



SUMMER – 15 EXAMINATION

Subject Code: **0807**

Model Answer

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Important Instructions to examiners:

- 1) The answers should be examined by key words and not as word-to-word as given in the model answer scheme.
- 2) The model answer and the answer written by candidate may vary but the examiner may try to assess the understanding level of the candidate.
- 3) The language errors such as grammatical, spelling errors should not be given more Importance (Not applicable for subject English and Communication Skills).
- 4) While assessing figures, examiner may give credit for principal components indicated in the figure. The figures drawn by candidate and model answer may vary. The examiner may give credit for any equivalent figure drawn.
- 5) Credits may be given step wise for numerical problems. In some cases, the assumed constant values may vary and there may be some difference in the candidate's answers and model answer.
- 6) In case of some questions credit may be given by judgement on part of examiner of relevant answer based on candidate's understanding.
- 7) For programming language papers, credit may be given to any other program based on equivalent concept.



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1. Attempt any TEN of the following: (2 marks for each)

a) Define Pharmacognosy. Give the contribution of Hippocrates.

Definition: (1 mark)

It is defined as the scientific and systemic study of structural physical, chemical and biological characters of crude drugs along with their history, method of cultivation, collection and preparation for the market.

Hippocrates: The great physician Hippocrates (460-360 B.C.) known as 'Father of Medicine' dealt with anatomy and physiology of human beings, particularly with circulatory system & nervous system. He prepared famous oath for physicians, which is still taken by the physicians. He is known as the father of medicine. (1 mark)

b) Name a drug having following microscopical characters.

(i) Lignified trichomes(1 mark)

Nux Vomica

(ii) Paracytic stomata (1 mark)

Senna



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c) Differentiate between organised crude drug and unorganised crude drug.(Any 4 points for 2 marks,i.e ½ marks for each point)

Organized crude drug	Unorganized crude drug
<p>1. It is obtained from definite anatomic parts of the plants such as flowers, leaves, fruits etc</p> <p>2. It is made up of definite tissue and cell.</p> <p>3. It is solid in nature</p> <p>4. Microscopical characters are used for identification.</p> <p>5.Botanical and zoological terminology can be used to describe the drug</p> <p>Ex. Coriander , fennel, datura, etc</p>	<p>1. It is obtained from plants or animals by means of physical process such as drying ,, incision ,extraction such as juices ,resins.</p> <p>2. It does not have cellular structure.</p> <p>3. It is solid, semi-solid and liquid in nature.</p> <p>4. Chemical tests and physical standards are used for identification.</p> <p>5. Botanical and zoological terminology is inadequate. To describe these drugs, physical characters such as solubility, optical rotation, refractive index are used.</p> <p>Ex.Aloe , bees wax, tragacanth, asafoetida etc</p>



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**d) Mention the synonym of following drugs.(1/2 marks for each synonym.
Any one of the mentioned synonyms for respective drug)**

- (i) **Asafoetida:** Hing, Devil's dung, Gum asafoetida
- (ii) **Gymnema:** Gurmar, Madhu nashini
- (iii) **Chaulmoogra oil:** Hydnocarpus oil, Gyanocardia oil
- (iv) **Dioscorea:** Yam, Rheumatism root

e) Write down the biological source of following drugs. (1 mark for each drug)

(i) Cinchona:

It consists of the dried bark of cultivated trees of Cinchona calisaya, Cinchona ledgeriana, Cinchona officinalis, and Cinchona succirubra

Family – Rubiaceae

(ii) Vinca:

It consists of the dried whole plant of Catharanthus roseus

Family- Apocynaceae

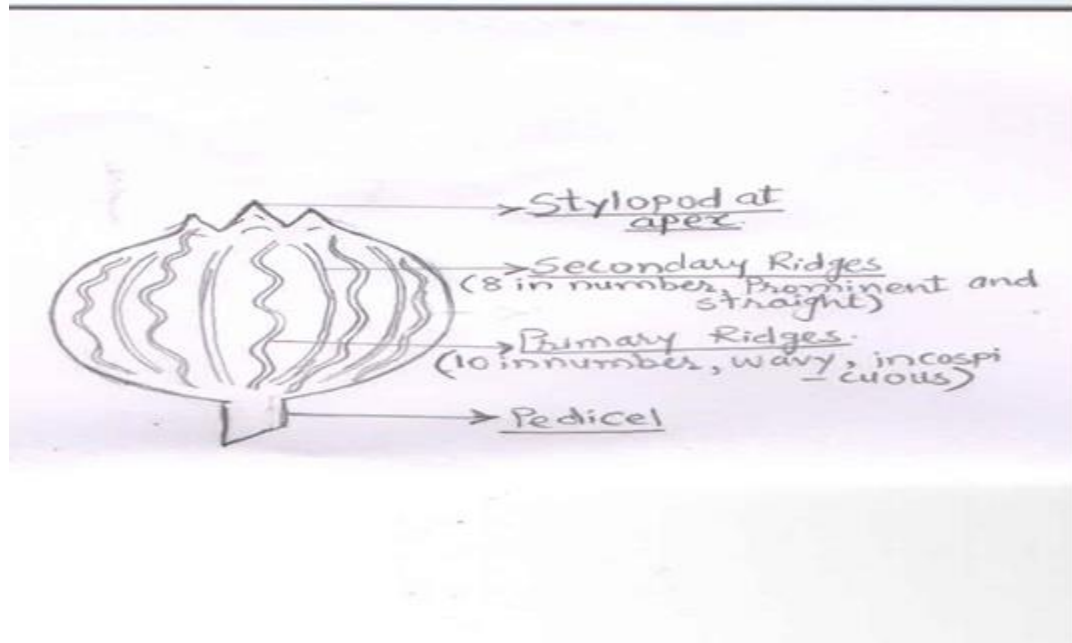
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f) Draw a well labelled diagram showing morphological characters of 'Coriander fruit'.(2 marks)



Coriander Fruit

g) Give the example of a drug used as antihypertensive and write its biological source.

(Example 1/2 mark, Biological source 1 1/2 marks)

Example: Rauwolfia (1/2 mark)

Biological source: It consists of dried roots of the plant Rauwolfia serpentina

Family – Apocynaceae



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h) Identify a drug containing following chemical constituents.(1/2 mark for each)

(i) Bassorin: Tragacanth

(ii) Kino: Pterocarpus

(iii) Margosine: Neem

(iv) Fibroin: Silk

i) Enlist various Indian traditional system of medicine:

The traditional Indian system of medicine: (2 marks for any four of the following, i.e. 1/2 mark for each)

1. Ayurveda
2. Siddha
3. Unani
4. Naturopathy and Yoga
5. Homeopathy

J.) Give any two examples of drugs from umbelliferae family and mention two characteristic features of umbelliferous fruits.

Examples of Umbelliferous fruits: (Any two for 1 mark, 1/2 mark for each)

Fennel, Coriander, Ajowan, Asafoetida

Characteristic features of umbelliferous fruits: (Any two of the following can be mentioned, 1/2 marks for each)



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1. Schizocarp (splitting fruits)- Dry fruits from syncarpous ovary that splits at maturity into 2 portions.
2. Mericarp- Each portion of Schizocarp (cremocarp) is called as mericarp.
3. Two mericarp join together by a thread like structure called as carpophore
4. Primary ridges are 5 or more runs from apex to base.
5. Each mericarp has a disc like structure at the apex called as stylopod.
6. Each mericarp has 2 surfaces
 - a) Outer dorsal or curved surface
 - b) Inner ventral or commissural surface.
7. Each mericarp contains 6 vittae- 4 on dorsal surface and 2 on commissural surface.
8. Each mericarp contains a single seed. The seed contains-
 1. An apex
 2. Endosperm
9. All umbelliferous fruits contains Volatile oil.

k) Define oxytocics. Write down chemical constituents of Ergot.

Definition:(1 mark)

The drug which causes the expulsion of the contents of uterus by contracting the uterine muscles is known as Oxytocic.



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Chemical constituents of Ergot: (1 mark)

The alkaloids of ergot are the derivatives of Lysergic acid or Isolysergic acid in combination with amino alcohol or amino acids

LEVOROTATORY ALKALOIDS		DEXTROROTATORY ALKALOIDS
(INDOLE ALKALOIDS)		
Ergometrine group(15%)	Ergometrine	Ergometrinine
Ergotamine group	Ergotamine	Ergotaminine
	Ergosine	Ergosinine
Ergotoxine group	Ergocristine	Ergocristinine
	Ergocryptine	Ergocryptinine
	Ergocomine	Ergocominine

1) Give the examples of drugs from following families. (1/2 mark for each)

- (i) **Rubiaceae:** Cinchona, Ipecacuanha, Pale catechu (Any one)
- (ii) **Polygonaceae:** Rhubarb
- (iii) **Acantheaceae:** Vasaka
- (iv) **Rutaceae:** Lemon, Orange (Any one)

2. Answer any THREE of the following:(4 marks for each)

a) Explain pharmacological method of classification of crude drug with its merits and demerits.

Explanation of method with examples 2 marks

In Pharmacological classification, drugs are classified according to the pharmacological action of their active ingredients. Thus the drugs similar in their action are put together, regardless of the morphology, biological behaviour.



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e.g Carminative - fennel, coriander

Laxative - castor oil and aloe

Antihypertensive –rauwolfia

Anti-tumor -Vinca

Anti-tussive – Tulsi

Merits: (1 mark)

1. Even if chemical constituents are not known, the drugs are classified according to the pharmacological action of the drugs.

Demerits: (1 mark, any 2 of the following)

1. Chemical constituent and morphology of the drug is not known .
2. If the drug has more than 1 pharmacological action it is difficult to classify them.
E.g. Opium has analgesic and anti diarrhoeal action.
3. Crude drug used as a pharmaceutical aid, do not find any place.

b) Mention the adulterants and substituents of-

(i) **Clove:** Mother cloves, Blown cloves, clove stalks, and exhausted cloves (2 mark)

(ii) **Senna:** Arabian senna,Palthe senna,Dog senna (2 mark)



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c) Define Natural pesticide. Give the biological source, chemical constituents, and uses of any one drug.

(1 mark for definition , biological source, chemical constituents, and uses of any one drug-1 mark each)

Natural pesticides are agents which are used for killing or inhibition of pest from natural origin.

TOBACCO

Biological Source: It consist of dried leaves of Nicotiana tobacum Family: Solanaceae

Chemical constituents: Pyridine-piperidine type of alkaloids i.e. nicotine(0.5%), nornicotine & anabasine.

Uses: Stimulant effect on heart & nervous system.

Nicotine is used in the manufacture of nicotinic acid & nicotinamide.

Nicotine acts as a contact poison against insects.

PYRETHRUM

BIOLOGICAL SOURCE: It consist of Dried flower-heads of Chrysanthemum cinerariifolium, C. marshallii. Family: Compositeae

CHEMICAL CONSTITUENTS

Active constituents are collectively known as pyrethrins, which are made up of carboxylic acid & keto-alcohols. Pyrethrin-I, cinerin-I, Jasmolin-I are esters of chrysanthemic acid, while Pyrethrin-II, cinerin-II, Jasmolin-II, are esters of pyrethric acid.

USES: contact poison- Insecticide.

Use in preparation of mosquito coils, sticks & insect repellent formulations.



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d) Define Lipids. Write down the properties of fixed oil.

Definition: Lipids are the substances of animals or plant origin and comprise of fixed oils, fats and waxes.(1 mark)

Properties of fixed oil:(1/2 mark for each property)

1. Fixed oils are thick, viscous yellow-coloured liquids with characteristic odour.
2. They are non-volatile and cannot be distilled.
3. They do have food value and can be saponified.
4. They turn rancid on storage due to free acidity.
5. Chemically, they are glycerides of higher fatty acids (i.e. on hydrolysis they yield glycerine and fatty acids, like stearic, palmitic, oleic etc.)
6. Physiologically they are emollients and demulcents.

e) Differentiate between Plant Fibre and Animal Fibre: (Any 4 points, 1 mark each)

Point	Plant Fibres	Animal Fibres
Source	Plant	Animal
Mollisch Reagent test	Violet colour	No Violet colour
On heating with Picric acid	No yellow stain	Permanent Yellow stain
On heating with Millon's reagent	No red stain	Red stain
On Ignition	No foul odour	Foul odour
Example	Jute , cotton	Silk , wool



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3. Attempt any THREE of the following: (4 marks each)

12

a) Give the uses of :(1 mark for each drug)

(i) Rauwolfia- (any 2 uses,1/2 mark for each use)

1. Antihypertensive
2. Hypnotic
3. It is used as an antidote to the bites of poisonous reptile like snakes.
4. Tranquillizing agent

(ii) Isapghula: (any 2 uses,1/2 mark for each use)

1. Laxative and emollient
2. In amoebic and bacillary dysentery
3. Antirheumatics
4. Mucilage of Isapghula is used in the preparation of Tablet and as a Stabilizer in the Ice cream Industry.

(iii) Colchicum: (any 2 uses,1/2 mark for each use)

1. Gout & rheumatism
2. Seed can control malignant tumour
3. Used to cause polyploidy
4. In the cultivation of medicinal plant.

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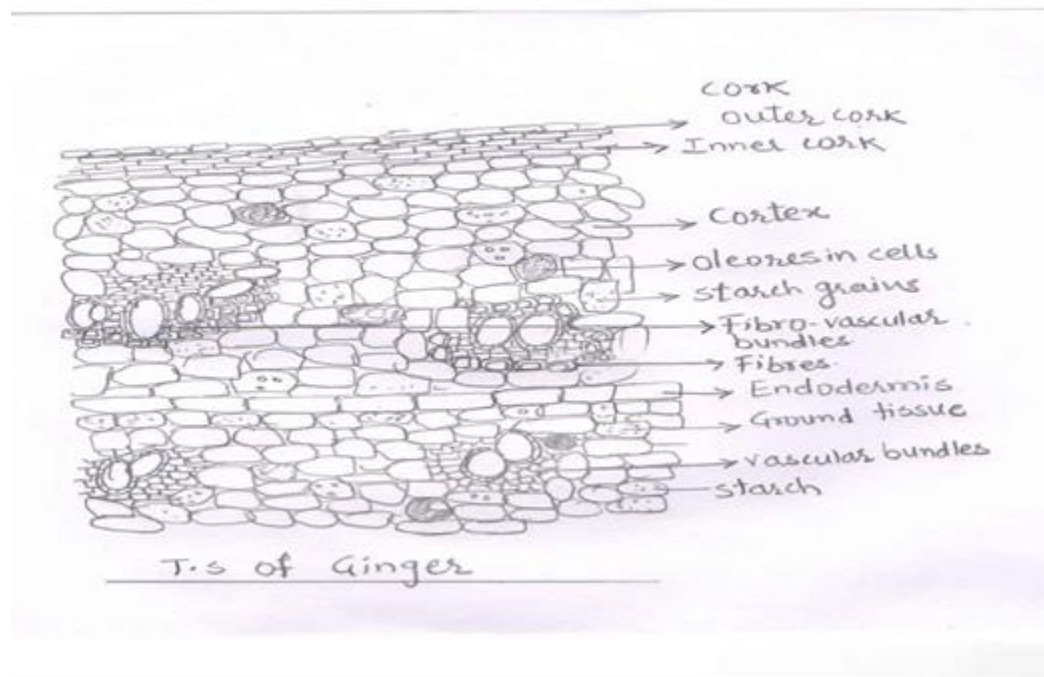
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(iv) Garlic: (any 2 uses, 1/2 mark for each use)

1. Carminative, 2. Aphrodisiac,
3. Stimulant, 4. Expectorant
5. Oil of garlic is used as anthelmintic & rubefacient.
6. It decreases cholesterol level & used in hypertension & atherosclerosis
7. The Allicin & Allin are potent antibacterial ingredients against gram +ve & gram-ve bacteria.

b) **Draw a well labelled diagram of T.S. of Ginger and describe it. (2marks – Diagram, 2 marks for describing any 4 points of the following)**





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CORK

Outer cork :Few layers ,dark brown colored ,irregularly arranged paranchymatous cells.

Inner cork: Few layres ,colorless paranchymatous cells,radially arranged in regular rows.

CORTEX

Isodiametric ,thin walled paranchymatous cells,with scattered vascular strandsand numerous idioblast about 40 to 80 μ in diameter

Yellowish to reddish brown oleoresin is present in parenchymatous cells.

Fibro-vascular bundles:Vascular bundle is conjoint ,collateral and closed.A group of sclerenchymatous fibres partially covers the vascular bundlesof cortex and ground tissue region.

FIBRES:Lignified,pitted,septate

ENDODERMIS:Single layered radialwalls,slightly thickened,free from starch .

GROUND TISSUE:Large ,parenchymatous cells with abundant starch,oleoresin cells and vascular bundles

Vascular bundles Ring of vascular bundles below endodermis ,not covered with sclerenchymatous fibres

Starch : Flattened,rectangular ovate grains mostly 5 to 15 to 30 to 60 μ long,7 μ thick.



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**c) Define Tannins and write down the chemical test for identification of tannins.
(1 mark –Definition, 1 mark each for chemical test)**

Definition-Tannins are the derivatives of polyhydroxy benzoic acid capable of combining with protein and causing precipitation.

Chemical test :(any 3 test-1 mark for each chemical test)

1. Gold Beater skin test:- A piece of gold beater skin, (intestine of ox) when treated with 2% HCL and washed with distilled water. It is placed in the solution of tannin for 5 mins. It is washed with distilled water and transferred to 1% ferrous sulphate. A change in colour of goldbeater's skin to brown or black indicates the presence of tannin.

2. With 1% gelatin solution and 10% sodium chloride, tannins precipitate gelatin

3. Phenazone test:

Take 5ml of aq solution of tannins. To it add 0.5 gm sodium acid phosphate. Warm the solution. Cool and filter. Add 2% phenazone solution, a bulky, colored ppt is obtained.

4. Catechin test: Dip the match stick in an extract of drug and moisten with conc HCL and warm over a flame. Catechin present in the presence of acid produces phrologlucinol, which stains lignified wood pink or red.

5. With Ferric chloride solution, hydrolysable tannins give blue-black colour and condensed tannins give brownish-green colour



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d) Describe any four physical methods of evaluation of crude drug. (1 mark for each for physical method with example, any four of the following methods)

1. Melting point

It is one of the parameter to judge the purity of crude drugs.in case of pure chemicals or phytochemicals ,Melting .Point is very sharp and constant .Since the crude drugs from animal or plant origin contain mixed chemicals ,they are described with certain range of melting point.

Drugs	Melting Point (°C)
Colophony	75-85
Kokum Butter	39-42
Cocoa butter	30-33
Bees wax	62-65
Anhydrous wool fat	34-40
Hard paraffin	50-57

2. Solubility: The purity of the drug can be judge by checking solubility of drug.

e.g.

1. Castor oil is soluble in 3 volumes of 90% alcohol .if it is adulterated ,it is easily soluble in alcohol,
2. Peru balsam is soluble in equal part of 90% alcohol, but if the quantity of alcohol increases it is insoluble



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3. Viscosity of a liquid is constant at a given temperature and is an index of its composition. Hence it can be used as a means of standardizing liquid drugs.

It is measured in stokes, 1 stoke = 100 centistokes.

e.g.1. Liquid paraffin: Kinematic viscosity not less than 64 centistokes.

2. Pyroxillin : Kinematic viscosity 1100-2450 centistokes.

4. Refractive index: When a ray of light passes from one medium to another medium of different density, it bends the light from its original path.

Refractive index is term as the ratio of velocity of light in vacuum to its velocity in a medium.

Drug	R.I
Clove oil	1.5300-1.5310

5. Optical rotation

Certain substances have property of rotating the plane of polarised light in pure state or in the solution, is an optically active substances. The phenomenon is known as optical rotation.

If plane of polarised light is rotated towards the left, it is laevorotatory and it is rotated towards the right, it is dextrorotatory. The optical rotation is determined at 25° C using polarimeter

Drug	Optical Rotation
Clove oil	0°-1.5°
Honey	+3°-15°



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e) Define Suture and Ligature and write down the properties of it. (1 mark for each definition, 2 marks for any 4 properties)

Definition: Sutures are sterile thread like strings or strands specially prepared and sterilized and used in surgery for sewing, stitching tissues like skin, muscles, tendons etc. by a needle. **(1 mark)**

Definition: Ligatures are used for tying the tissues. **(1 mark)**

Properties: (2 marks for any 4 properties, 1/2 mark for each property)

1. They must be Sterile
2. They should not cause irritation.
3. They should have finest possible gauze.
4. They should have adequate strength.
5. If absorbable their time of absorption should be known .
6. They are intended to be used for occasion only .

4. Attempt any THREE of the following:(4 marks each) 12

a) Write down the classification of Glycosides on the basis of linkage between sugar and non - sugar with one example each. (1 mark for each class)

Classification based on glycosidic linkages

1. 'O' Glycoside: The sugar molecule is directly attached to oxygen atom of aglycon. e.g. Rhein (rhubarb)
2. 'C' Glycoside: The sugar molecule is directly attached to carbon atom of aglycon. e.g. Barbaloin



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3. 'N' Glycoside: The sugar molecule is directly attached to nitrogen atom of aglycon.
e.g. adenosine. they are absent in plants and present in nucleoside.

4. 'S' Glycoside: The sugar molecule is directly attached to sulphur atom of aglycon.
e.g. sinigrin

b) Name a drug containing papain and citral as active constituents and write their uses. (1/2 mark each for writing name of the drug, 1 ½ mark for any 3 uses)

a) Papain containing drug – Papaya

USES

1. Papain is proteolytic enzyme that tenderises meat & act as clarifying agent in many food industry.

2. It is a common ingredient of brewery industry.

3. These are used in the care of some chronic wounds to clean up dead tissue.

4. It is an ingredient in some toothpastes or mints as teeth – whitener

b) Citral containing drug-Lemon oil **or** Orange oil

USES

Lemon oil

1 Lemon oil is used as Flavouring agent.

2. It has stimulant, carminative and stomachic properties.

3. Lemon oil is used in cosmetics and liquid cleansers because of its aroma.

OR



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Orange oil

Uses:- 1. Flavouring Agent 2. Perfumery 3. Preparation of terpeneless orange oil.

c) Define Diuretic. Give the examples of it and write biological source, chemical constituents of any one drug.(definition-1 mark,examples-1 mark, biological source-1 mark, chemical constituents-1 mark)

Definition : Diuretics are the drugs which increases the flow of urine .

Examples- Gokhru, Punarnava

(Any one of the following can be considered)

.GOKHRU

Biological source. – It consists of dried fully ripen fruits of the plant Tribulus terrestris. Family – Zygophyllaceae

Chemical constituents: Alkaloids: Harmine & Harman.

Also contain saponins, which on hydrolysis yield steroidal sapogenins like diosgenin, chlorogenin, gitogenin & ruscogenin.

Saponin, flavonoids, kaemferol, tribuloside & its derivatives have also been isolated from leaves & fruits.

Other constituents are fixed oil, resin, essential oil & nitrates.

OR

PUNARNAVA

Biological source:It consist of Fresh as well as dried herb of Boerhaavia diffusa

Family: Nyctaginaceae



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Chemical constituent: Alkaloids: Punarnavine ,Also contain flavones, ursolic acid, sterols & potassium salts.

d) How will you differentiate Black catechu and Pale catechu?(Any 4 points -1 mark each)

Black catechu	Pale catechu
Synonym- Cutch,Kathha,Khadir,Khair,Catechu nigrum	Synonym- Gambier catechu
It is dried Aq extract of the heartwood of Acacia catechu Family :- Leguminosae	It is a dried aq extract prepared from the leaves and young twigs of drug Uncaria gambier Family:- Rubiaceae.
Colour –Light brown to Black	Colour- Dark reddish brown
Gambier fluorescin test is negative in black catechu	Gambier fluorescin test- Boil a little powdered drug with alcohol, filter and add solution of NaOH. Stir and add few ml of light petroleum. Petroleum layer shows green fluorescence in case of pale catechu..
As black catechu not containing chlorophyll no yellow residue gets in it	Heat powdered drug with 5ml of CHCl ₃ in a dish & filter. Evaporate the filtrate on water bath. A greenish yellow residue is left due to the presence of chlorophyll in pale catechu.



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e) Give the method of collection and preparation of opium for market

Collection and Preparation of opium: (4 marks)

Collection starts late in February and may extend upto may . unripe capsules which changes colour green to yellowish in winter are incised in afternoon vertically from top to bottom of capsules. Whitish latex come out in the next morning , is scrapped off with knife & transferred to earthen vessel. Each capsule is required to be lanced 3 to 4 times on alternative days till no more latex is left. When sufficient latex is collected , it is kneaded into balls that are wrapped in poppy leaves & dried in the shade.

Question 5 Attempt any three (4 marks each)

12

(a) Define Pharmaceutical aids. Give the classification of it with examples.

Definition : (1mark)

Pharmaceutical aids - The substances which are of little or no therapeutic value but are essentially used in manufacture or compounding of various pharmaceuticals are known as Pharmaceutical aids.



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Classification with examples (any 6 classes with examples ½ mark each)

Sr.No.	Class	Example
1	Acidulent	Tamarind, lemon juice
2	Colours	Turmeric, saffron, indigo, caramel, chlorophyll, β -carotene
3	Disintegrating agent	Starch, CMC, psyllium husk, microcrystalline cellulose.
4	Diluents	Cinnamon water, peppermint water, corn oil, peanut oil, wild cherry syrup, sesame oil, glucose, lactose
5	Emulsifying & suspending agent	Acacia, agar, gelatin, alginic acid, bentonite, methyl cellulose, tragacanth, guar gum
6	filter aid	Talc, bentonite, kieselghur.
7	flavours	Cardamom, rose, nutmeg, cinnamon, benzaldehyde, anethol, lemon oil, orange peel, nutmeg
8	Hardening agents	Bees wax, hard paraffin
9	lubricants	Talc, cocoa butter, magnesium stearate.
10	solvents	Alcohol, glycerine, propylene glycol, paraffin, triethanolamine.
11	Sweetening agent	Honey, saccharin, glycyrrhiza, sorbitol.
12	Ointment bases	Bees wax, lanolin, polyethylene glycol, paraffin, petroleum jelly, spermaceti, wool fat
13	Thickening agents	Pectin, tragacanth, methyl cellulose.
14	vehicles	Arachis oil, honey, sesame oil



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(b) Give the biological source and chemical constituents of

(i) Amla (ii) Sandalwood

i) AMLA (Biological source-1 mark, chemical constituent -1 mark)

Biological source - It consists of fresh or dried fruit of *Embelica officinalis*

Family - Euphorbiaceae

Chemical constituents :

Vitamin C,

Phyllamblin, Condensed tannins (elagic acid), Calcium, magnesium, iron salts.

Fresh fruits contain 70% water

ii)SANDAL WOOD (Biological source-1 mark, chemical constituent -1 mark)

Biological source –It is Dried heartwood of *Santalum album*,

Family: Santalaceae

Chemical constituents

Sandalwood oil: α -santalol & β -santalol(95%)

Also contain santene, santenone, teresantol



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c) Define drug evaluation and explain the terms

(i) stomatal No

(ii) stomatal index

(iii) Vein - islet No

Definition of drug evaluation (1 mark)

Drug identification is the process of confirmation of identity of crude drug, determination of its purity and quality and setting up new standards if required.

OR

Drug evaluation means confirmation of identity, determination of purity and quality and detection of nature of adulterant.

Explanation of terms: (1 mark for each term)

(i) **Stomatal No** - It is defined as average number of stomata per square mm of epidermis of leaf

It helps identification of leaf drug and determination of its variety and purity.

(ii) **Stomatal index** - It is the percentage in which the number of stomata form the total number of epidermal cells.

$$S.I = \frac{S \times 100}{(E + S)}$$

Formula -



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Where S is stomatal number

E is No. of Epidermal cells

It helps identification of leaf drug and determination of its variety and purity.

(iii) Vein islet No - It is the number of polygons formed by veins per square mm of leaf surface. It helps identification of leaf drug and determination of its variety and purity.

(d) Define

(i) Antidysenterics

(ii) Enzymes

(iii) Vitamins

(iv) Antileprotics

Definition (1 mark for each definition)

(i) Antidysenterics - Antidysenterics are the drugs which are used in treatment of
dysentery

(ii) Enzymes- Enzymes are the protein substances which act as catalysts in various
biochemical reactions

(iii) Vitamins - Vitamins are the substances which are essential for the
maintenance of normal metabolic functions but not synthesized in human body and so
to be supplied from external sources.

(iv) Antileprotics- Antileprotics are the drugs used in treatment of leprosy.



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(e) Describe the method of preparation of silk fibers.

Preparation of silk fibers (4 marks)-

The silk worm life cycle consists of four stages namely eggs, larva cocoon and insect. The larvae produce silk fibroin fibers from the oral glands. The fibroin gets united with gum like secretion known as sericin and forms cocoons.

The cocoons are collected and heated at 60⁰C to 80⁰ C by exposing to the steam. The exposed cocoons are put into hot water to dissolve the gum and separate the fibers. The fibers are washed, dried, sterilized and packed.

Question 6 - Explain the chemical tests for following crude drugs (Any 4) (12)

- a) Starch
- b) Myrrh
- c) Tolu balsam
- d) Digitalis
- e) Asafoetida
- f) Gelatin

CHEMICAL TESTS-(3 marks for chemical tests of each drug)

i) Starch:(3 marks for each test,any three)

- 1.1gm of starch is boiled with 15ml of water and cooled ,a translucent viscous jelly is produced.
- 2.Above jelly turns deep blue by addition of iodine solution.This blue color disappears on warming and reappears on cooling.



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3. Hydrolyse the starch solution with acid and then add Fehling's solution A and Fehling's solution B in equal quantity and heat it in water bath which gives brick red ppt.

4. To the solution of starch add Molisch reagent and add H_2SO_4 from the side of test tube.

b) Myrrh: (1 mark for each test)

i) When triturated with water, it forms yellowish brown emulsion.

ii) Ethereal solution of Myrrh becomes reddish when treated with bromine vapour.

iii) Ethereal solution of Myrrh becomes purplish when moistened with nitric acid.

c) Tolu balsam: (1 mark for each test, any 3 tests of the following)

i) When heated and pressed in between two glass slides and examined under microscope, it shows crystals of cinnamic acid.

ii) To alcoholic solution of balsam of tolu add ferric chloride solution, green color is produced.

iii) When 1 gm of drug and 5 ml of $KMnO_4$ are heated, odor of benzaldehyde is produced.

iv) Alcoholic solution of tolu balsam is acidic to litmus.

d) Digitalis- (3 marks)

i) KELLER KILLIANI TEST- 1 gm of drug powder is boiled with 10 ml of 70% alcohol for 3 minutes. Filtered. To the filtrate 5 ml of water and 0.5 ml strong solution of lead acetate are added and filtered. To the filtrate equal volume of chloroform is added and evaporated. The extract is dissolved in glacial acetic acid and after cooling 2 drops of ferric chloride are added. These contents are transferred to a test tube containing 2 ml of concentrated sulphuric acid.

A reddish brown layer acquires bluish green color on standing due to presence of digitoxose.



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e) Asafoetida : :(1mark for each test ,any 3 tests of the following)

- i) When triturated with water, it forms yellowish orange emulsion.
- ii) On fractured surface of drug add sulphuric acid, red or reddish brown color is observed.
- iii) Drug when treated with 50% nitric acid gives green color.
- iv) Combined umbeliferone test - Triturate about 0.5 gm of drug with sand and 5 ml hydrochloric acid. To it add little quantity of water, filter. To the filtrate add equal volume of ammonia. A blue fluorescence is produced due to presence of umbeliferone.

f) Gelatin : (1mark for each test ,any 3 tests of the following)

- i) Aqueous solution of drug gives precipitate with solution of trinitrophenol and solution of tannic acid.
- ii) On heating gelatin solution with soda lime, ammonia gas is evolved.
- iii) Aqueous solution of gelatin precipitates mercuric nitrate solution forming white colour, which turns black-red on heating.
- iv) Formaldehyde makes gelatin hard & insoluble after drying.
- v) To aqueous solution of drug, add drop of picric acid or tannic acid solution, precipitate is produced



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