



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

<b>Faculty</b>	Pharmacy
<b>Department</b>	Pharmacognosy
<b>Module Code</b>	PHG112
<b>Module Title</b>	Pharmacognosy
<b>Semester</b>	Spring 2023
<b>Date</b>	15-6 -2023
<b>Time Allowed</b>	2 hours
<b>Total Mark</b>	60 marks
<b>No. of Pages</b>	8 Pages
<b>Material provided</b>	-
<b>Equipment permitted</b>	-
<b>Additional Instructions</b>	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 (25 marks)**

**Case 1**

A 9 months pregnant female admitted to the hospital for labor. After delivery, the mother was suffering from severe postpartum hemorrhage. One week later the mother was suffering from low milk secretion.

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

- Drug name: Ergot herb (1 mark)
- Main active constituents: **Ergometrine alkaloid:-It stimulates the uterus → initiate delivery (labor) - It reduces postpartum haemorrhage** (1 mark)
- Chemical test: **Test for Chitin: Digest the sclerotium with NaOH to give chitosan, acetic acid and ammonia. Chitosan + Iodine + H<sub>2</sub>SO<sub>4</sub> gives violet colour.** (1 mark)

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

Drug	Organ	Main active constituents
Anise (0.5 mark)	fruit	Essential oil (1.5-5%) containing: <b><u>Trans- anethole</u> (80-90%),</b> responsible for the taste and smell. <b><u>Methyl chavicol</u> (1:2%),</b> which also smells like anise but doesn't taste sweet. - <b><u>Anisaldehyde</u> (1%).</b> Sesquiterpene hydrocarbons (2%) and less than 1% monoterpene hydrocarbons (1%) -The dimers of anethole (dianethole) and anisaldehyde (Dianisidine) (1 mark)
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 (0.5 mark)	Seed	-saponins glycosides upon hydrolysis gives steroidal sapogenin, gitogenin - mucilage - <b><u>Alkaloids:</u> Gentianine, trigonelline &amp; choline</b> (1 mark)

**Case 2**

Mr. Mahmoud was diagnosed with severe renal colic due to the presence of kidney stones.

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

II-What are the other uses of this drug? Do you think that this drug has any contraindications? (2 marks)

Name (1 mark)	Main active constituent (1 mark)	Chemical test (1 mark)
<i>Ammi visnaga</i>	1-Furanochromones Khellin, visnagin, khellol & its glucoside. 2- Pyranocoumarins (Visnagans), Visnadin, samidin and dihydrosamidin  (Any of the active constituent)	Boil about 0.1 g. of <i>Ammi visnaga</i> 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

II-Other uses:

- 1- Spasmolytic especially on the muscles of the bronchi, GIT, biliary tract, urogenital system and the coronary vessels
2. Whooping cough, it is now given for bronchial asthma and is safe even to children
3. Cramp-like conditions of GIT, biliary colic, and painful menstruation.
4. It is used for the removal of gall bladder and kidney stones by relaxing the muscles of the ureter.
5. The drug relaxes the coronary arteries, helps to improve the blood supply to the heart muscle and thereby eases angina pectoris

( Any three uses with 1.5 marks)

Contraindications:

In pregnancy due to uterine stimulating activity of khelline (0.5 mark)

III-How can you differentiate between the two species of this drug? (2 marks)  
 (Any two differences with 2 marks)

Item	<i>Ammi visnaga</i>	<i>Ammi majus</i>
1- <u>Colour</u>	-Brownish to greenish-brown, <u>with a violet tinge.</u>	-greyish brown to reddish brown in colour <u>without a violet tinge.</u>
2- <u>Carpophore</u>	-Is simple and is crowned at apex by pyramidal stylopod bearing at its apex a reflexed style.	-forked ,crowned by the stylopod, and showing reflexed style -The epidermal cells are papillosed, covered with thick or distinctly striated cuticle

<p><b>3-Epicarp</b></p>	<p>-Polygonal cells with finely striated cuticle                  -Crescent shaped bicollateral fibrovascular bundles, with lacuna and accompanied by reticulate, lignified cells.                  -Large, polygonal, brown-walled cells, with thick porous inner walls.</p>	<p>-The vascular bundles appear in T.S. oval or circular and not accompanied by lacuna.                   -The innermost layer of the mesocarp is non-porous</p>
<p><b>4-Innermost layer of the mesocarp</b></p>		

**Case 3**

Ahmad 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 suffered from vomiting as a side effect to the chemotherapeutic drug.

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

Name (1 mark)	Main active constituents (1 mark)	Chemical test (1 mark)
Vinca herb	Alkaloids (about 90 alkaloids) , the therapeutically active alkaloids are <u>vincristine</u> and <u>vinblastine</u>	Mayer's test

II- 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 constituent (1 mark)	Chemical test (1 mark)
Cannabis Herb	-Resin materials , tetrahydro cannabinol and cannabinoids e.g. cannabinol & 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

**Case 4**

Mr Tarek is a 50-year-old occasional smoker who started smoking at a young age, with a history of hypertension for three years. As a result from his smoking habits, he is suffering from repeated bronchospasm. Also, he is complaining from low back pain (lumbago)

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

**Ergot or ginger or Rauwolfia**

Name (0.5 mark)	Main active constituents (0.5 mark)	One use (0.5 mark)	Chemical test (0.5 mark)
<b>Rauwolfia</b>	<b>Mainly alkaloids (Reserpine, rescinnamine, ajmaline, ajmalinine and serpentine.)</b>	<b>In insomnia and psycatric disorders</b>	<b>Mayer's test</b>

II-Recommend a drug to **manage his bronchospasm** (Mention the name, active constituents and chemical test) (2 marks)

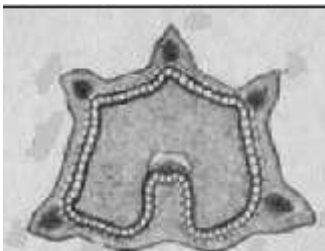
**Anise or Star anise or Fennel**

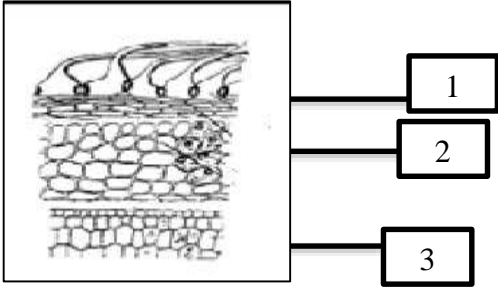
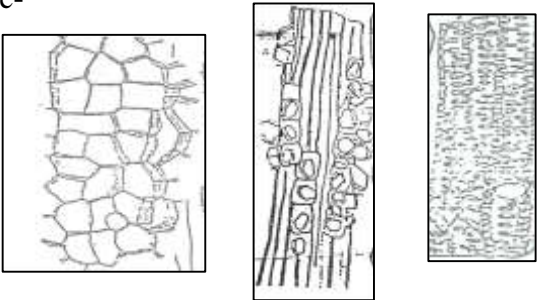
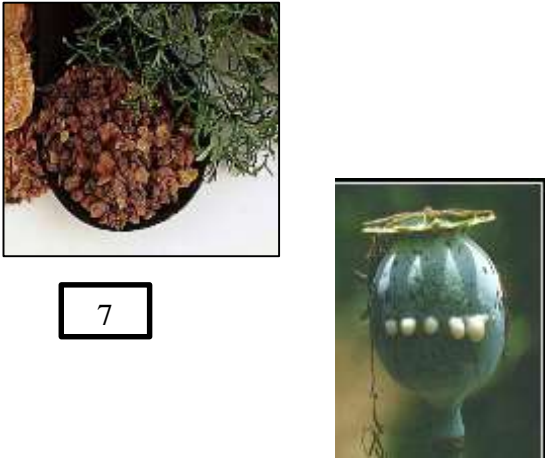
Name (0.5 mark)	Main active constituents (1 mark)	Chemical test (0.5 mark)
<b>Lobelia</b>	<b>-Alkaloids (0.25-0.4%) Lobeline, lobelidine, lobelanine and isolobelanine.</b>	<b>Mayer's test</b>

III-Suggest a medication that should be added to the patient's regimen to relief his back -ache? (Drug name, active constituents and chemical test) (2 marks)

Name (0.5 marks)	Main active constituents (1 mark)	Chemical test (0.5 mark)
<b>Capsicum Fruit</b>	<b><u>Pungent principles named Capsaicinoids</u> (up to 1.5%), including capsaicin (0.1 - 1 %), 6,7 - dihydrocapsaicin, nordihydrocapsaicin, homodihydrocapsaicin, and homocapsaicin</b>	<b>1- Capsaicin gives a bluish-green colour on addition of few drops of FeCl<sub>3</sub> 2-Capsaicin dissolved in H<sub>2</sub>SO<sub>4</sub> and small piece of sucrose sugar is added, a violet colour is developed after few hours.</b>

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

a-		<ul style="list-style-type: none"> <li>The fruit belongs to family <b>Umbelliferae</b></li> </ul> <p>It differs from the official drug morphologically by <b>Smaller in size or Slight odor and taste</b> and histologically by <b>Absence of vittae and hairs</b></p>
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	<p>and Campylosporous endosperm</p> <ul style="list-style-type: none"> <li>• <b>Coniine alkaloid</b> is the main active constituent, tested by-<b>chemical test for alkaloids ( Mayer's test)</b></li> </ul> <p><b>-Rubbing the fruits with solution of caustic alkali, it develops a strong mouce-like odor</b></p>
<p>b-</p> 	<ul style="list-style-type: none"> <li>• Identity</li> </ul> <p><b>1- Covering hairs</b>  <b>2-Endosperm</b>  <b>3-Embryo</b></p> <ul style="list-style-type: none"> <li>• <b>T.S of Strophanthus seed</b></li> <li>• <b>The drug contains Cardiac glycosides</b></li> <li>• <b>It is used to treat Heart failure</b></li> </ul>
<p>c-</p>  <p style="text-align: center;"> <span style="border: 1px solid black; padding: 2px 10px;">4</span> <span style="border: 1px solid black; padding: 2px 10px;">5</span> <span style="border: 1px solid black; padding: 2px 10px;">6</span> </p>	<ul style="list-style-type: none"> <li>• Identity</li> </ul> <p><b>4-Cork cells</b>  <b>5-Crystal sheath</b>  <b>6-Xylem vessel</b></p> <p><b>Name of the drug: Licorice</b>  <b>Active constituents:</b></p> <ul style="list-style-type: none"> <li>-<b>Saponin glycosides( glycerrhizin)</b></li> <li>-<b>flavonoids (liquiritin, isoliquiritin)</b></li> </ul>
 <p style="text-align: center;"> <span style="border: 1px solid black; padding: 2px 10px;">7</span> <span style="border: 1px solid black; padding: 2px 10px;">8</span> </p>	<ul style="list-style-type: none"> <li>• The figures represent two unorganized drugs, identify them, mention the type and one use for each</li> </ul> <p><b>7-Myrrh, oleo-gum-resin</b>  <b>Myrrh is used</b></p> <ul style="list-style-type: none"> <li>- <b>Mouth wash</b></li> <li>- <b>Uterine stimulant and emmenagogue</b></li> </ul> <p><b>8-Opium, Dried Latex</b>  <b>Opium is used</b></p> <ul style="list-style-type: none"> <li>- <b>Hypnotic, analgesic and sedative</b></li> <li>- <b>Astringent</b></li> <li>- <b>Cough sedative</b></li> </ul> <p><b>Pepsin is an animal drug prepared from the mucous membrane of the stomach of domesticated animals</b>  <b>It is used in dyspepsia caused by deficient gastric secretion</b></p>

(13 marks, 0.5 mark for each space)

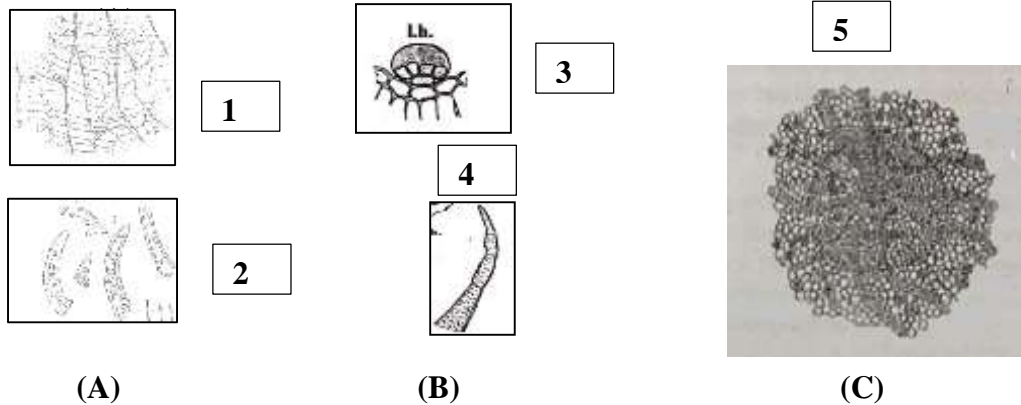
**Question 3: Enumerate two of each of the following:** (5 marks, 0.5 each sentence)

- a- **Cardamom & ginger** are two drugs from different organs belonging to the same family
- b- **Castor seed & Nux vomica** are two toxic drugs
- c- **Legume & follicle** are two types of true, dry, simple, dehiscent fruits
- d- **Linseed, Colchicum, Cardamom, and Mustard** are two seeds with a testa of two coats
- e- **Mulberry & fig** are two fruits formed from the whole inflorescence
- f- **Mentha & ginger** are two drugs from different organs rich in volatile oils
- g- **Hesperidium & used in cosmetics** are two characters of lemon peel
- h- **Capsaicin & gingerol** are two different pungent principles
- i- **Insulin & cochineal** are two different animal drugs having medicinal uses
- j- **Grain & nuts** are two examples of true, dry, simple, indehiscent fruits

**Question 4: Justify for each of the following statements:** (5 marks, 1 mark each)

- a- Fennel is added to laxative preparation  
- **Carminative. It regulates the peristaltic function of GIT and relieves the associated pain and cramping. Used with purgatives to allay their gripping effect**
  
- b- Linseed is not considered a toxic drug (any two reasons 1 mark)  
- **Toxic effects arising from the liberation of HCN from the cyanogenic glycoside (Linamarin) by the enzyme linamarase.**
  - 1- **When crushed seeds are taken internally, linamarase is partly inactivated under the influence of the acidity of the stomach and less than 1% of the cyanogenic glycoside is hydrolyzed.**
  - 2- **Hydrolysis time of four hours is required *in vivo* system.**
  - 3- **The majority of HCN, liberated is converted rapidly into the relatively non toxic thiocyanate through a detoxification mechanism in the body.**
  - 4- **The minor part of HCN remained is eliminated via the urine and the feces.**
  
- c- Cardamom should be recently separated from the fruit (any two reasons 1 mark)
  - 1- **To avoid loss of volatile oils. The loss of oil from seeds kept in the pericarp is small but a loss of 30% in 8 months takes place when the seeds are separated from the fruits.**
  - 2- **To protect against insect attack**
  - 3- **To differentiate between commercial varieties**
  
- d- Lobelia herb is known as asthma weed & indian tobacco  
**It is used by North American Indians as domestic medicine as a cigarette for asthma.**
  
- e- Distillation residues of coriander are suitable for animal feed  
**The high percent of fats and protein makes distillation residues suitable for animal feed**

**Question 5: You are supplied with a tea bag composed of three drugs detected from the following drawings:** (12 marks)



- a) Suggest **ONE** common medicinal use for this mixture and explain the role of each drug. (1 mark 0.25 each)

**This mixture is used as laxative in case of constipation associated with spasm and gases**

**Role of Rhubarb: Stimulation of intestinal motility due to the presence of anthraquinones**

**Role of Anise& Mentha: Regulation of intestinal motility and prevention of gripping effect caused by anthraquinones, act as spasmolytic and carminative due to the presence of volatile oil**

- b) Identify the key elements (1-4), then identify the corresponding drugs (A and B) (3 marks 0.5 each)

**Drug A: Anise fruit**

- 1- Branched vittae
- 2- Non-glandular hair

**Drug B: Mentha herb**

- 3- Glandular hair
- 4- Non-glandular hair

- c) Describe the drawing 5, then identify drug C. (2 marks)

**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**

**Drug C: Rhubarb rhizomes**

- d) For each drug in this mixture, mention the **part used**, **main active constituent** and how can you **test for this active constituent**. (6 marks)



Drug	Part used	Main active constituent	Test for this active constituent
Anise	Fruit	Essential oil	Sudan III
Mentha	Herb	Essential oil (menthol)	- 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
Rhubarb	Rhizomes	Anthraquinone glycosides	1-Test for anthraquinone glycosides: -Boil with acid (H <sub>2</sub> SO <sub>4</sub> ),Extract with organic solvent (ether or benzene) -add NH <sub>4</sub> OH à a rose red colour in ammonical layer 2- Powder rhubarb has yellow needle-shaped sublimate which with KOH à reddish colour <u>Test for Linseed</u>

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End of questions