

**Faculty of Health Sciences****Bsc. (HONS) in Industrial Pharmaceutical Science****IPS 3253– Drug Release and Novel Drug Delivery System****Batch - 05****3rd year 2nd semester****Assignment**

Date : 09th July 2024
Time : 9.00 a.m. – 10.00 a.m.

INSTRUCTIONS TO CANDIDATES

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

01 **(100 marks)**

As an research and development scientist you are asked to develop a hydrophilic matrix system for the delivery of drug X.

- 1.1. Outline the mechanism of drug delivery in the hydrophilic matrix system. (50 marks)
- 1.2. Explain how you would design the above mentioned drug delivery system in 1.1. (50 marks)

2.2. State **five (05)** advantages of mucoadhesive drug delivery systems. (30 marks)

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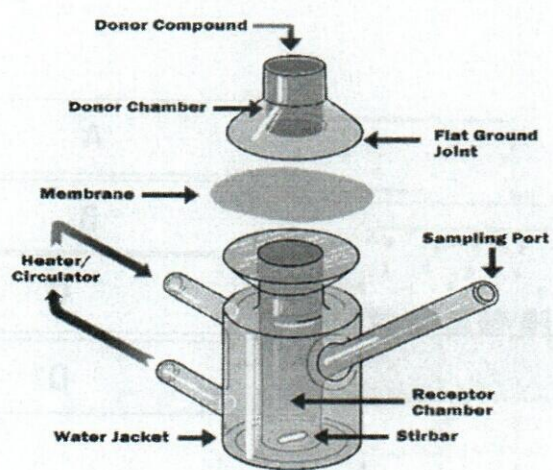
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2.3.



2.3.1. Identify the above given apparatus. (15 marks)

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2.3.2. What is the purpose of this apparatus? (20 marks)

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2.4. State the mechanism of mucoadhesion. (25 marks)

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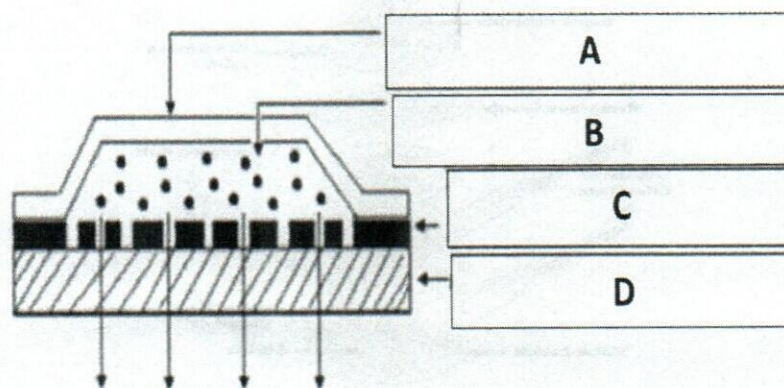
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Question 03

(100 marks)

3.1.



3.1.1. Identify A, B, C, and D.

(20 marks)

3.1.2. What are the importance of each layer of TDDs?

(30 marks)

Question 04

(100 marks)

4.1. List 05 applications of resealed erythrocytes.

(20 marks)

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4.2. How the hypo-osmotic dilution differ from hypo-osmotic dialysis in the context of drug entrapment in erythrocytes?

(30 marks)

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4.3. Outline the preswell method used from the entrapment of drugs to the erythrocytes.

(25 marks)

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5.4. Outline the regulatory considerations of liposomes. (30 marks)

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Question 06 (100 marks)

6.1. Classify the matrix tablet systems used in oral controlled drug delivery. (20 marks)

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6.2. State the procedure of 02 systems you mentioned in 6.1. above. (30 marks)

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Faculty of Health Sciences
Bachelor of Science Honours in Industrial Pharmaceutical Sciences
IPS 3233 – Advanced Medicinal Chemistry II
Batch – 05
3rd year 2nd semester
End Semester SEQ Examination

Date : 05th of June 2024
Time : 09.00 a.m. – 12.00 p.m. (Three hours)

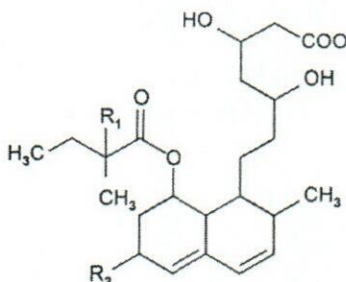
INSTRUCTIONS TO CANDIDATES

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

Question 01

(100 marks)

1.1. The pharmacophore of the type I statin is given below.



1.1.1. Draw the chemical structure of simvastatin by using the pharmacophore given above.
 (20 marks)

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1.1.2. How are you going to make the statins molecules more selective for the liver cells. (30 marks)

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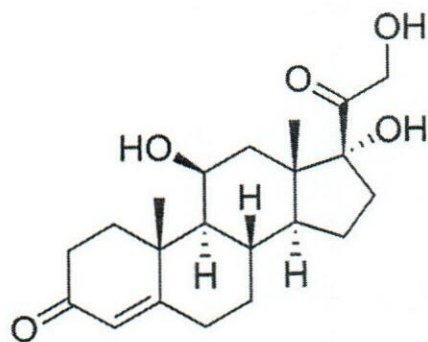
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1.2. Draw the chemical structure of aldosterone by using the given pharmacophore. (20 marks)



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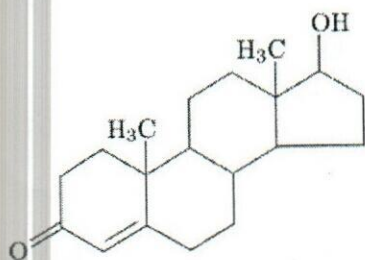
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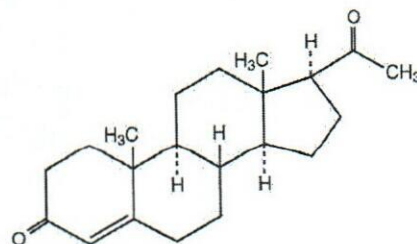
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1.3. Identify the A and B structures given below. (30 marks)

1.3.1.



1.3.2.



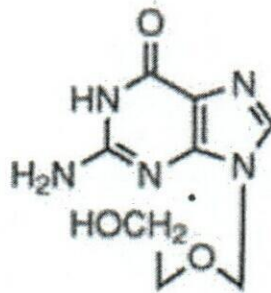
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Question 02

(100 marks)

2.1. Identify the following antiviral drug given below.

(20 marks)



2.2. Outline the mechanism of action of the drug mentioned in 2.1 above.

(30 marks)

2.3. What is the mechanism of action of Vitamin A in stimulating the visual center? (20 marks)

2.4. Provitamin D₃ is activated with the exposure to ultraviolet sunlight. Justify the given statement. (30 marks)

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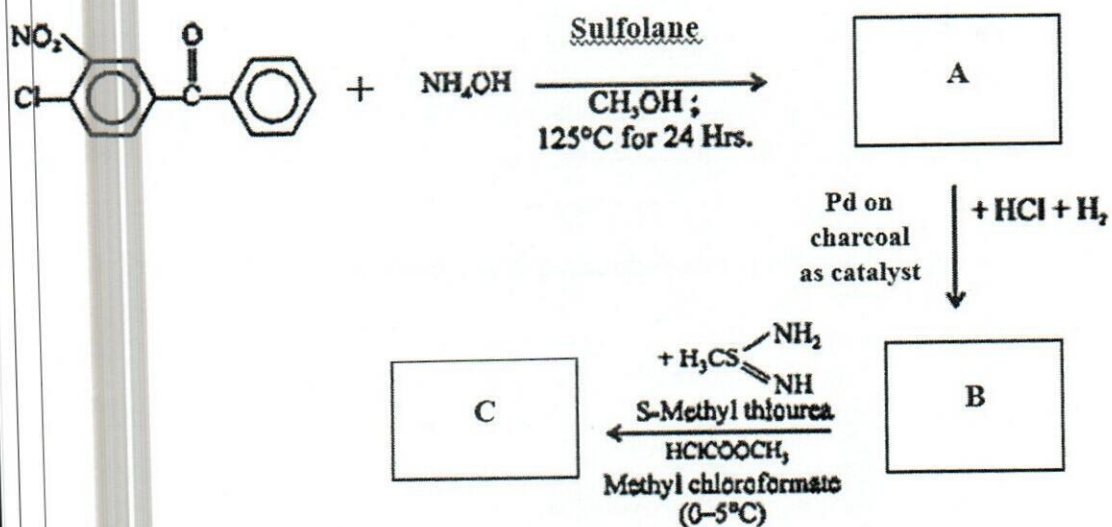
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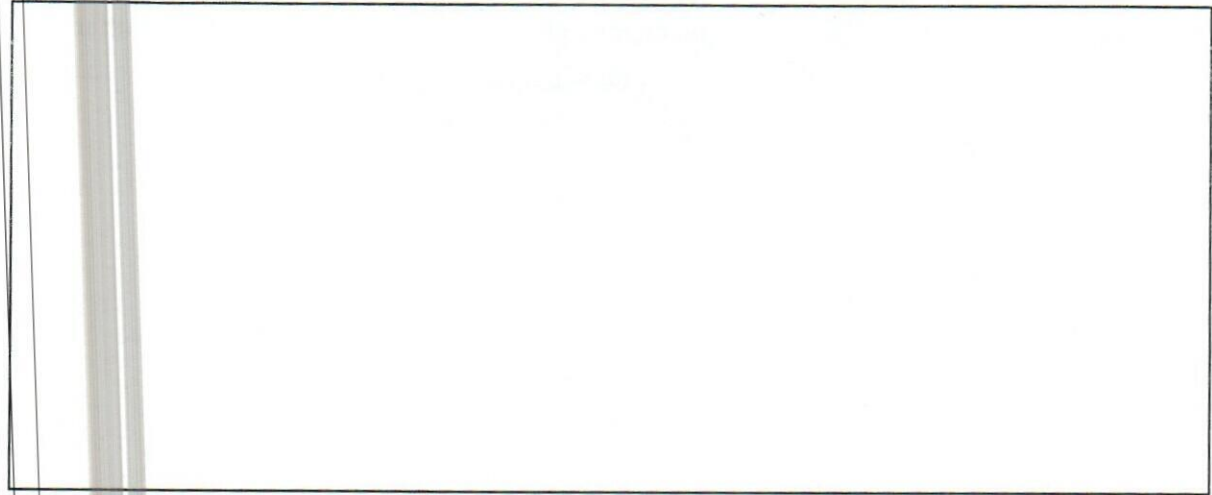
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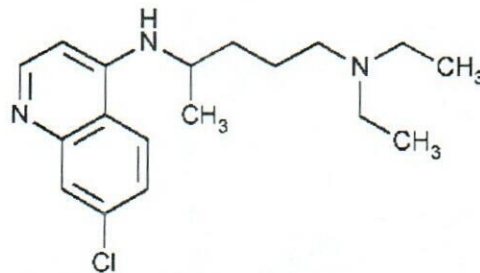
03. (100 marks)

3.1. Draw the chemical structures of A, B, and D of the mebendazole synthesis. (30 marks)





3.2. Chloroquine structure is given below.



3.2.1. What is the chemical modification need to do in chloroquine to reduce the toxicity and increase the plasma concentration? (20 marks)

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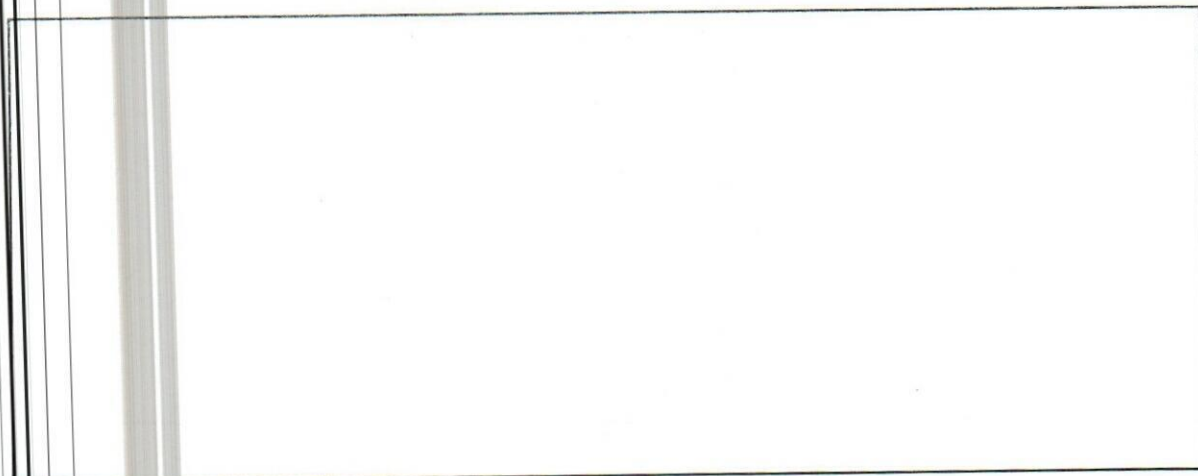
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3.2.2. Draw the chemical structure with the modification.

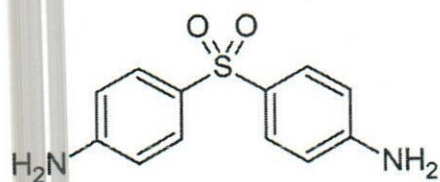
(10 marks)



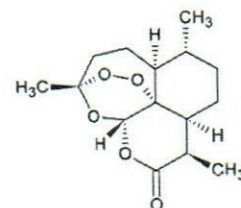
3.3. Identify the chemical structures given below.

(40 marks)

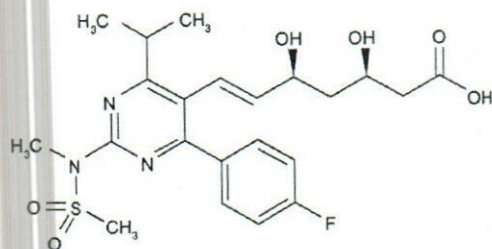
3.3.1



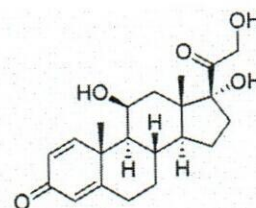
3.3.2



3.3.3



3.3.4



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04

(100 marks)

4.1. Differentiate the two antibiotics Penicillin G and Penicillin V.

(20 marks)

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4.2. What is the mechanism of action of penicillin antibiotics? (30 marks)

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4.3. State the chemical properties of macrolides. (25 marks)

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

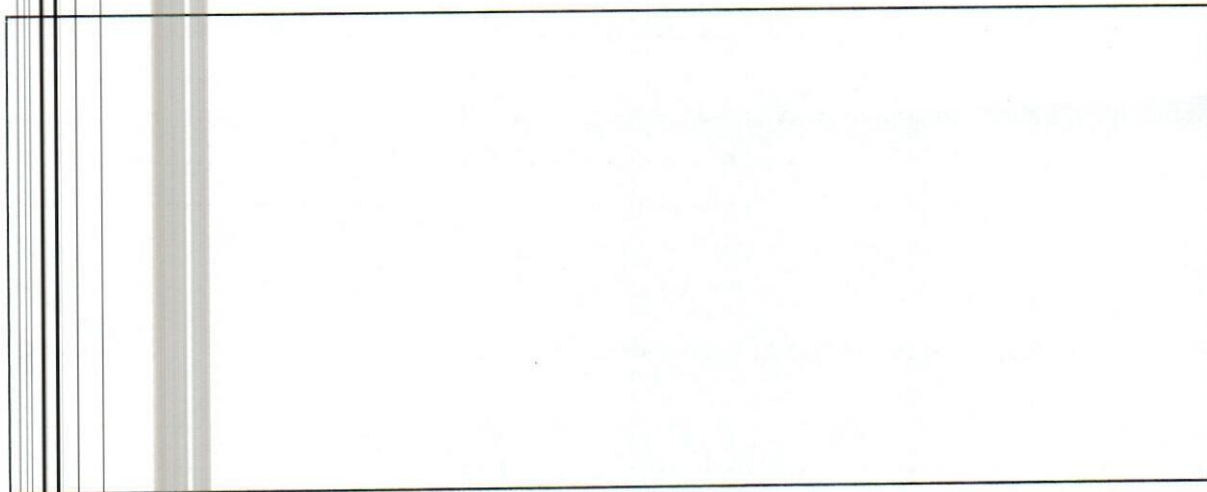
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Question 05

(100 marks)

5.1. Draw the chemical structure of 5-fluorouracil by using the given structure of uracil.

(20 marks)

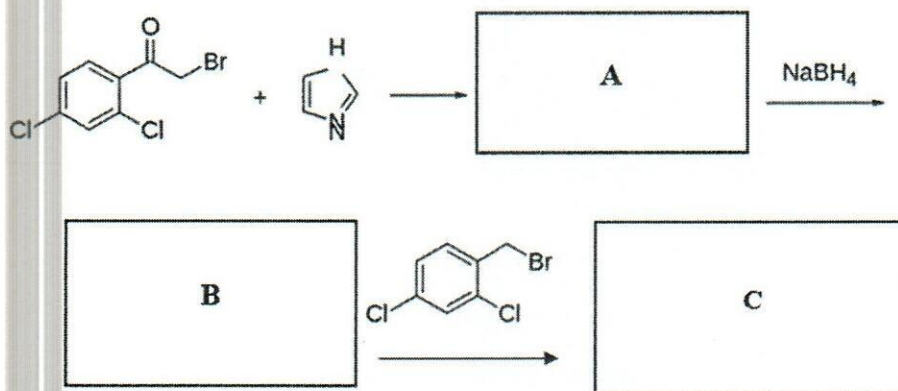


5.2. How the chemical modification in 5-fluorouracil is effective as an anticancer drug?

(30 marks)

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5.3. Draw the chemical structures of A, B, and C of the miconazole synthesis. (30 marks)



5.4. What is the reason for amphotericin B and ketoconazole are contraindicated? (20 marks)

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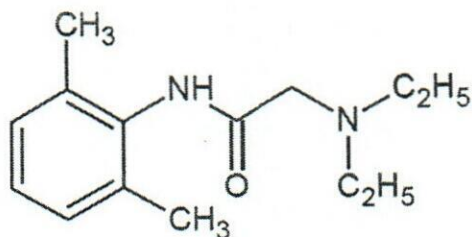
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Question 06**(100 marks)**

- 6.1. Given below is the structure Lidocaine. Draw the active intermediate produced during the metabolism of this drug. (20 marks)



- 6.2. "Quinidine is used as in water soluble salt forms in the pharmaceutical formulations".
Mention the reasons for this practice. (30 marks)

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6.3. Briefly explain the structure activity relationship of thiazide diuretics. (30 marks)

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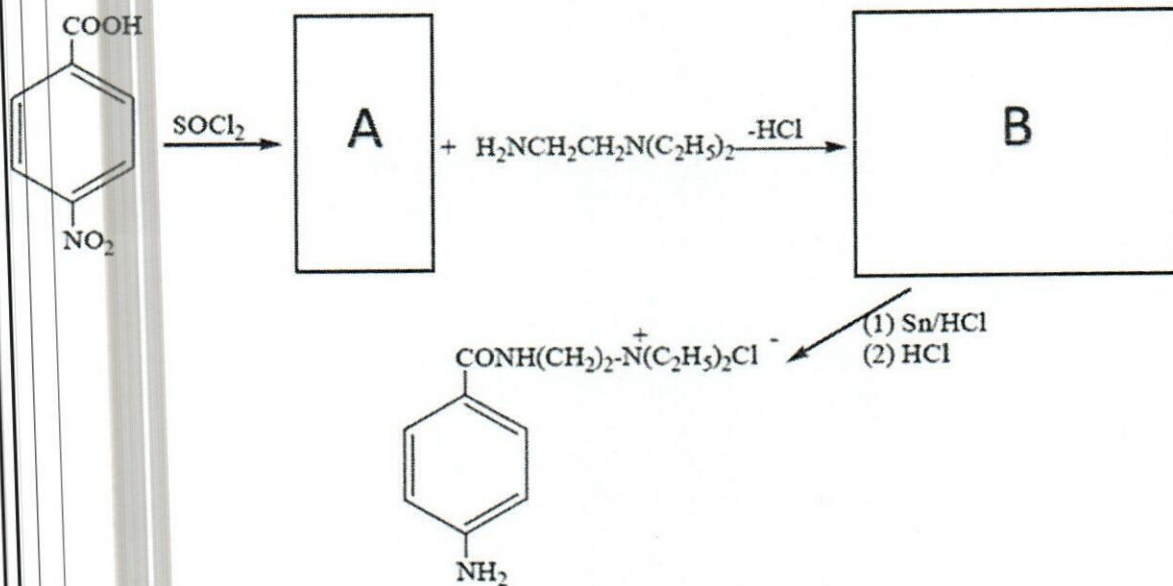
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6.4. Draw the suitable chemical structures (A and B) to complete the synthesis pathway of Procainamide. (20 marks)



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Faculty of Health Sciences

Bachelor of Science Honours in Industrial Pharmaceutical Sciences

IPS 3233 – Advanced Medicinal Chemistry II

Batch – 05

3rd year 2nd semester

End Semester SEQ Examination

Date : 05th of June 2024
Time : 09.00 a.m. – 12.00 p.m. (Three hours)

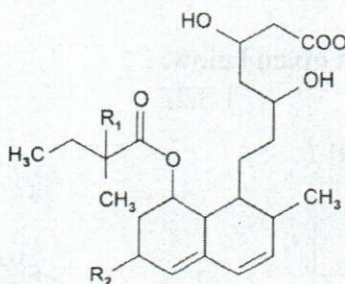
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1.1.1. Draw the chemical structure of simvastatin by using the pharmacophore given above.
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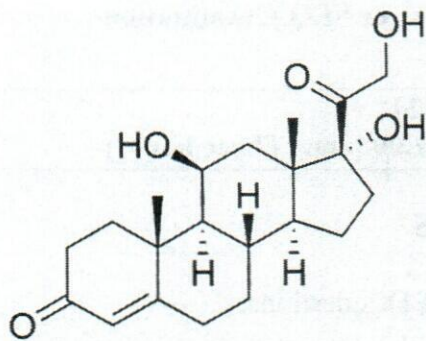
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(20 marks)



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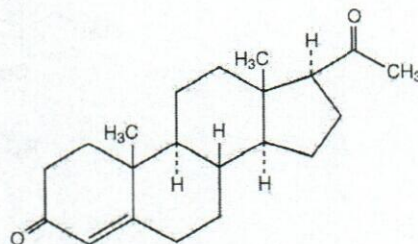
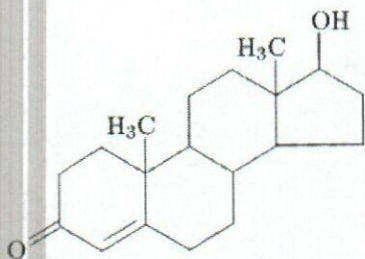
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1.3. Identify the A and B structures given below.

(30 marks)

1.3.1.

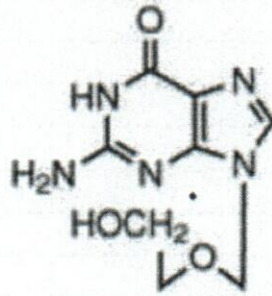
1.3.2.



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Question 02**(100 marks)**

2.1. Identify the following antiviral drug given below.

(20 marks)

2.2. Outline the mechanism of action of the drug mentioned in 2.1 above.

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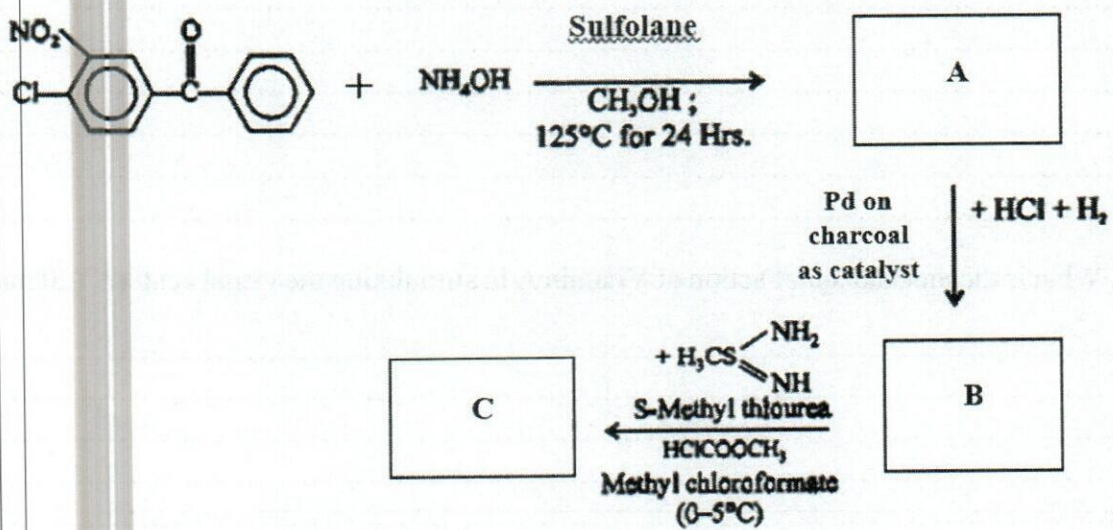
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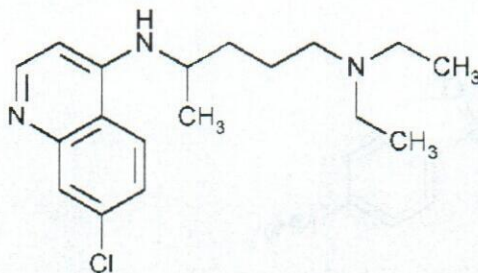
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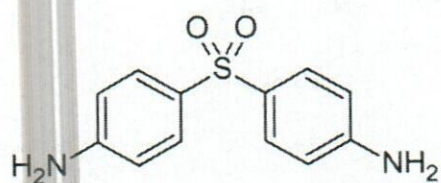
3.2.2. Draw the chemical structure with the modification.

(10 marks)

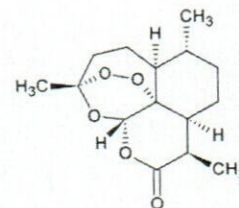
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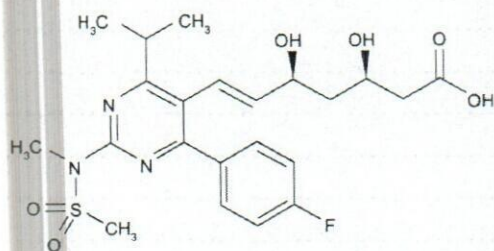
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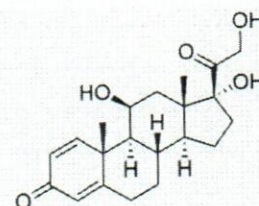
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3.3.3



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04

(100 marks)

4.1. Differentiate the two antibiotics Penicillin G and Penicillin V.

(20 marks)

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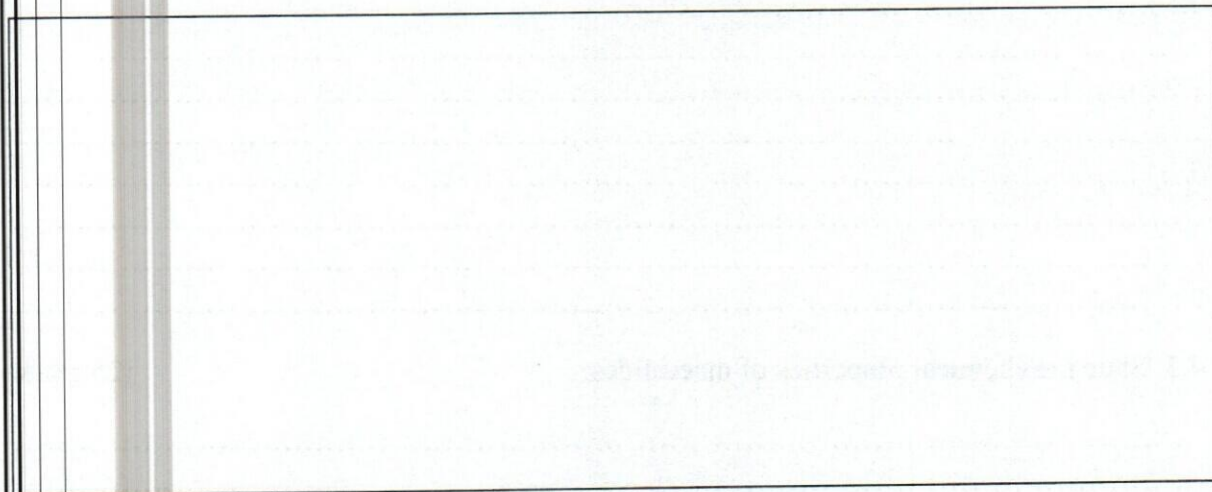
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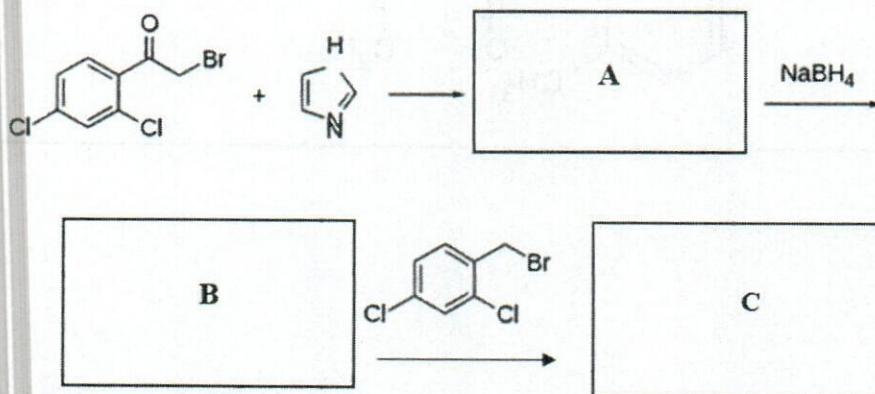
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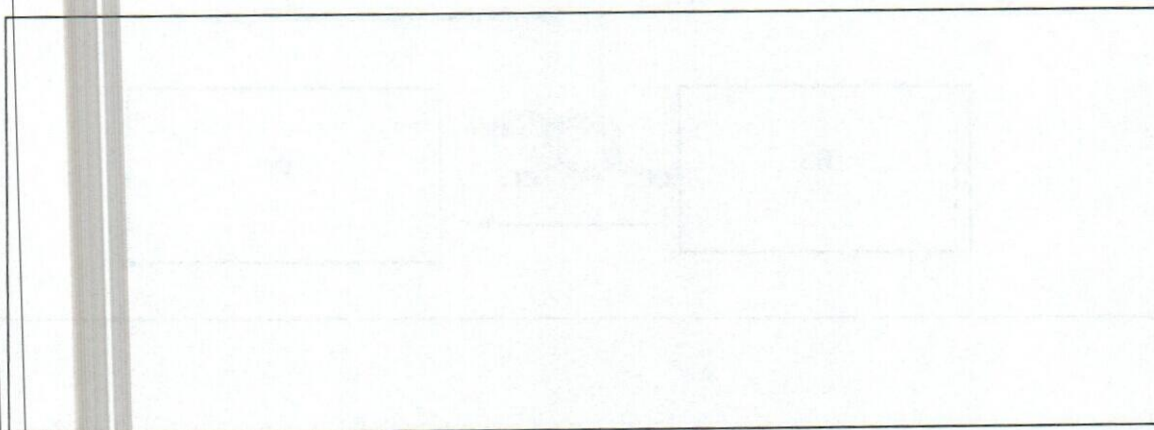
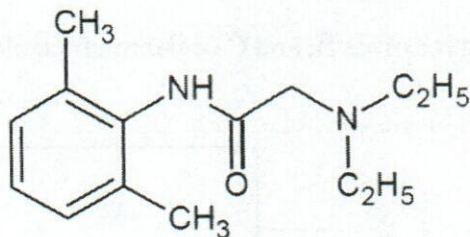
5.4. What is the reason for amphotericin B and ketoconazole are contraindicated?

(20 marks)

Question 06

(100 marks)

- 6.1. Given below is the structure Lidocaine. Draw the active intermediate produced during the metabolism of this drug. (20 marks)



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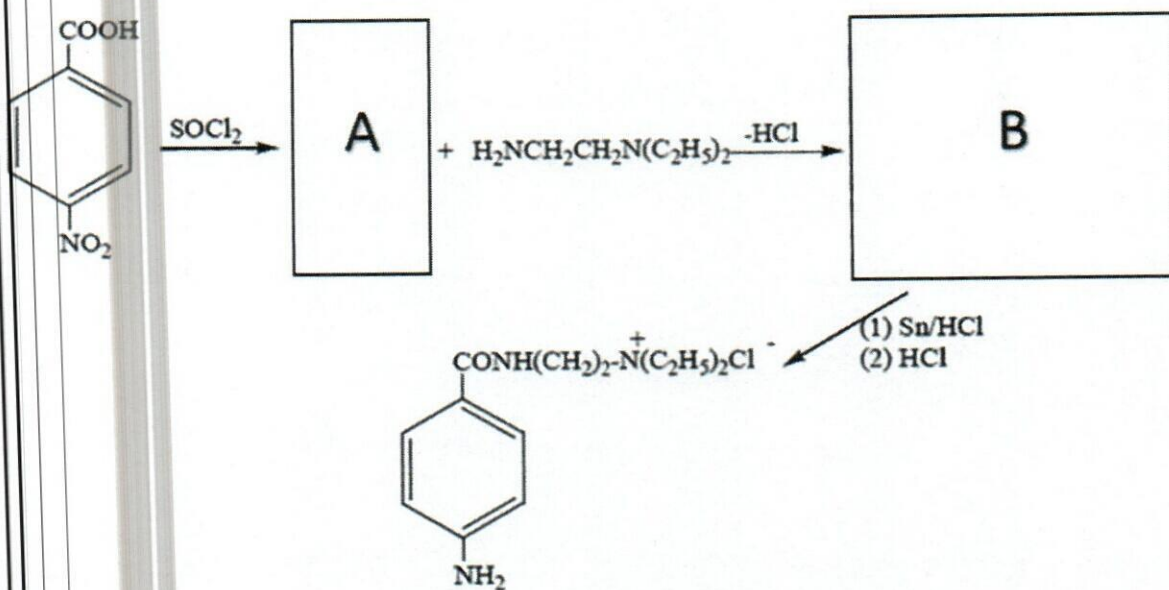
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Faculty of Health Sciences
Bachelor of Science Honors in Industrial Pharmaceutical Science
IPS 3224 Pharmaceutical Engineering II
Batch 05
3rd Year 2nd Semester
End Semester Examination - SEQ

INDEX NUMBER:

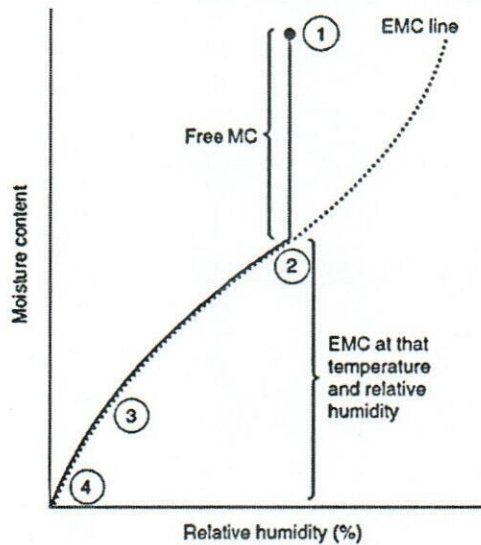
Date : 04th June 2024
 Time : 9.00 a.m. - 12.00 p.m. (Three hours)

INSTRUCTIONS TO CANDIDATES

- This question paper consists of **SIX** questions.
- Answer **ALL** the questions on this paper itself.
- Final answers should be given legibly in black or blue ink.

Question 01 **(100 marks)**

1.1 The moisture content of a solid varies with the relative humidity has shown in the below graph.



1.1.1 Identify the position upto where water can be lost by evaporation. (10 marks)

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1.1.2 Describe a method you can remove more water below the equilibrium moisture content. (30 marks)

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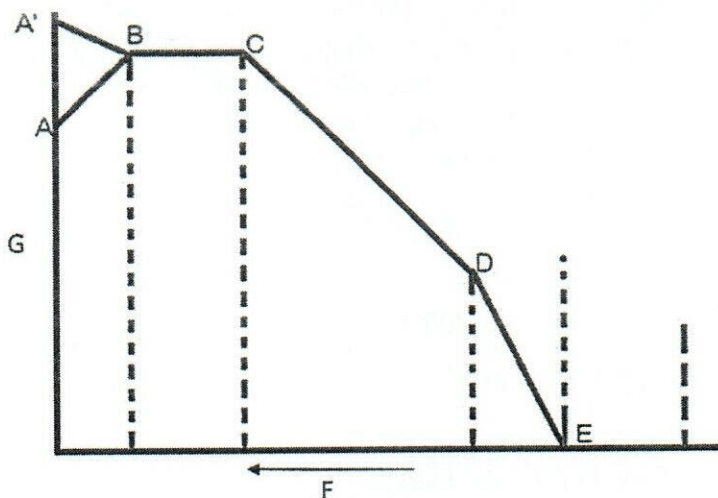
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1.2 The drying-rate curve is shown in the below graph.



1.2.1 Identify the following.

(35 marks)

- a) A-B
- b) B-C
- c) C-D
- d) D-E
- e) E

1.2.2 What happens in B-C area during the drying?

(25 marks)

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Question 02

(100 marks)

2.1 State **three (03)** machines/ instruments used in the particle size separation.

(15 marks)

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2.2 What is 'attrition' mechanism of milling?

(25 marks)

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2.3 Write an equation to show Bond's law of size reduction. Define each term.

(25 marks)

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2.4 Briefly outline the construction and function of ball mill.

(35 marks)

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Question 03**(100 marks)**3.1 List **three (03)** factors that affect the radiant heat transfer.**(15 marks)**

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3.2 What are the advantages of using electricity for heating purposes?

(20 marks)

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3.3 One side of an iron machine wall is at 100°C , while the other side is at 74°C . The wall is 1.52 cm thick and have an area of 1035 mm^2 . (Thermal conductivity of iron = $79.5\text{ Wm}^{-1}\text{K}^{-1}$)

3.3.1 Calculate the heat transfer rate through the iron machine wall.

(25 marks)

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3.3.2 Write **two (02)** assumptions you made during the calculations.**(10 marks)**

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3.4 What are the differences of dry steam and wet steam?

(30 marks)

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Question 04 (100 marks)

4.1 How does mixing secure uniformity of composition? Give examples. (25 marks)

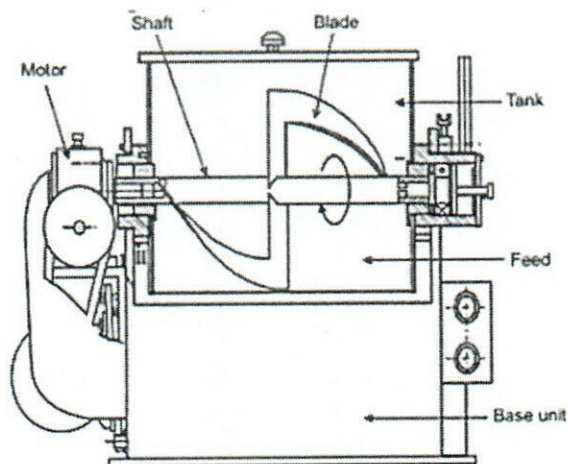
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4.2 State **three (03)** methods to prevent de-mixing of a mixture. (15 marks)

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4.3 Draw the **three (03)** flow patterns can be seen in the liquid-liquid mixing. (30 marks)

4.4 A commonly used mixing machine is given below.



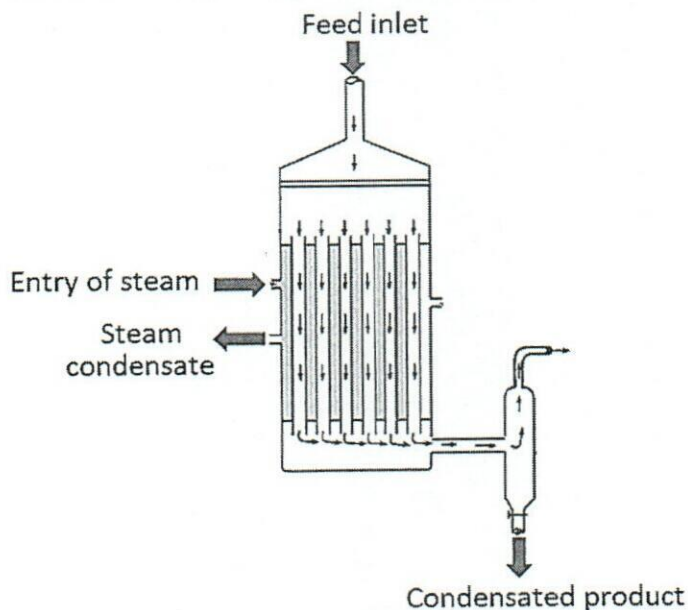
4.4.1. Identify the mixer given in the above image. (20 marks)

4.4.2. State **one (01)** usage of this mixer. (10 marks)

Question 05 (100 marks)

5.1 Briefly indicate the influence of external pressure on boiling point. (15 marks)

5.2 A schematic diagram of an industrial evaporator is given below.



5.2.1 Identify the above machine. (20 marks)

5.2.2 List **two (02)** other types of evaporators used for industrial purposes. (20 marks)

5.3 An industrial evaporator is used to concentrate a solution from 20% to 65.5% of non-volatile solid at 100 kg/h feed rate.

5.3.1 Calculate the rate of product collected. (25 marks)

5.3.2 Calculate the mass of product collected at 12 minutes. (20 marks)

Question 06 (100 marks)

6.1 Define the term 'volatility'. (15 marks)

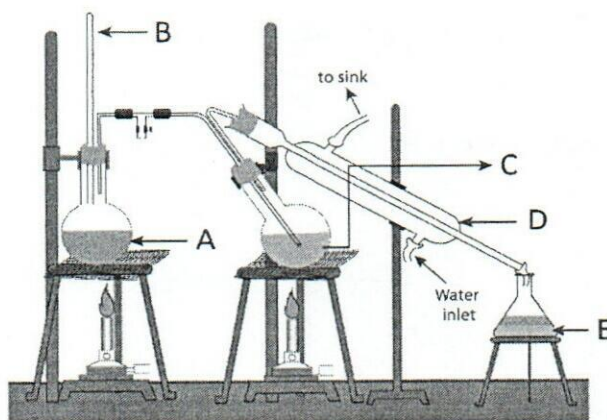
6.2 Toluene and n-heptane produces an ideal solution when mixed. Saturated vapour pressures of toluene and n-heptane at 100°C are 73.7 kN/m² and 106 kN/m² respectively.

6.2.1 State **three (03)** characteristics of an ideal solution. (15 marks)

6.2.2 Write expressions for toluene and n-heptane vapour pressures using Raoult's law. (10 marks)

6.3 Steam distillation is a separation method used in various industries.

6.3.1 Name A – E parts shown in the following diagram of a steam distillator. (30 marks)



6.3.2 "Steam distillation is used for separation of volatile compounds, particularly those with limited solubility in water, and have a high boiling point." Do you agree with this statement? Justify your answer with the mechanism of steam distillation. (30 marks)
