



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

<b>Faculty</b>	<b>Pharmacy</b>
<b>Department</b>	<b>Pharmacognosy</b>
<b>Module Code</b>	<b>PHG 112</b>
<b>Module Title</b>	<b>Pharmacognosy</b>
<b>Semester</b>	<b>Fall 2022</b>
<b>Date</b>	<b>12/1/2023</b>
<b>Time Allowed</b>	<b>2 hours</b>
<b>Total Mark</b>	<b>60 Marks</b>
<b>No. of Pages</b>	<b>7</b>
<b>Material provided</b>	<b>-</b>
<b>Equipment permitted</b>	<b>-</b>
<b>Additional Instructions</b>	<b>All Answers must be in English otherwise it will not be considered.</b>

**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 drawing when required. The examination is located in **THREE** pages. **ALL ANSWERS MUST BE IN THE ANSWER PAPER.** (Total: 60 marks)

**Question I: Answer the following cases (18 marks)**

**A- A 9-months pregnant female gave birth to a boy who immediately suffered from severe difficulty in breathing and asphyxia. (5 marks)**

1-What seems to be the drug of choice for the resuscitation of this newborn? (1 mark)

**Lobelia herb (1 mark)**

2-Identify the main active constituent of this drug. (1 mark)

**Alkaloid lobeline (1 mark).**

- **One week later the mother was suffering from a low milk secretion.**

3-As a community pharmacist, suggests the name of two fruits (1 mark, 0.5 mark each) that promote her milk production and mention their main active constituents. (2 marks, 1 mark each)

**-The two drugs are fennel (0.5 mark) and anise (0.5 mark).**

**Main active constituents: volatile oils (fenchone) (1 mark), volatile oils (trans- anethol) (1 mark).**

**B- A 31-yr-old woman with a history of migraines came to the emergency department because of a severe headache. Also, she was complaining of low back pain (lumbago). (6 marks)**

1- Recommend a herb to manage her migraine (drug name (0.5 mark), main active constituents (1 mark), chemical test (1 mark)).

**-Herb: Ergot (0.5 mark)**

**-Ergotamine alkaloid: Used for the treatment of migraine. Used in combination with caffeine to treat headache. (1 mark)**

**- Chemical test:**

**1-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.**

**2-Test for colouring substance: Shake the ergot with ether &5 drops of H<sub>2</sub>SO<sub>4</sub>, add NaHCO<sub>3</sub> 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<sub>2</sub>CO<sub>3</sub> and CHCl<sub>3</sub>. Separate the chloroform layer and shake it with PDMAB and FeCl<sub>3</sub> in H<sub>2</sub>SO<sub>4</sub> where a blue colour is developed in the acid layer. (1 mark)**

2- Suggest a herbal drug to control her low back pain (drug name (1 mark), active constituents (1 mark), one other use (0.5 mark)).

**-Capsicum Fruit (1 mark)**

**Main active constituents: Pungent principles named Capsaicinoids (up to 1.5%), including capsaicin (0.1 - 1 %), 6,7 -dihydrocapsaicin, nordihydrocapsaicin, homodihydrocapsaicin, and homocapsaicin (1 mark)**

**Main uses: 1- Condiment 2- Internally, in atonic dyspepsia and flatulence.3-Externally, It is used in different formulations (e.g. ointments and plasters) as a pain controller for the relief of rheumatism and after *Herpes Zoster* infections and counter irritant. Topical application of capsaicin relieves pain and itching by acting on sensory nerves for a range of conditions, including nerve pain in diabetes (diabetic neuropathy), post-surgical pain, muscle and nerve pain, osteoarthritis pain and rheumatoid arthritis. (0.5 mark)**

3-What are the potential side effects of using this drug topically for the treatment of her low back pain? (1 mark, 0.5 mark each)

**Application on injured skin (0.5 mark), allergies to cayenne preparations (0.5 mark)**

**C-Mrs. Sarah (27 yrs) was hospitalized with acute pain in her stomach and hematemesis. She was diagnosed with peptic ulcer. The following drug was prescribed to her. (7 marks)**

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

**1-crystal sheath (0.5 mark) 2-Cork cells (0.5 mark) 3-Starch granules. (0.5 mark)**

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

**-Licorice, underground organ (0.5 mark)**

**Main active constituents: 1- Sweet principle glycyrrhizin (triterpenoid saponin), 2- Flavonoids, liquiritin, isoliquirtin, 3- Coumarins (liqcoumarin) & bitter principle (glycyramarin) (1 mark)**

**Uses: 1- Demulcent and mild expectorant 2- Sweetening agent 3- Anti-inflammatory for gastric and duodenal ulcer and rheumatoid arthritis (due to presence of cortisone like compounds) 4- Mild laxative. 5- Mouth wash for mouth ulcer. (1 mark)**

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


**1-Froth test:Powder + Water in a test tube and shake well, Persistent froth stable for more than 1 min. (saponin) 2- Powder +66% H<sub>2</sub>SO<sub>4</sub>→orange red colour (1 mark)**

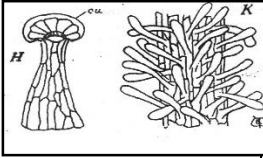
4-During her hospitalization, they discovered that she is pregnant in 2 months. The physician prescribed to her DGL. Critically analyze this statement. (1.5 marks)

**-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. (1.5 marks)**

**Question II: (22 marks)**

**Complete the given table, then answer the following questions: (13 marks/0.5 mark each)**

	Drug name	Part used	Main active constituent	One use	One key element	Chemical test
A	Rhubarb	underground	1- Anthraquinone derivatives a- Free (aglycone) e.g. emodin, aloemodin, 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	1- Laxative (in small dose) 2- In large dose purgation followed by astringent effect due to tannins. 3- Bitter stomachic	  Not required	Borntrager's test
B	Star anise	fruit	Volatile oil mainly anethole	1- Expectorant & In hard dry cough, it may be used in bronchitis & in whooping cough. 2- For digestive tract problems including upset stomach, loss of appetite &	Not required	Sudann III

				Relieving colic in babies 3- Antimicrobial & Antiviral activity		
<b>C</b>	<i>Ammi visnaga</i>	fruit	<b>Khellin</b>	Spasmodic especially on the muscles of the bronchi, GIT, biliary tract, urogenital system and the coronary vessels	innermost layer of mesocarp (porous layer) accompanied by parquetory endocarp and vittae	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 in 1) and shake, a rose red color is produced within 2 minutes
<b>D</b>	Opium	unorganized	morphine	1- Hypnotic, analgesic and sedative  2- Astringent  3- Cough sedative	Not required	<b>Test for meconic acid</b>
<b>E</b>	Cannabis	herb	Resin materials, tetrahydrocannabinol and cannabinoids e.g. cannabinal & cannabinal	THC is a potent anti-emetic used in cancer patients	 Not required	Powder+ HCl produces eff. due to Calcium carbonate in cystolith.

F	Pancreas	animal drug	crude insulin	Insulin has the property of reducing the amount of sugar in the blood and is employed as a remedy for diabetes	
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- Referring to plants from (A to F), answer the following questions: (9 marks)

1-What motive is there for the use of drug (B) as antiviral? (1.5 mark)

**It is a good source of shikimic acid, which is used in the manufacture of oseltamivir (Tamiflu), a flu treatment (1.5 mark)**

2-. State the name (1 mark) and main active constituents (1 mark) of the other species of (C).

***Ammi majus* (1 mark), 1- Furanocoumarin bitter principle, Psoralene; xanthotoxin (ammoidin). (1 mark)**

3- During your practical exam, you were given an entire sample of drug (C) and its other species. Mention two morphological differences that can give you a clue. (2 marks, 1 mark each)

<p><b><i>Ammi visnaga</i></b>  <b>1-Colour: brownish to greenish-brown, with a violet tinge. (0.5 mark)</b>  <b>2-Carpophore: is simple and is crowned at apex by pyramidal stylopod bearing at its apex a reflexed style. (0.5 mark)</b></p>	<p><b><i>Ammi majus</i></b>  <b>-greyish brown to reddish brown in colour without a violet tinge. (0.5 mark)</b>  <b>-forked ,crowned by the stylopod, and showing reflexed style.(0.5 mark)</b></p>
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4- What would result upon the long term use of drug (E)? (1.5 marks)

**Long term side effects may include addiction, decreased mental ability in those who started as teenagers, and behavioral problems in children whose mothers used cannabis during pregnancy (1.5 mark)**

5- i-The given T.S. is correlated to which drug from (A-F). (0.5 mark)

ii-Identify the labels. (1.5 marks, 0.5 mark each)

**i- (C). (0.5 mark)**

**ii- 1-lacuna (0.5 mark) 2-club shaped vittae (0.5 mark) 3-inner most layer of mesocarp (0.5 mark)**

**Question III: Answer as shown between brackets: (6 marks)**

1-Explain two general histological characters of family Umbelliferae. (2 marks, 1 mark each)

**1) Epicarp is usually one row (epidermis) (1 mark)**

**2) Glandular trichomes are rare, while non-glandular trichomes occur as unicellular to multicellular having a shaggy form. (1 mark)**

2-Cochineal is used as a coloring matter for tooth-pastes. (Give reason) (1 mark)

**Cochineal contains about 10% of a red colouring matter, carminic acid in addition to 10% of fat, 2% of wax together with albuminoids and inorganic matter (1 mark)**

3-Coriander can be used as animal feed. (Discuss). (1 mark)

**The high percent of fats and protein makes distillation residues suitable for animal feed (1 mark)**

4-What would happen to your body if you ingest linseed in your daily food?

**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. (0.5 mark) 2- Hydrolysis time of four hours is required in vivo system. (0.5 mark) 3-The majority of HCN, liberated is converted rapidly into the relatively nontoxic thiocyanate through a detoxification mechanism in the body. (0.5 mark) 4-The minor part of HCN remained is eliminated via the urine and the feces. (0.5 mark)**

**Question IV: (9 marks)**

**You are working as a botanist in the quality control unit of a herbal company, manufacturing over-the-counter herbal tea bags for the following drugs.**

1-Identify the names of the three drugs. (1.5 marks, 0.5 mark each)

**a-anise (0.5 mark) b- mentha (0.5 mark) c-ginger (0.5 mark)**

2-Identify the key elements from 1-6. (3 marks, 0.5 mark each)

**1-branched vittae 2-non-glandular hair 3- labiate hair 4- non-glandular hair 5-starch 6-septate fibers (3 marks, 0.5 mark)**

3-The quality control unit rejects the patch of drug (A) due to adulteration. The following T.S. section was reported for the adulterant. Suggest the name (0.5 mark) and main active constituents (1 mark) of the adulterant.

**Hemlock (0.5 mark) - alkaloid coniine (1 mark)**

4- How can you confirm by a laboratory test the identity drug (B)? (1 mark)

**Oil with a mixture of glacial acetic acid and nitric acid give blue colour change to golden yellow when heating on water bath (1 mark)**

5- Give a clue to destroy the pungency of (C). (1 mark)

**The pungency is destroyed by boiling with KOH solution (1 mark)**

6- Predict a common use of a tea bag containing a mixture of the three drugs. (1 mark)

**-antispasmodic, flavoring agent . (1 mark)**

**Question V: Suggest the appropriate term (words) used to indicate each of the following:  
(5 marks, 0.5 mark each)**

- 1-A part of capsicum fruit responsible for its pungency **Dissepiment**
- 2-The type of senna fruits-**Pods**
- 3-The type of Colocynth fruits **Pepo**
- 4-A type of branching in which the main stem axis continues growing from the apical growing point while the lateral branches never exceed the length of the main axis. **Monopodial branching.**
- 5- Herbs that live one season and dies **Annual herbs**
- 6-The main active constituents of Aloe **Antraquinones derivatives**
- 7-A difference between the subterranean stem and the aerial stem **Scale leaves (not foliage)**
- 8-The main active constituents in wheat grains **Starch, protein, vitamins A, B, B2, E, enzymes, wheat germ oil**
- 9-It is an example of a hesperidum fruit **Lemon peel**
- 10- A herb used in the treatment of leukemia in children **Vinca herb**

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**End of questions**