

October University for Modern Sciences & Arts Model Answer of Final Exam

Faculty	Pharmacy
Department	Pharmacognosy
Module Code	PHG112
Module Title	Pharmacognosy
Semester	Spring 2024
Date	5 -6 -2023
Time Allowed	2 hours
Total Mark	60 marks
No. of Pages	8 Pages
Material provided	-
Equipment permitted	-
Additional Instructions	All Answers must be in English otherwise it 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. The exam is located in THREE PAGES. Total marks= 60

Question 1: Read the following cases and answer the corresponding questions (16 marks)

Case 1

Adel is an 18- year- old male who suffers from lymphoma. He was admitted to the hospital to take chemotherapy. After taking the required dose, he experienced vomiting as a side effect to the chemotherapeutic drug.

I- Suggest a drug that can be used to treat this side effect, mention its main active constituent, and how can you test for this active constituent. (3 marks)

Name (1 mark)	Main active constituents (1mark)	Chemical test (1mark)
Cannabis Herb	-Resin materials , tetrahydrocannabinol and cannabinoids e.g. cannabinalol & cannabinal	1- Powder+ HCl produces eff. due to Calcium carbonate in cystolith. 2- Beam's test: <u>Cannabis</u> shaken with <u>light petrol</u> and <u>alc. KOH</u> and <u>amyl alcohol</u> give violet pink colour. 3- Fast blue test: (di-O-anisidine tetrazolium chloride) Biological samples + Fast Blue reagent Different sequences of colours with different cannabinoids
Ginger	Volatile oil; gingerol&zingeberene	Sudan III, red color

Case 2

A pregnant female was admitted to the hospital for labor, she had difficulty in giving birth. After delivery, the baby was suffering from difficulty in respiration. After saving both the mother and the baby, the mother showed low milk secretion.

I-Suggest a crude drug that can be used to facilitate the delivery, mention its main active constituent, and how can you test for this active constituent. (3 marks)

Ergot (1mark)

Ergometrine alkaloid:-It stimulates the uterus → initiate delivery (labor) - (1mark)

-Chemical test: **Test for Chitin: Digest the sclerotium with NaOH to give chitosan, acetic acid and ammonia. Chitosan + Iodine + H₂SO₄ gives violet colour** (1mark)

Or

Van Urk test: Shake the ergot with Na₂CO₃ and CHCl₃. Separate the chloroform layer and shake it with PDMA and FeCl₃ in H₂SO₄ where a blue colour is developed in the acid layer

II- Suggest a **crude drug** that can be used to help the baby with his difficulty in breathing, mention **its main active constituent, and explain other uses of this drug.**
 (3 marks)

Name (1mark)	Main active constituents (1mark)	Other uses (1mark)
Lobelia	-Alkaloids (0.25-0.4%) Lobeline, lobelidine, lobelanine and isolobelanine.	1-Expectorant 2-Inbronchitis & bronchial asthma as it dilates the bronchioles 3-Breaking of smoking habit

III-Suggest the name **of two crude drugs from different plant organs** to promote her milk production and **mention their main active constituents.** (3 marks)

Drug (1mark)	Organ (1mark)	Main active constituents (1mark)
Anise	fruit	1-Essential oil (1.5-5%) containing: <u>Trans- anethole</u> (80-90%), responsible for the taste and smell. <u>Methyl chavicol</u> (1:2%), which also smells like anise but doesn't taste sweet. - <u>Anisaldehyde</u> (1%). Sesquiterpene hydrocarbons (2%) and less than 1% monoterpene hydrocarbons (1%) -The dimers of anethole (dianethole) and anisaldehyde (Dianisidine)
Fennel	fruit	1-Essential oil (4 - 6 %), containing fenchone, estragol (methyl chavicol) 2- Fixed oil (17-20%) 3- Flavonoids (Kaempferol, quercetin) 4- Protein (16-20%) & minerals (relatively high Ca and K)
Foenugreek	Seed	-saponins glycosides upon hydrolysis gives steroidal sapogenin, gitogenin - mucilage - <u>Alkaloids</u> : Gentianine trigonelline & choline

Case 3

Mr Mahmoud is a 50-year-old occasional smoker who started smoking at a young age, with a history of hypertension for three years. He also suffers from hair falling.

I- Recommend a herbal drug to control his hypertension. (Mention the drug name (0.5mark) , active constituents (0.5mark) , one other use(0.5mark) and the chemical test(0.5mark)) (2 marks)

Ergot or ginger or Rauwolfia

Name	Main active constituents	One use	Chemical test
Rauwolfia	Mainly alkaloids (Reserpine, rescinamine, ajmaline, ajmalinineand serpentine.)	In insomnia and psycatric disorders	Mayer's test

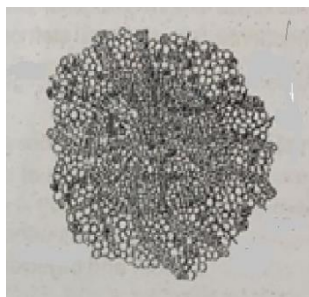
II-Suggest a mixture of **two crude drugs** that can be used to treat his boldness. (2 marks)

Rosemary Herb (1 mark)

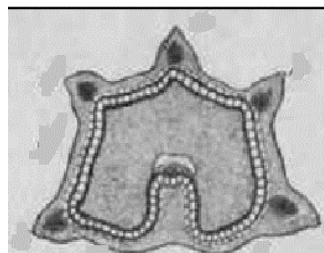
Onion rhizome (1mark)

Question 2: Illustrate the missing data concerning the given figures:

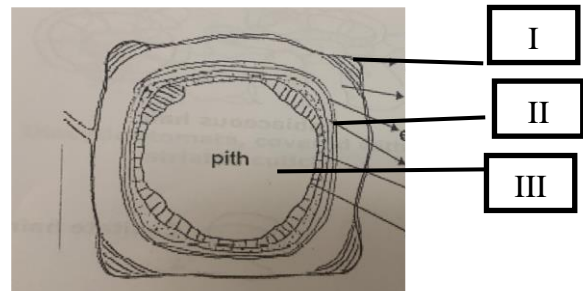
(14 marks)



A



B



C

Figure A (4 marks)

1- The name of the drug.- **Rhubarb rhizome & big root (0.5 mark)**

2- Description of the figure. (1.5marks)

Star spot of Rhubarb

In pith region anomalous or abnormal structure called star spots; the cambium produce 2ry phloem towards the center and xylem externally traversed by wavy medullary rays to form amphivasal concentric, abnormal vascular bundles

3- Two uses of this drug. (1mark, 0.5 each)

1- Laxative

(in small dose)

2- In large dose purgation followed by astringent effect due to tannins.

3- Bitter stomachic

4- Test for the active constituents. (1mark)

1- Test for anthraquinone glycosides:

-Boil with Acid (H₂SO₄)

-Extract with organic solvent (ether or benzene)

-Add NH₄OH , a rose red colour in ammonical layer.

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

Figure B (4 marks)

1- The name of the drug & the name of the official one.

Hemlock, Anise (0.5 mark each)

2- Three differences between the two drugs. (1 mark each)

Item	Hemlock	Anise
Size	- Smaller in size	-Larger in size
Odour & taste	Slight odor and taste	Strong aromatic, agreeable odor
Vittae & hairs	Absence of vittae and hairs	Branched vittae, non glandular hairs
Active constituent	Coniine alkaloid which is highly toxic	Essential oil, Fixed oil, protein & coumarins
Test	-Mayer's test -Rubbing the fruits with solution of caustic alkali, it develops a strong mouse-like odor	Sudan III

Figure C (6 marks)

1- The name of the drug.

Mentha (1 mark)

2- Two uses of this drug. (1 mark)

Local action: antipruritic, mild local anesthetic and antiseptic

Systemic action: carminative and gastric sedative

Flavouring agent

3- Major active constituent (1mark) , test for the active constituent. (1mark)

-Volatile oil mainly menthol, menthyl acetate, menthone

Test:

-Oil with a mixture of glacial acetic acid and nitric acid give blue colour change to golden yellow when heating on water bath

-Sudan III, red color

4- The missing labels (2 marks)

I-Epidermis or collenchyma II- Endodermis III- Pith

Question 3: Correct the underlined word in each sentence by a suitable word (term) (10 marks, 1 mark each sentence)

a- Aloe, is an oleo-gum-resin obtained from the stems and branches of Commiphora species.
Myrrh

b- Gelatin is soluble in alcohol, similar to gum Arabic, it contains alpha-boswellic acid, olibanic acid and volatile oils.

Olibanum

c- **Myrrh**, is the latex obtained by incision from an unripe capsule.

Opium

d- **Frankincense**, is the solid residue obtained by evaporating the liquid, which drains from the cut leaves, used topically to treat wound healing, sunburn, hair tonic and minor skin irritation.

Aloe

e- **Opium**, is the protein obtained by boiling the collagenous tissues of animals such as skin, tendons, ligaments and bones with water, evaporating the aqueous extract and drying the residue in air.

Gelatin

f- **Chinese knotweed** is obtained from ox, sheep or pigs used to treat goiter and obesity

Thyroxin

g- **Thyroxine** is prepared from the mucous membrane of the stomach of domesticated animals such as pigs, sheep or calves.

Pepsin

h- **Oxidase enzyme** has the property of reducing the amount of sugar in the blood and is employed as a remedy for diabetes.

Insulin

i- **Olibanum** contains carminic acid and is used as a coloring matter for tooth-pastes and tinctures.

Cochineal

j- **Morphine** is tested with 5% ferric chloride where a purplish red colour is produced.

Meconic acid

Question 4: Justify (rationalize) each of the following statements: (10 marks, 2 each)

1- Papaya fruit may aid in digestion.

Due to the presence of papain, a digestive super enzyme, improves digestion by breaking down proteins and cleanses the digestive tract.

2- Despite its medicinal value, cannabis usage may lead to serious side effects.

Side effects include a decrease in short-term memory, dry mouth, impaired motor skills, red eyes, and feelings of paranoia or anxiety, addiction, and decreased mental ability. (any two side effects)

3- The development of deglycyrrhizinated licorice (DGL) as an alternative therapy to the normal liquorice.

Deglycyrrhizinated licorice, or DGL, is an herbal supplement typically used in the treatment of gastric and duodenal ulcers.

It is made from licorice from which the glycyrrhizin has been removed.

Glycyrrhizin is known to cause negative side effects, such as hypertension and edema; removing the glycyrrhizin is meant to avoid these symptoms.

4- Onion can be employed as a cosmeceutical for hair loss.

Stimulate hair growth as being rich in vitamins (A and C), minerals (potassium, calcium, magnesium) and sulfur which is already naturally present in the composition of the keratin which constitutes our hair.

- 5- Commercial pancreatin may aid in treating malabsorption or digestion related problems.
Commercial pancreatin is a mixture of pancreatic enzymes: trypsin (which converts proteins) ;amylase (which digests carbohydrates) and lipase (which digests fats).

Question 5: You are working as a teaching assistant in the pharmacognosy course and some of your students came to the laboratory and asked about some confusing points: (10 marks, 2 each)

- 1- Ahmed till now cannot recognize subterranean stem from aerial stem.

Aerial stem	Subterranean stem
Presence of green leaves	Presence of scaly leaves
No roots	Bears adventitious roots arise from the nodes

- 2- Hesham cannot distinguish between normal ginger and black ginger. (only 2 points)

Normal Ginger	Black Ginger/Kaempferia Parviflora
It has a pungent and zesty aroma, accompanied by a slightly spicy and tangy flavor.	It emits an intense & exotic fragrance with hints of earthiness. Its flavor is described as milder & less pungent than normal ginger.
It is renowned for its anti-inflammatory properties, aiding digestion, relieving nausea, and supporting immune health.	It is valued for its antioxidant content and its potential to boost energy levels, enhance circulation.
The regular/normal ginger exhibits a pale yellow to golden color, with a smooth and thin skin.	It stands out with its deep ebony color, often appearing darker and more intense than normal ginger. Its skin is rougher and thicker.
It is a versatile spice used in various cuisines, adding flavor and aroma to dishes, beverages, and desserts	While less commonly used in cooking, it can be infused into teas, herbal remedies, & health supplements for its health benefits.

- 3- Maha cannot distinguish between Ashwaganda and potato (active constituents and uses).

Drug	Ashwaganda	Potato
Active constituents	-Steroidal lactones: Withanolides (as withaferin A, B, D) -Alkaloids : Withanine, somniferine, - Others: terpenoids, saponins, phenolics, flavonoids, phytophenols, and glycosides.	vitamin C, potassium, various B vitamins, calcium, iron, phosphorus, copper, and sulfur, among other phytonutrients and organic compounds.
Uses	A-As a sleep aid B. Memory enhancement C. An adaptogen	-Prevents Aging -Boosts Energy Levels -Improves Digestion

		<ul style="list-style-type: none"> -Treats Ulcers -Improves Heart Health -Boosts Immunity -Speeds up Wound Healing -Improves Circulation -Improves Hormone Production -Detoxifies Liver & Gallbladder
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4- Huda till now cannot recognize root from rhizome as a subterranean organ.

Root	Rhizome
<ul style="list-style-type: none"> -It is derived from the radical and grows towards the soil and water -It has no leaves -No nodes and internodes -No buds -No chlorophyll -Apical growing point called root-cap. 	<ul style="list-style-type: none"> -It has nodes and internodes -The growing point covered with scaly leaves and not root cap.

5- Ola cannot distinguish between Spanish liquorice and Russian liquorice.

Spanish liquorice	Russian liquorice
<ul style="list-style-type: none"> -It is mainly peeled stolon (rhizome) and few root. -The stolon bears scale leaves, buds and root scars microscopically has central pith. It has a sweet taste free from any bitterness. 	<ul style="list-style-type: none"> -Mainly unpeeled roots -It has sweet taste but with bitterness

You are asked to use your experience in the course to solve these problems for your students.

End of questions