



October University for Modern Sciences & Arts

Final Exam Model Answer

Faculty	Pharmacy
Department	Pharmacognosy
Module Code	PHG 112 (level 1)
Module Title	Pharmacognosy
Semester	Fall 2023
Date	13/1/ 2024
Time Allowed	2 hours
Total Mark	60 Marks
No. of Pages	9/ 9 (cover page is not included)
Material provided	----
Equipment permitted	Calulator
Additional Instructions	All answers must be in English otherwise they will not be considered

No books, paper or electronic devices are permitted to be brought into the examination room other than those specified above.

All questions are to be answered and illustrate your answer with a drawing when required. The exam contains three pages. **ALL ANSWERS MUST BE IN THE ANSWER PAPER.**

(60 marks)

Question 1: In a tabular form mention the part used (0.5 mark), one main active constituent (0.5 mark), one use (0.5 mark), and a chemical test (0.5 mark), for the following drugs. (10 Marks, 2 marks each)

Vinca, Star anise, Capsicum, Opium and Licorice

Name	part used	one main active constituent	one use	chemical test
Vinca	herb	Mainly alkaloids (about 90 alkaloids) and that of therapeutically active alkaloids are vincristine and vinblastine.	Mainly used as antitumor -Vinblastine is used Hodgkin's disease and breast cancer -Vincristine is used in leukemia in children	Mayer's
Star anise	fruit	Volatile oil mainly anethole more than 4.5%, which is the same ingredient that gives the anise (<i>Pimpinella anisum</i>) its distinctive odor	It is a good source of shikimic acid, which is used in the manufacture of oseltamivir (Tamiflu), a flu treatment	
Capsicum	fruit	Pungent principles named Capsaicinoids (up to 1.5%), including capsaicin (0.1 - 1 %), 6,7 -dihydrocapsaicin, nordihydrocapsaicin, homodihydrocapsaicin, and homocapsaicin	<u>Externally</u> , It is used in different formulations (e.g. ointments and plasters) as a pain controller for the relief of rheumatism, lumbago, and after <i>Herpes Zoster</i> infections and counter irritant	1- Capsaicin gives a bluish-green colour on addition of few drops of FeCl ₃ 2-Capsaicin dissolved in H ₂ SO ₄ and small piece of sucrose sugar is added, a violet colour is developed after few hours.

Opium	Dried Latex	1- Alkaloids. It contains about 25 different alkaloids, which occur in combination with meconic acid. The most important alkaloids are morphine, codeine, narcotine, thebaine and papaverine. 2- Mucilage, wax and sugar.	1- Hypnotic, analgesic and sedative 2- Astringent 3- Cough sedative	<u>Test for identity (test for meconic acid)</u> few drops of 5% ferric chloride where a purplish red colour is produced and not destroyed by addition of hydrochloric acid or 5% mercuric chloride
Licorice	underground	1- Sweet principle glycyrrhizin (triterpenoid saponin) 2- Flavonoids, liquiritin, isoliquirtin 3- Coumarins (liqcoumarin) & bitter principle (glycyramarin)	<ul style="list-style-type: none"> • Anti-inflammatory for gastric and duodenal ulcer and rheumatoid arthritis (due to presence of cortisone like compounds) • Mouth wash for mouth ulcer • Demulcent and mild expectorant 	Powder +66% H ₂ SO ₄ →orange red colour

Question 2: Answer the following cases (27 marks)

I-A 23 years old female suffering from migraine and fungal infection. (6 marks)

- 1- Recommend **a drug** to manage her migraine (1 mark), mention **its main active constituents** (1 mark), **and the steps to test for these active constituents** (1 mark).

-Ergot herb

- Ergotamine alkaloid
- 1- Test for Chitin

Digest the sclerotium with NaOH to give chitosan , acetic acid and ammonia.
 Chitosan + Iodine + H₂SO₄ gives violet colour.

2-Test for colouring substance

Shake the ergot with ether & 5 drops of H_2SO_4 , add $NaHCO_3$ and shake well where a reddish violet colour is given in the aqueous layer (used to detect ergot in flour).

3-Test for ergotoxin (Van Urk)

Shake the ergot with Na_2CO_3 and $CHCl_3$. Separate the chloroform layer and shake it with PDMAB and $FeCl_3$ in H_2SO_4 where a blue colour is developed in the acid layer.

2- Suggest a drug to treat her fungal infection (1 mark), mention **its main active constituents** (1 mark), **and the steps to test for these active constituents** .(1 mark).

- Thyme herb

- Volatile oil

Thymol, Carvacrol

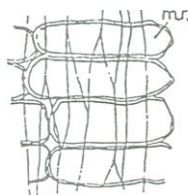
Linalool, Borneol and Bornylacetate.

- Thymol crystals + 1 ml glacial acetic acid + 6 drops conc H_2SO_4 + 1 drop HNO_3 → deep bluish green

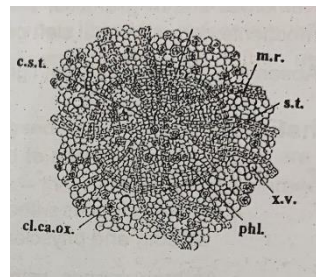
II- Mrs. Marwa (27 yrs.) was diagnosed with acute constipation. The following drug was prescribed for her. (6 marks)



1



2



3

1- Identify the given key elements from (1-3). (1.5 marks, 0.5 mark each)

-cluster of CaOX

-Medullary rays -Star spot

2-State **the name** (1 mark), **part used** (0.5 mark), and **main active constituents** (1 mark) of this drug.

-Rhubarb

-underground

- 1-Antraquinones derivatives a- Free (aglycone) e.g. emodin, aloe-emodin, chrysophanol, palmidin A, B, C and rhein

b- The glycoside derivatives of the above compounds e.g. glucoaloe-emodin and chrysophanein

c- Sennosides glycosides A, B, C and D

2- Tannins, e.g. gallic acid and catechin

3- How can you confirm by a laboratory test the identity of this drug? (1 mark)

1- Test for anthraquinone glycosides:

-Boil with Acid (H₂SO₄)

-Extract with organic solvent (ether or benzene)

-Add NH₄OH → a rose red color in ammonical layer.

2- Powder rhubarb gives yellow needle-shaped, add KOH reddish color.

4- Criticize the appropriateness of taking the medication while pregnant. (1 mark)

Stimulant laxatives cannot be used during pregnancy

III- A 50-year-old male presents to the clinic suffering from vitiligo. (4 marks)

a- Suggest a **drug name** (1 mark) that is likely to be efficient in the treatment regimen and mention **its main active constituents** (1 mark).

- *Ammi majus*

1- Furanocoumarin bitter principle, Psoralene: xanthotoxin (ammoidin)

2- Related bitter principles, imperatorin (Ammidin) and bergapten (majodin)

b- How would you test for this drug? (1 mark)

1- Boil about 0.1gm of *Ammi majus* fruit with 5 ml of water for a minute, strain, add 1 to 2 drops of this decoction to 1mL solution of sodium hydroxide (1 in 1) and shake, no rose red colour is developed.

2- The alcoholic extract of *A. majus* fruit (1 in 10), gives a blue fluorescence in ultraviolet light (due to furanocoumarin content)

c- How can you differentiate between this drug and its other species? (1 mark)

<i>Ammi visnaga</i>	<i>Ammi majus</i>
1- Colour : brownish to greenish-brown, <u>with a violet tinge</u> . 2- Carpophore : is simple and is crowned at apex by pyramidal stylopod bearing at its apex a reflexed style. 3- Epicarp : polygonal cells with finely striated cuticle	- greyish brown to reddish brown in colour <u>without a violet tinge</u> . -forked, crowned by the stylopod, and showing reflexed style -The epidermal cells are papillosed, covered with thick or distinctly striated cuticle -The vascular bundles appear in T.S. oval or circular and not accompanied by lacuna.

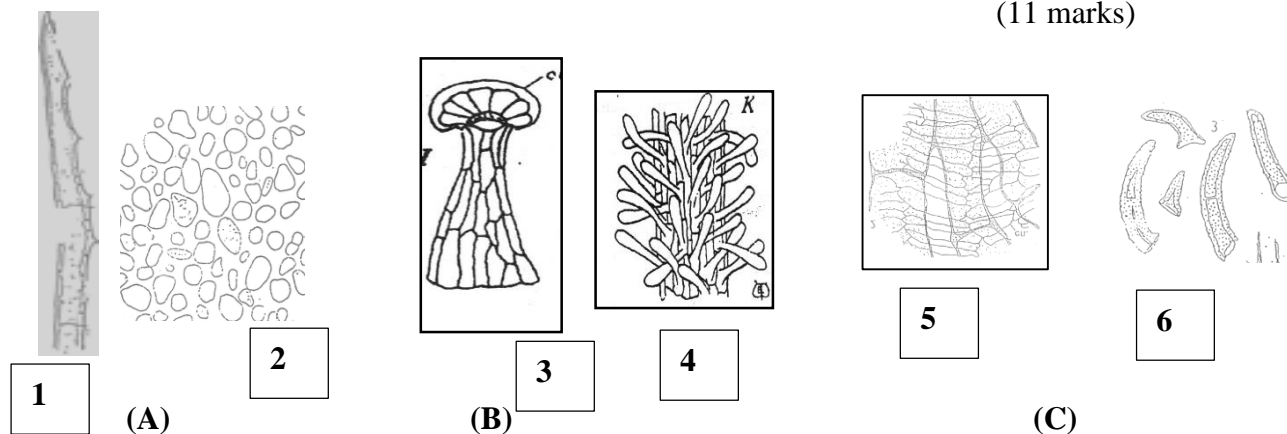
4-Crescent shaped bicollateral fibro vascular bundles, with lacuna and accompanied by reticulate, lignified cells.

5-Innermost layer of the mesocarp: Large, polygonal, brown-walled cells, with thick porous inner walls.

-The innermost layer of the mesocarp is non-porous

IV-A medicinal company has started the production of an anti-emetic drug during pregnancy. The quality control unit was supplied with the shown samples (A, B&C) before starting the synthesis.

(11 marks)



1- Identify **the name of** drug (A),(B), and (C) (1.5 marks, 0.5 mark each) and the given **labels** from (1-6) (3 marks, 0.5 mark each).

-Ginger -Cannabis -Anise

1-Septate fibres 2-Starch 3-Shaggy hair 4-Papillosed stigma 5-Branched vittae 6-Non-glandular hair

2-For each drug, mention the **part used**, the **main active constituent** and the **steps to test for these active constituents** (4.5 marks, 1.5 marks each)

	Ginger	Cannabis	Anise
Main active constituent	1- Volatile oils zingiberene , bisabolene, and farnesene β-phelladrene, cineol, and citral) 2-Gingerol and shogaols (responsible for pungent taste)	1-Resin materials , tetrahydrocannabinol and cannabinoids e.g. cannabinal & cannabinal 2-Volatile oil, oxidase enzyme	1-Essential oil (1.5-5%) containing: Trans- anethole (80-90%) ,responsible for the taste and smell. methyl chavicol (1:2%), which also smells like anise but doesn't taste sweet. - Anisaldehyde (1%). - Sesquiterpene hydrocarbons

			(2%) and less than 1% monoterpene hydrocarbons (1%) - The dimers of anethole (dianethole) and anisaldehyde (Dianisidine)
Chemical test	SudanIII	Powder+ HCl produces eff. due to Calcium carbonate in cystolith.	SudanIII
Part	underground	herb	fruit

5- How would you destroy the pungency of drug (A)? (1 mark)

The pungency is destroyed by boiling with KOH solution

4-As a quality control specialist, which drug from (A-C) is the best choice for this preparation? (1 mark)

Drug (A)

Question 3:

Complete the given table, then answer the following questions: (10 marks/0.5 mark each)

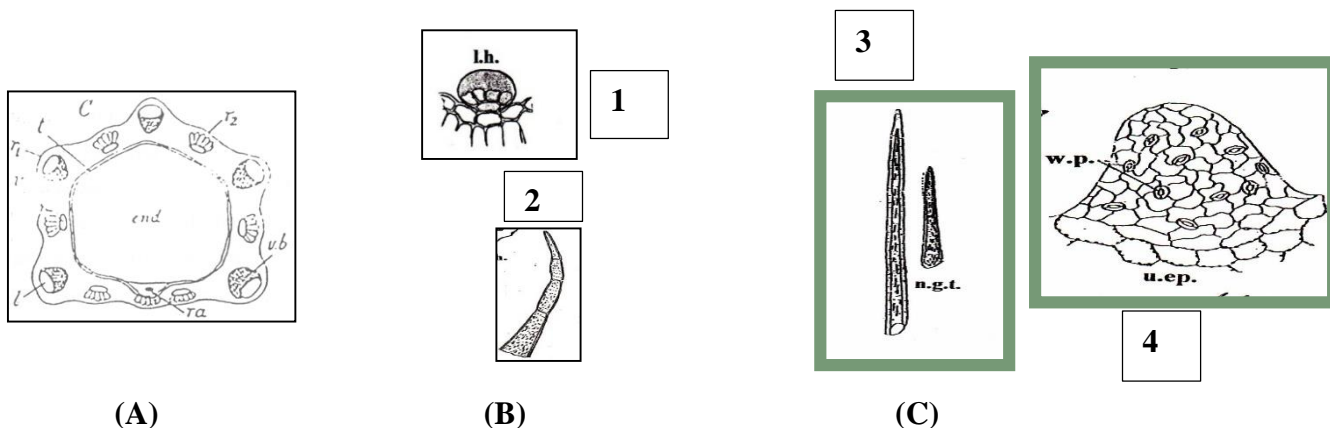
	Drug name	Part used	Main active constituent	One use	Chemical test
A	Myrrh	oleo-gum-resin	1- 1.5-17% volatile oil composed of limonene, pinene, cinnamaldhyde & cadinene. 2- Resin consists mainly of α - and β -commiphoric acid and commiphorinic acid 3- 60% gum	1- Mouth wash 2- Uterine stimulant and emmenagogue	Emulsion test: Mix powder myrrh+ water Yellow brown emulsion is formed
B	Hemlock	fruit	Coniine alkaloid which is highly toxic	Adulterant for anise	1-by chemical test for

					alkaloids (Mayer's test) 2- Rubbing the fruits with solution of caustic alkali, it develops a strong mouse- like odor
C	Cochineal	insects	a red colouring matter, carminic acid	used as a coloring matter for tooth-pastes	KOH test
D	Ephedra Herb	herb	ephedrine	- Ephedrine is used to relief bronchial asthma. Nasal decongestant in common cold and sinusitis. C. N. S. stimulant. - Hay fever	Mayer's
E	Colocynth fruit	the pithy pulp of a pepo fruit	1- Resin soluble in ether and chloroform which is a powerful purgative. 2- Cucurbitacins cucurbitacin E, B, L, and cucurbitacin-L-glucoside	1- Powerful purgatives, acting as a hydragogue cathartic 2- The cucurbitacin has necrosing activity. The drug as well as the cucurbitacins are reported as potent cytotoxic 3- In folk medicine it is used as antirheumatic 4- The flavonoidal contents have moderate antimicrobial activity.	Al Cl₃ test

Question 4: Enumerate TWO of each of the following: (5 marks, 0.5 mark for each sentence)

- a- Bulk laxative drugs. (linseed, black mustard)
- b- Hallucinogenic drugs. (nut meg, ergot)
- c- Branching of aerial stems. (dichotomous, axillary branching)
- d- Seeds with the same type of embryo. (black mustard, white mustard)
- e- Antihypertensive drugs from different organs. (ergot, ginger)
- f- Circulatory stimulant drugs. (mentha, black mustard)
- g- Drugs safe during pregnancy. (thyme, psyllium)
- h- Different characters of family Apiaceae.
 - 1) The fruit is true, simple, dry, schizocarpic, cremocarp that splits upon drying into two indehiscent one seeded mericarps.
 - 2) The apex of the fruit is crowned with a conical structure named stylopod (represents the remains of the style, stigma and nectary disc).
- i- Different drugs that are added to purgative preparations to prevent the gripping effect. (fennel, coriander)
- j- Seeds decrease cholesterol. (linseed, nigella)

Question 5: You are supplied with a tea bag composed of three drugs detected from the following drawings: (8 marks)



- a) Suggest **ONE** common medicinal use for this mixture. (1 mark)
 Cough, bronchial asthma
- b) Identify the key elements (1-4) (2 marks, 0.5 each), then identify the corresponding drugs (A, B & C). (1.5 marks)
 - glandular hair -non-glandular hair -non-glandular unicellular hair -anomocytic stomata
 - (A) *Ammi visnaga* (B) mentha (C) lobelia
- c) For drugs **(A & C)**, mention the **part used** (1 mark), **main active constituent** (1 mark) **and the steps to test for these active constituents** (1.5 mark). (3.5 marks)

(A) Fruit

1-Furanochromones

Khellin, visnagin, khellol & its glucoside.

2- Pyranocoumarins (Visnagans), Visnadin, samidin and dihydrosamidin

Boil about 0.1 g. of *Ammi visnaga* fruits with 5 ml of water for a minute,
 strain add 1 to 2 drops of this decoction to 1 ml solution of sodium hydroxide (1 in1)
 and shake, a rose red color is produced within 2 minutes

(C)Herb

-Alkaloids (0.25-0.4%)Lobeline, lobelidine, lobelanine and isolobelanine

-Mayer's

Assessment of Achievement of Module LOs

Department: Pharmacognosy				
Module Title: Pharmacognosy			Module Code: PHG112	
Credit Hours: 3			Total Marks: 150	
Academic Year: 2023/2024			Semester: Fall 2023	
Final Written Exam				
Question Number	Type of Questions according to Bloom's taxonomy	Marks	Marks %	Module LOs (as numbered in module specifications)
I	Comprehension	10	6.66	1-1-4-1-1 ,2-2-1-2-1 2-3-1-1-1
II	Application	27	18	1-1-1-1-1, 1-1-4-1-1, 2-2-1-2-1 2-3-1-1-1, 3-2-6-1-1
III	Comprehension	10	6.66	1-1-1-1-1
IV	Analysis Application	5	3.33	,1-1-4-1-1 ,2-2-1-2-1 2-3-1-1-1 , ,3-2-6-1-1
V	Application	8	5.33	1-3-3-1-1,1-1-4-1-1 ,2-2-1-2-1 2-3-1-1-1 1-1-1-1-1
Total		60marks	40%	

 End of questions