



UNIVERSITY OF RUHUNA – FACULTY OF ALLIED HEALTH SCIENCES
DEPARTMENT OF PHARMACY
SECOND BPHARM PART II EXAMINATION – DECEMBER 2018/JANUARY 2019
PH 2254 PHARMACOGNOSY IB (SEQ)

TIME: THREE HOURS

INSTRUCTIONS

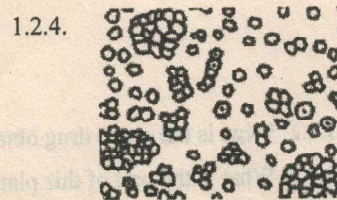
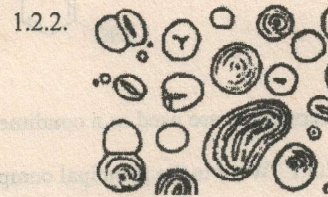
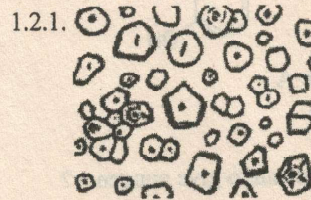
- There are Six (06) questions of SEQ paper
- Answer **all** questions in the booklet given.
- No paper should be removed from the examination hall.
- Do not use any correction fluid.
- Use illustrations where necessary.

01. Carbohydrates are one among the four major classes of biomolecules.

1.1.1. Name **two** types of polysaccharides of starch. (05 marks)

1.1.2. State the basic structural difference between two types of polysaccharides of starch named in 1.1.1. (05 marks)

1.2. Following images show starch granules obtained from different sources. Identify the sources. (20 marks)



1.3. Alginate is one of the versatile biopolymers used in pharmaceutical industry.

1.3.1. What is the main source of alginate? (05 marks)

1.3.2. List the basic units of alginates. (10 marks)

1.3.3. What would you expect from the partial hydrolysis of alginate? (10 marks)

1.3.4. Explain briefly how alginate could form a three-dimensional gel network. (15 marks)

1.3.5. Give **two** pharmaceutical uses of alginate. (10 marks)

1.4. Write a short account on the pharmaceutical applications of natural gums. (20 marks)

02.

2.1. Complete the following table.

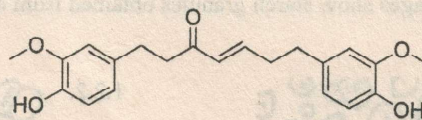
(50 marks)

	Source	Chemical constituents	Pharmaceutical use
Neem oil			
Chaulmoogra oil			
Olive oil			
Cotton seed oil			
Castor oil			

2.2. Turmeric is one of the major natural products used in our day to day life.

2.2.1. What is the plant of origin of turmeric? (05 marks)

2.2.2. What is the name given for the yellow colored compound of turmeric? (10 marks)

2.2.3. Based on the structure of diarylheptanones-gingerenone A shown below, which is isolated from *Zingiber officinale*, draw the structure of the compound you mentioned in 2.2.2. (10 marks)

Gingerenone A

2.3. Capsicums are used as a condiment.

2.3.1. What is the principal compound of capsicum to give pungency? (05 marks)

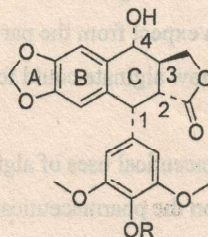
2.3.2. List four medicinal uses of capsicum. (20 marks)

03.

3.1.

3.1.1. What is the crude drug obtained from *Podophyllum peltatum*? (05 marks)

3.1.2. What is the part of this plant used in the production of the crude drug you mentioned in 3.1.1.? (05 marks)

3.1.3. Basic structure of one of the active constituents present in *Podophyllum peltatum* is shown below. Give the names of the metabolites when R=H and R=CH₃. (10 marks)

3.1.4. Give the names of compounds when 4-OH moved to ring "B" with the replacement of

3.1.4.1. R=H. (05 marks)

3.1.4.2. R=CH₃ (05 marks)

3.1.5. One of the anti-cancer drugs used in the treatment of small-cell lung cancer has been semi-synthetically obtained from the crude drug you mentioned in 3.1.1. Provide the name of the anti-cancer drug. (05 marks)

3.2. Briefly explain how tannins are classified. (30 marks)

3.3. Answer the following questions based on the knowledge on "nutgalls" which is one of the sources of tannins.

3.3.1. What is the biological source of nutgalls? (05 marks)

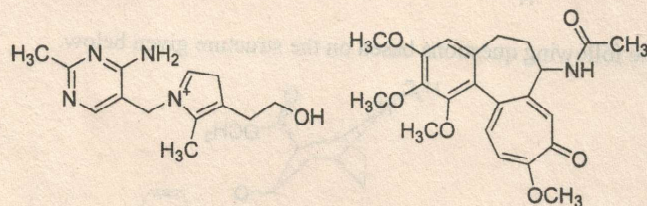
3.3.2. Give the name of the insect responsible for the formation of nutgalls? (05 marks)

3.3.3. List **three** constituents which could be obtained from nutgalls? (15 marks)

3.3.4. Give **one** example each for industrial and medicinal uses of nutgalls. (10 marks)

04.

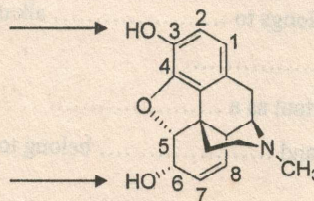
4.1. Structures of two compounds containing N is shown below. Giving reasons state whether they are considered as alkaloids. (20 marks)



Compound A

Compound B

4.2. Structure of the alkaloid 'morphine' is given below.



What would be the products when,

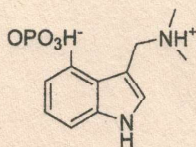
4.2.1. Methylation takes place at 3-OH group. (05 marks)

4.2.2. Acetylation takes place at both 3-OH and 6-OH groups. (05 marks)

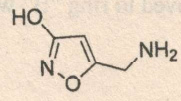
4.3. Draw the structure of 'desomorphine', a synthetic opioid. (10 marks)

4.4. Identify the following psychedelic compounds and indicate one source for each. (30 marks)

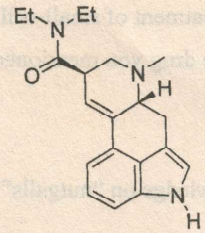
4.4.1.



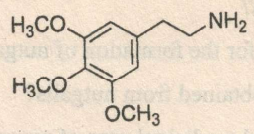
4.4.2.



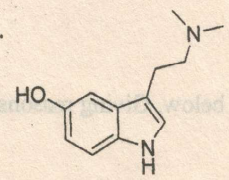
4.4.3.



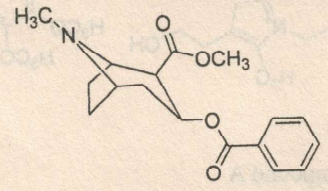
4.4.4.



4.4.5.



4.5. Answer the following questions based on the structure given below.

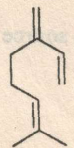


- 4.5.1. This is the structure of (05 marks)
- 4.5.2. This compound belongs to alkaloids. (05 marks)
- 4.5.3. Isolated from (05 marks)
- 4.5.4. Medicinally important as a (05 marks)
- 4.5.5. and belong to the same family of alkaloids. (10 marks)

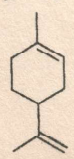
05.

5.1. Structure of three terpenoids are shown below. Indicate the terpene units. (15 marks)

5.1.1.



5.1.2.

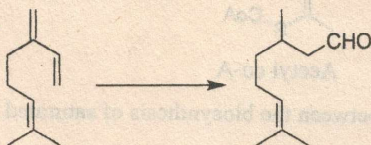


5.1.3.



5.2. Show how you would carry out the following conversions. (30 marks)

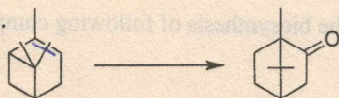
5.2.1.



Myrcene

Citronellal

5.2.2.



α -pinene

Camphor

5.3. Write the name of **one** essential oil and **one** pharmaceutical use of each of the following plant material. (30 marks)

5.3.1. *Mentha piperita*

5.3.2. *Cinnamomum zeylanicum*

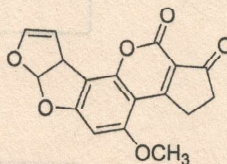
5.3.3. *Syzygium aromaticum*

5.3.4. *Elettaria cardamomum*

5.3.5. *Pimpinella anisum*

5.4.

5.4.1. Identify the molecule given below. (05 marks)



5.4.2. Name the class of natural products this molecule belongs and the origin of this molecule. (10 marks)

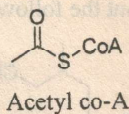
5.4.3. In terms of biological activity, what is the specialty of this molecule? (05 marks)

5.4.4. In addition to the compound mentioned in 5.4.1., name **two** compounds belongs to the same class of natural products. (05 marks)

06.

6.1.

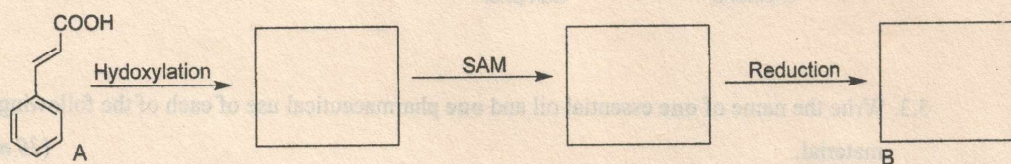
6.1.1. Acetyl co-A (shown below) is the basic unit of the biosynthesis of fatty acids. Using appropriate equations, briefly explain the biosynthesis of fatty acids indicating the enzymes involved. (32 marks)



6.1.2. What is the major difference between the biosynthesis of saturated and unsaturated fatty acids. (04 marks)

6.2.

6.2.1. Write down the intermediates of the biosynthesis of following compounds. (12 marks)

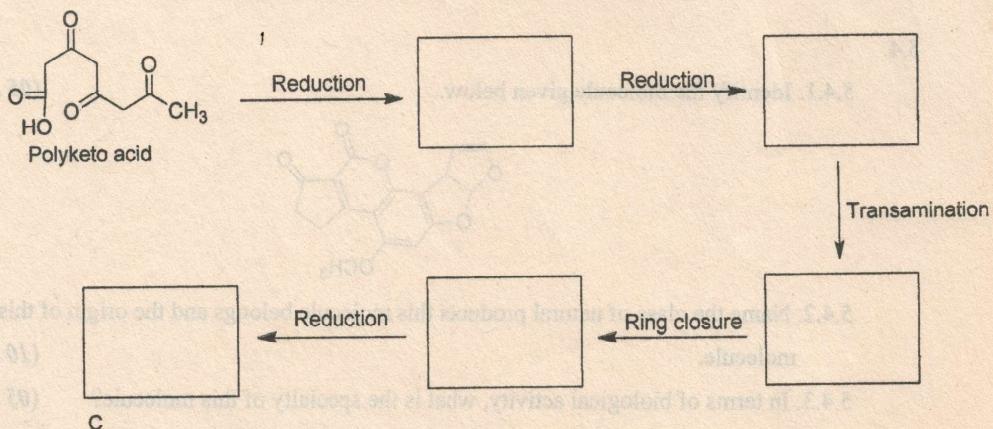


6.2.2. What is the name of the starting material A? (04 marks)

6.2.3. What is the name of the product B? (04 marks)

6.3.

6.3.1. Write down the intermediates of the following reaction. (20 marks)



6.3.2. What is the name of the product C? (04 marks)

6.4. Using appropriate chemical structures, briefly describe the structural features to distinguish the following pairs. (20 marks)

6.4.1. Arecoline and arecaidine

6.4.2. Solanum alkaloids and veratrum alkaloid