



KENYATTA UNIVERSITY
EXAMINATION FOR THE DEGREE OF BACHELOR OF PHARMACY

PPD 320: PHARMACOGNOSY II

2ND SEMESTER, 2022/2023

TIME: 2 Hours

INSTRUCTIONS:

1. The paper consists of three sections; A, B and C
2. Answer all questions
3. Answer sections A, B and C in separate booklets

SECTION A: FATS, OILS and WAXES

Part I. Multiple Choice Questions. Tick the correct answer only. (10 marks)

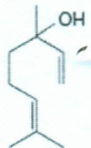
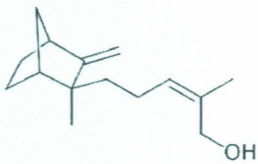
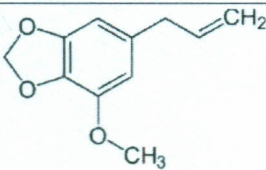
1. The following is true about expression method.
 - A. The oil obtained by this method may have a strong odour, dark colour and waxes.
 - B. The oil obtained by this method contains water, resins and volatile compounds.
 - C. The method is used to obtain yellow beeswax through expressing honeycombs.
 - D. None of the above
2. Concerning fats and fixed oils, which of the following is not true?
 - A. Linolenic acid is found in linseed fixed oil.
 - B. There is no chemical difference between fats and oils.
 - C. Fats and oils are esters of glycerol and fatty acids.
 - D. Fixed oils that resinify and dry without forming a thin film are called drying oils.
3. Fats and oils have certain common characteristics except.
 - A. Their specific gravity is always less than water.
 - B. They form a permanent translucent stain on paper.
 - C. They are insoluble in chloroform, petroleum ether and benzene.
 - D. When distilled they form acryldehyde, glycerol and carboxylic acids.

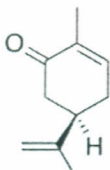
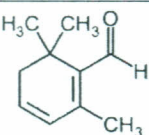
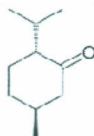
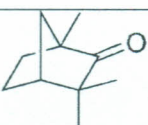
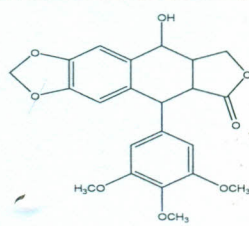
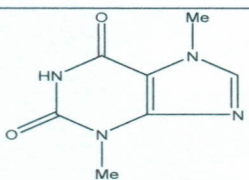
4. Sesame seed produces an oil known commercially as;
 - A. Benne oil.
 - B. Teel oil.
 - C. Sesamum oil.
 - D. All the above.
5. The following is not true about Carnauba wax.
 - A. The highest grade Carnauba wax is used for enteric coating for pills.
 - B. It is derived from the leaves of a tropical palm tree found in Brazil.
 - C. It is the hardest natural wax known to man.
 - D. It is obtained by shaking the leaves.
6. Which of the following waxes is used as a flavouring agent in chewing gums and medicinal syrups?
 - A. Tolu Balsam
 - B. Tolu Balsam and Gum Benjamin
 - C. Storax
 - D. Tolu Balsam and Storax
7. Which of the following is true about waxes?
 - A. Non true waxes are the ethers of cholesterol, vitamin A and D.
 - B. Waxes have higher saponification and iodine values than fats.
 - C. The chief constituents of the wax Lanolin are cholesterol and ischolesterol.
 - D. Spermaceti is a solid wax obtained from sperm head of the whale *Physeter catodon*.
8. Which of the following is true about volatile oils?
 - A. In hydrosteam distillation, plant materials are mixed with water and heated to boiling.
 - B. Volatile compounds derived via the acylpolymalonate pathway are referred to as terpenoids.
 - C. Phytosols have low viscosity and are able to penetrate plant material during extraction of volatile oils.
 - D. Crocin is the chief component of saffron oil.

9. The following is true about Spermaceti.
- Contains about 1.5 to 2.3 % of wax alcohols.
 - It may be obtained from the bottle-nosed whale, *Hyperoodon rostratus*.
 - It is a non-true wax.
 - It is used in association with lanolin or mastic as an enteric coating for pills.
10. Which of the following statements is not correct about beeswax?
- It is used in the formulation of medicinal preparations for treating skin cracks.
 - It is a non-true wax
 - White beeswax is prepared from yellow beeswax by bleaching with chromic acid.
 - White beeswax is prepared from yellow beeswax by slow bleaching with sunlight, air and water.

Part II: TRUE/FALSE QUESTIONS. Indicate T or F against each question (10 marks)

For the following structures of molecules of pharmaceutical importance, indicate whether the name of the molecule in column **A** and the pharmaceutical use in column **B** is True (T) or False (F). [10 Marks]

		A	B
	Structure of active ingredient	Name of compound (5 marks)	Pharmaceutical use (5 marks)
1		Linalool.	Water absorbable ointment base.
2		β -Santalol.	Base for cold-creams and ointments.
3		Safranal.	Tablet-coating agent.

4		Menthone.	Tapeworm infestation.
5		Myristicin.	Diuretic in veterinary medicine.
6		Carvone.	Antispasmodic.
7		Fenchone.	Skin cracks.
8		Cineole.	Expectorant in chronic bronchitis and asthma.
9		Theobromine.	Paint in the treatment of soft venereal warts.
10		Podophyllotoxin.	Suppository base.

Part III: Short Answer Questions (10 marks)

1. Identify the source and explain the process of obtaining the following pharmaceutical products
 - a. Mandrake root (2 marks)
 - b. Sandalwood oil (2 marks)
 - c. Lanolin (3 marks)
 - d. Colophony (3 marks)

Part IV: Essay Question (10 marks)

1. Jackeline expressed canola seeds and obtained a fixed oil that had a strong odour and a dark brown colour. She purified the oil using a locally available material. She used the purified oil as a carrier in making a mosquito repellent using a volatile oil from a locally grown tree.
 - a. Explain how Jackeline carried out purification of the canola oil and name the locally available purifying material. [8 marks]
 - b. Give the common and botanical name of the locally grown tree whose volatile oil repels mosquitoes. [2 marks]

SECTION B: GLYCOSIDES

Part I. Multiple Choice Questions. Tick the correct answer only. (10 marks)

1. All of the following contain Anthraquinone glycosides except
 - A. Cascara
 - B. Rhubarb
 - C. Aloe
 - D. Dioscorea

2. Which of the following is not a derivative of Anthraquinones
 - A. Chrysophanol
 - B. Emodine
 - C. Carmic acid
 - D. Prunasin
3. All of the following plants are biological sources of saponins except
 - A. *Glycyrrhizaglabra*
 - B. *Saponaria officinalis*
 - C. *Smilax febrifuga*
 - D. *Quintea Saponaria*
4. Which one among the following cannot be precipitated by tannins?
 - A. Proteins
 - B. Heavy metals
 - C. Gelatins
 - D. Simple sugars
5. Which among the following glycones constitute cyanogenic glycosides
 - A. Linamarin and amygdalin
 - B. Digoxin and gitaloxin
 - C. Gingsenosides and dianthrone
 - D. None of the above
6. Which among the following is true about glycosides?
 - A. They are polar substances
 - B. They can be extracted using a mixture of water and alcohol
 - C. Majority of naturally occurring glycosides are β -glycosides
 - D. All of the above
7. All of the following are industrial applications of tannins except
 - A. Ink manufacture
 - B. Vegetable tanning
 - C. Preservatives
 - D. Antidotes

8. Which one among the following is not true about steroidal saponins?
- A. Present in *glycyrrhiza glabra*
 - B. Less distributed in nature
 - C. Mostly abundant in monocotyledonous plants
 - D. Majority have significant Pharmaceutical importance
9. Which one among the following is not a phytoconstituent of aloes?
- A. Barbaloin
 - B. Aloe A and B
 - C. Aloinosides A and B
 - D. Aloeresin A and C
10. Which one among the following is a constituent in Senna allied drugs?
- A. Aloe emodin
 - B. Sennoside A and B
 - C. A and b
 - D. Hypericin

Part II: TRUE/FALSE QUESTIONS. Indicate T or F against each question

(10 marks)

- 1. Anthraquinones are characterized by two aromatic rings fused to the central ketone-bearing ring
- 2. Anthraquinone glycosides can irritate the intestinal mucosa if overdosed
- 3. *Digitalis purpurea* is the biological source of scillaren A and B
- 4. Digoxin is an example of a bufanolide
- 5. Hecogenin is a saponin
- 6. Guignard test is ideal for cyanogenic glycosides
- 7. *Rhumnus purshiana* has cascarosides A and B
- 8. Digitoxin acts as a laxative
- 9. *Cascara sagrada* contains barbaloin
- 10. Cyanoglycosides are enzymatically degraded to form hydrogen cyanide which is poisonous

Part III: Short Answer Questions

10 marks)

1. Describe two types of Saponins (3 marks)
2. With the aid of appropriate structures, differentiate between cardenolides and bufadienolides (4 marks)
3. State aglycones obtained from *Digitalis purpurea*, *Glycyrrhiza glabra*, *Areca catechu* for each give one Pharmaceutical use (3 marks)

Part IV: Essay Question

(10 marks)

1. Discuss any three anthraquinone aglycones, their biological sources and pharmaceutical uses (10marks)

SECTION C: ALKALOIDS

Part I. Multiple Choice Questions. Tick the correct answer only.

(20 marks)

1. Deadly nightshade is an important source of the alkaloid
 - A. Hyoscyamine
 - B. Brucine
 - C. Colchicine
 - D. Lobeline
2. The species of Cinchona that gives highest yield of alkaloids is
 - A. *C. succirubra*
 - B. *C. calisaya*
 - C. *C. officinalis*
 - D. *C. nitida*
3. Which of the following ergot alkaloids is water soluble at room temperature
 - A. Ergotamine
 - B. Ergocristine
 - C. Ergometrine
 - D. Ergosine

4. A positive result is obtained when Ergot alkaloids are treated with sulphuric acid and
 - A. potassium ferricyanide
 - B. Sodium nitroprusside
 - C. Potassium Bismuth Iodide
 - D. *p*-dimethylaminobenzaldehyde
5. In plants, the tropane ring is obtained by the condensation of
 - A. Pyrrolidine and piperidine
 - B. piperidine and pyridine
 - C. pyrrolidine and piperazine
 - D. pyridine and pyrrolidine
6. N-butylscopolamine is the most clinically used derivative of tropane alkaloids because it
 - A. Has high bioavailability
 - B. Has high selectivity to target receptor
 - C. Has poor permeability to the blood brain barrier
 - D. Is not a substrate for CYP450
7. Calystegines are unique tropane alkaloids mainly because
 - A. They are polyhydroxylated
 - B. They are not methylated at the N-atom
 - C. They do not give a positive result with the Vitali-Morin test
 - D. They exhibit optical isomerism
8. Coca leaves were traditionally used for all of the following conditions except
 - A. Pain relief
 - B. motion sickness
 - C. combat fatigue
 - D. psychostimulant
9. The property that makes colchicine a unique alkaloid is
 - A. Soluble in water
 - B. Gives negative result in the Wagner's test
 - C. It is not basic
 - D. N-atom is in aliphatic chain

10. In Africa, the roots of *Rauwolfia vomitoria* were traditionally used in management of erectile dysfunction. This activity is attributed to the presence of
- A. reserpine,
 - B. ajmaline
 - C. yohimbine
 - D. serpentine
11. Indole alkaloids have structural similarities to the neurotransmitter
- A. Serotonin
 - B. Dopamine
 - C. Gamma-aminobutyric acid
 - D. Norepinephrine
12. Which of the following alkaloids has found wide application as an ingredient in rodenticides
- A. Aconitine
 - B. Reserpine
 - C. Lobeline
 - D. Strychnine
13. Which of the following alkaloid groups is not precipitated by Meyer's reagent
- A. Purine alkaloids
 - B. Tropane alkaloids
 - C. Quinoline alkaloids
 - D. Terpenoid alkaloids
14. Which of the following statements is false about pilocarpine
- A. Its synthesis is entirely from the amino acid histidine
 - B. *Pilocarpus microphyllus* is currently the main source
 - C. The isomer isopilocarpine is readily formed if base or heat is applied during extraction of the alkaloids
 - D. Isopilocarpine lacks significant biological activity

15. The following compounds can be classified as pseudo alkaloids except
- A. Aconitine
 - B. Valerianine
 - C. Theophylline
 - D. Strychnine
16. Which of the following is a quinoline alkaloid that has found application in the treatment of colorectal cancers
- A. Indicine N-oxide
 - B. Seneciophylline
 - C. Berberine
 - D. Camptothecin
17. The main focus in the study of Senecionine in pharmacy is
- A. Its potential as a lead compound in the development of cancer medicine
 - B. Its efficacy in the treatment of *P. falciparum* malaria
 - C. Its potential for toxicity in humans as an impurity in food
 - D. Its usefulness as an antidote in organophosphate poisoning
18. The main challenge of obtaining Vinca alkaloids from *Catharanthus roseus* is
- A. Low yield
 - B. Complex extraction techniques
 - C. Chemical degradation during extraction
 - D. Expensive extraction and purification methods
19. The following statements about theobromine are true except
- A. It gives positive result with the FeSO_4 test
 - B. It is commercially obtained from cocoa husks
 - C. It has appreciable diuretic activity
 - D. It is soluble in water

20. Which of the following alkaloids is not biosynthesised from tyrosine

- A. Berberine
- B. Pilocarpine
- C. Tubocurarine
- D. Papaverine

Part II: Short Answer Questions

(10 marks)

1. Explain the value of both ergot and purine alkaloids in the traditional and modern management of pain (4 marks)
2. Describe the colorimetric tests that can help identify purine alkaloids (3 marks)
3. Pyrrolizidine alkaloids are derived from the bicyclic pyrrolizidine ring shown below;

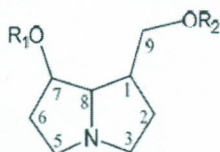


Figure 1: Pyrrolizidine ring nucleus

Re-draw the pyrrolizidine ring nucleus with the functional groups that confer upon it its toxic properties (3 marks)

Part III: Essay Question

(10 marks)

1. With the aid of a diagram discuss the structural features of tropane alkaloids that confer upon them their biological activity (10 marks)