conventional dosage forms". Based on this statement, write 03 possible consequences of forming drug -blood protein complex by the absorbed drug molecules. (15 marks)
2.3. State 05 characteristics of drug molecules that are not suitable for controlled release dosage forms. (20 marks)
2.4. Illustrate the drug releasing mechanism through an orifice of a novel drug delivery system due to osmotic pressure. (20 marks)
2.5. Describe the chemically controlled drug release mechanism involve in new drug design. (35 marks)

Question 03 **(100 marks)**

3.1. List four (04) advantages of Hydrogels used in the controlled drug delivery. (10 marks)
3.2. Briefly describe the significance of polymers in designing the controlled release dosage forms. (20 marks)
3.3. State the methods that are used to modify the release of an active pharmaceutical ingredient from a dosage form. (20 marks)
3.4. Identify the system designed to increase residence time of drug in stomach or intestine. (10 marks)
3.5. Describe the mentioned system in 3.4. (40 marks)

Question 04 **(100 marks)**

4.1. What is a resealed erythrocyte? (10 marks)
4.2. Describe the advantages of erythrocytes use as drug carriers. (25 marks)
4.3. Briefly describe the pharmaceutical applications of resealed erythrocytes. (15 marks)
4.4. List out the characteristics of mucoadhesive polymers. (25 marks)
4.5. State the factors affecting mucoadhesion. (25 marks)

Question 05 **(100 marks)**

5.1. Outline the basic structural features of a liposome. (15 marks)
5.2. Describe the detergent removal method use in preparation of liposomes by passive loading. (20 marks)
5.3. State 05 therapeutic applications of liposomes as a new drug carrier. (20 marks)
5.4. Describe the factors that should consider in evaluation of chemical stability of formulated liposomes. (20 marks)
5.5. List the parameters that should consider in obtaining regulatory approval for the newly developed liposomes. (25 marks)

Question 06 **(100 marks)**

6.1. What are the physicochemical properties of permeation molecule used in transdermal drug delivery system? (15 marks)
6.2. Briefly describe the polymer membrane permeation controlled transdermal drug delivery system. (20 marks)
6.3. How does the permeation enhance in transdermal drug delivery systems? (20 marks)
6.4. State 4 physicochemical evaluation methods of transdermal drug delivery system. (10 marks)
6.5. Compare the structure and the applications of polymer nanoparticles with the metallic nanoparticles used in drug delivery systems. (15 marks)
6.6. What are the challenges in use of nanoparticles in drug delivery systems? (25 marks)

CINEC CAMPUS
Beyond A Graduate

Faculty of Health Sciences

Bachelor of Science Honours in Industrial Pharmaceutical Science

Pharmaceutical Engineering II

IPS 3224

Batch 01

3rd year 2nd Semester

End Semester SEQ Examination

INDEX NUMBER: .....

Date: 17th February 2022
Time: 9.00 am – 12.00 pm (Three Hours)

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **SIX** questions.
- Answer **all** questions.
- You should write legibly in black or blue ink.
- You are not allowed to take out the examination papers.

MATERIALS REQURIED

- You may use a scientific calculator. This must not be programmable and may be inspected during the examination. Programmable calculators, PDAs and mobile phones are not permitted in the examinations.

01 **(100 marks)**

1.1. State 04 applications of heat transfer. (20 marks)

1.2. Describe "Newton's Law of Cooling for Convection". (25 marks)

1.3. Describe the term "Surface Coefficient". (25 marks)

1.4. Describe heat transfer by conduction. (30 marks)

02 **(100 marks)**

2.1. List 04 factors effecting the rate of drying. (10 marks)

2.2. Name 02 types of dryers used for the batch process of drying. (10 marks)

2.3. Describe the differences between drying and evaporation. (20 marks)

2.4. Illustrate the drying rate curve and label it. (20 marks)

2.5. Write a descriptive account on stages of freeze-drying. (40 marks)

03 **(100 marks)**

3.1. What are the 04 mechanisms of size reduction in pharmaceutical industry? (10 marks)

3.2. Write 02 advantages of size reduction in pharmaceutical manufacturing. (10 marks)

3.3. State the Kick's Law and briefly describe its significance in size reduction. (20 marks)

3.4. Write a short note on "ball mills" employed in size reduction. (25 marks)

3.5. Discuss the factors affecting size reduction. (35 marks)

04 **(100 marks)**

4.1. Describe the theory of evaporation. (25 marks)

4.2. Describe how Duhring plot use in the determination of boiling point of a solution. (25 marks)

4.3. Describe the methods of operation of Single-effect evaporators. (25 marks)

4.4. Differentiate falling film evaporators from climbing film evaporators. (25 marks)

05 **(100 marks)**

5.1. Briefly describe general principle of distillation. (15 marks)

5.2. Briefly describe methods used to separate azeotrope mixtures. (20 marks)

5.3. Describe flash distillation. (25 marks)

5.4. Write a descriptive account on use of distillation technology for the extraction of essential oils. (40 marks)

06 **(100 marks)**

6.1. State 04 mechanisms involved in liquid mixing. (10 marks)

6.2. Describe the differences between liquid mixing and solid mixing. (15 marks)

6.3. Comment on the negative mixtures by providing two examples. (20 marks)

6.4. Write a short note on V -blender in mixing. (20 marks)

6.5. Write a descriptive account on mechanisms of mixing employed in mixing mills. (35 marks)