-Azhar University culty of Pharmacy partment of Pharmacognosy d Pharmaceutical chemistry	**Phytochemistry II.** **Final exam.**	**Student name:**..... ..... Time: 2 hours. Mark: /120

1) Choose the best correct answer: (30 Marks)

The main constituent of devil's claw root is:

a. Harpagoside.
b. Permethrin.
c. Epoxyiridoid ester.
d. Valterate.

All of the following effects could be related to α-Bisabolol except:

a. Anti-inflammatory.
b. Antihelmintic
c. Antibacterial.
d. Ulcer-protective properties.

All of the following statements are correct about Docetaxel except:

a. It is found predominantly in the bark of *T. brevifolia.*
b. It was found to be more active than Paclitaxel.
c. It is an important anticancer agent.
d. Both baccatin III and 10-deacetylbaccatin III provide reliable supplies for its semisynthesis.

Which of the following statements is correct about sesterterpenes:

a. They are class of terpenes composed of five isoprene units.
b. They are arise from geranylfarnesyl diphosphate (GFPP).
c. They are found principally in fungi and marine organisms.
d. All of the above statements are correct.

Which of the following statements is correct about squalene

a. Its biosynthesized by head to tail addition of IPP to GFPP.
b. It is the main substrate for triterpenoid cyclase enzymes.
c. Its biosynthetic role as a precursor of triterpenes and steroids.
d. Both b + c are correct.

A typical triterpenoid, and the precursor of sterols in animals and fungi is:

a. Ergostrol.
b. Cycloartenol.
c. Lanosterol.
d. Oxidosequalene.

Compounds that are characteristically bitter tasting, purgative, and extremely cytotoxic:

a. Dammarenediols.
b. Cucurbitacins.
c. Ginsenosides.
d. None of the above answers.

8- Which of the following statements is incorrect about bevirimat:

a. It is a semi-synthetic ester of betulinic acid.
b. It inhibits HIV growth.
c. It is a major component in the bark of white birch (*Betula alba*).
d. It may be obtained by selective oxidation of betulin.

9- Liquorice extract has been recently exploited in the treatment of Addison's disease because:

a. It decrease serum sodium concentration.
b. It has a corticosteroid-like effect
c. It can reduce gastric ulcer associated with the disease.
d. It antagonizes the action of [illegible] in the body.

10- All of the following are properties of saponines except:

a. Low molecular weight.
b. Produce a frothing in aqueous [illegible]
c. Surfactant properties.
d. Cause haemolysis of red [illegible] when injected directly in the [illegible]

11- Which of the following statements is incorrect about aescin:

a. It is a type of steroidal saponines.
b. It is a triterpene glycoside [illegible]
c. It can be obtained from the dried horse chestnut seeds.
d. It has an anti-exudative, [illegible] tightening effect.

12- One of the following features characterize stigmasterol over cholesterol:

a. A trans-22 double bond.
b. C-24 methyl group.
c. C-10 methyl group.
d. cyclopropan ring.

13- Which of the following statements is incorrect about ergosterol:

a. It is the predominant sterol found in fungi.
b. It has an additional C-24 methyl group.
c. Its biosynthesis could be inhibited by 14α-demethylase inhibitors.
d. It's a type of phytosterols that are biosynthesized from the precursor cycloartenol.

14- Blood LDL cholesterol levels may also be reduced by all of the following except:

a. Avoiding foods rich in cholesterol.
b. Using specific inhibitors of HMG-CoA reductase
c. Avoiding the intake of the plant sterol esters into the diet.
d. Reducing the intake of foods containing amounts of saturated fatty acids.

15- Which of the following compounds is the natural activated form of Vitamin D:

a. Colecalciferol.
b. Alfacalcidol
c. Ergocalciferol.
d. Calcitriol.

16- One of the following compounds are considered toxic when ingested:

a. Glycoside of yamogenin.
b. Glycoside of hecogenin.
c. Solasonine.
d. Dioscin.

27- Pharmacological uses of estrogen drugs include all of the following except:

a. Combined oral contraceptives.
b. Hormone replacement therapy (HRT)
c. Treatment of breast cancer.
d. Prostate cancers.

28- Which of the following statements is incorrect about Finasteride:

a. It is an anti-androgen.
b. It has a value in the treatment of prostate ca
c. It inhibits biosynthesis of testosterone.
d. It is a specific inhibitor of the 5α-reductase.

29- All of the following statements are related to carotenoids except:

a. They are C-40 compounds.
b. They are derived from isoprene units coup
c. They are the only type of tetraterpenes.
d. They are colourless.

30- Rubber is related to which group of terpenoids:

a. Tetraterpenes.
b. Diterpenes.
c. Higher terpenes.
d. Sesterterpenes.

All of the following compounds can be obtained from *Trigonella foenum-graecum* except:

a. Trigofoenosides.
b. Diosgenin.
c. Foenugraecin.
d. Hecogenin.

A group of C-23 steroid glycosides that contain a five-membered lactone ring are known as:

a. Spirostanes.
b. Furostanes.
c. Cardenolides.
d. Bufadienolides.

***D. purpurea* cardiac glycosides are based on 3 aglycones, including all of the following except:**

a. Digitoxigenin.
b. Gitoxigenin
c. Digoxigenin
d. Gitaloxigenin

Digoxin is preferred in treatment regimens over digitoxin because all of the following except:

a. It is metabolized more slowly by the liver (this increase duration of action).
b. It has a rapid action.
c. It is more hydrophilic.
d. It binds less strongly to plasma proteins.

Which of the following compounds represents the primary glycoside of the dried ripe seeds of *phanthus komb`e*

a. K-strophanthoside.
b. K-strophanthin-β.
c. Strophanthidin.
d. Cymarin.

Important starting materials for the semi-synthesis of steroidal drugs including:

a. Steroidal alkaloids.
b. Furostane steroidal saponines.
c. Spirostane steroidal saponines.
d. All of the statements are correct.

One of the following drugs has a value in treating Cushing's syndrome:

a. Prednisolone.
b. Trilostane.
c. Spironolactone.
d. Cortisol.

Which of the following is incorrect regarding biological role of progesterone:

a. It is concerned with preparing the uterus for pregnancy.
b. It is a potent antagonist of the mineralocorticoid receptor.
c. It is an intermediate in the biosynthesis of the androgens.
d. It (with estrogen) prevent further ovulation if pregnancy occurs.

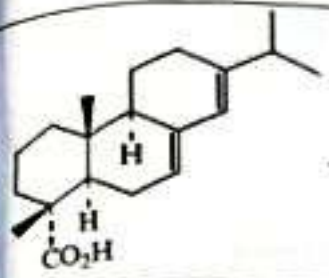
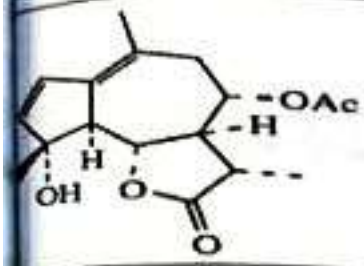
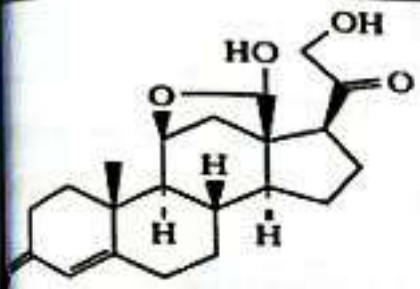
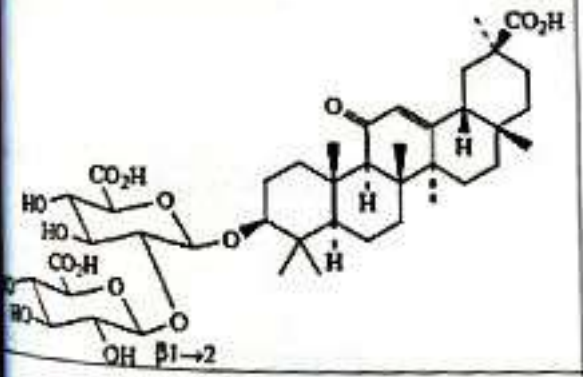
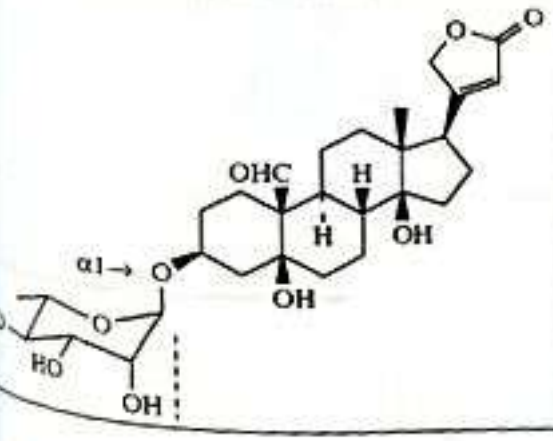
One of the following drugs has unusually different stereochemistry at C-9 and C-10 (selective estational activity):

a. Progesterone.
b. Dydrogesterone.
a. Ethisterone.
c. Medroxyprogesterone acetate.

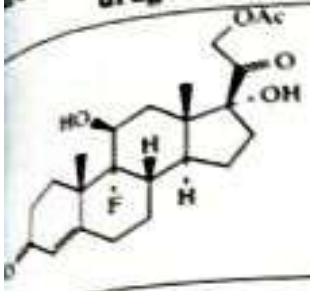
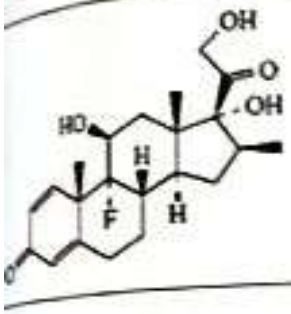
The most commonly used medicinal oestrogen drug is:

a. Diosgenin.
b. Ethinylestradiol.
c. Estradiol.
d. Ethisterone.

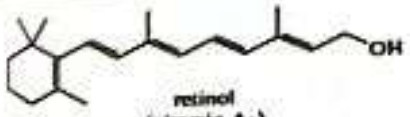
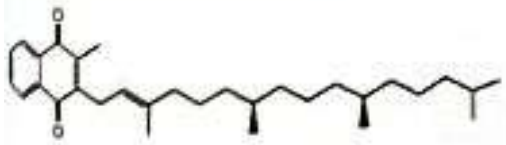
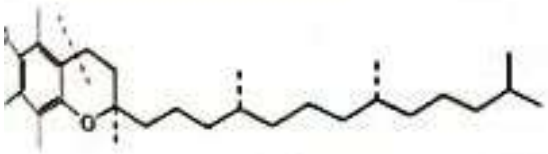
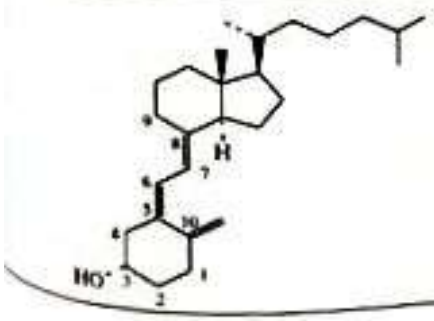
The following table shows the structures of a number of natural products. Please give the name of them, their general chemical group and their main effect(s). **(20 M)**

Natural product	Name + Chemical group (General)	Effect(s) (Don't explain mechanism of action)
		
		
		
		
		

According to the structure-activity relationship, please classify the following drugs as corticoids or mineralocorticoids with justification. Then give the side effects for each drug ding to your classification. **(10 M)**

ctures of corticosteroid drug	Classification	Justification	Side effects
			
			

The following table shows structures of fat soluble vitamins. Please write the name of the vitamins simplify the role of isoprene units in their biosynthesis. (*Do as the example*). **(10 M)**

Vitamin Structure	Vitamin name	Role of isoprene units in biosynthesis
 retinol (vitamin A_1)		IPP+DMAPP ⟹ GGPP ⟹ phytoene ⟹ β-Carotene vitamin A
		
		
		

Q3) The following table shows the name of a number of medicinal plants. Please fill th required:

The medicinal herb	Approved Indication(s) (maximum 3)	Contraindications precautions Or d interactions
Panax ginseng		Precaution(s)
Wild Yam	(Industrial usage)	Drug interaction(s)
Red foxglove		Drug interaction(s)
Devil's claw		Contraindication(s)
Ginkgo biloba		Contraindication(s)
Valerian		Drug interaction(s)
Liqurice		Precaution(s)
Chrysanthemum cinerariaefolium		

Q6) 17α-hydroxypregnenolone is a key intermediate in biosynthesis pathway of impo hormones.

a. **Please, illustrate this role using schemes, showing enzymes, structures a intermediates and final products.**
b. **Mention the names of 3 different drugs that inhibit 3 different enzymes in this pat** *each drug with the enzyme inhibited by it*).

) The stereochemistry in oxidosqualene cyclization are controlled by the type of folding achieved on enzyme (cyclases) surface. Thus, oxidosqualene can be folded into two conformational racteristics giving two transient cations that have different stereochemical features.

a. Please, illustrate with structures using schemes how oxidosqualene in the two different conformational forms can give lanosterol and lupeol. (10 M)

b. Explain why the different stereochemistry in the transient cations can give different final products. (*In other words what is the role of stereochemistry in guiding oxidosqualene to the final product*). (5 M)

مع أطيب تمنياتي لكم بالتوفيق و النجاح

أ. مها الخطيب