



SUMMER-16 EXAMINATION

Subject Code : **0807**

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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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Q 1 Answer any EIGHT of the following (2 marks each) (16)

a) Define pharmacognosy. When and who coined the term pharmacognosy?(1 mark for Definition, ½ mark each for when & who)

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

A German scientist, C. A. Seydler coined the term Pharmacognosy in 1815.

b) Name the drug which contain:(½ mark for each)

- i) Bassorin – Tragacanth
- ii) Harmine – Gokhru
- iii) Fenchone – Fennel
- iv) Reserpine – Rauwolfia

c) Mention a crude drug for which each of the following synonym is applicable(1/2 mark for each)

- i) Mel – Honey
- ii) Oleum selachoids – Shark liver oil
- iii) yam – Discorea
- iv) Cera flava – Yellow bees wax

d) Name a crude drug to which each of following chemical test is applicable(½ mark each)

- i) Klunge's test – Aloe
- ii) Fiche's test – Honey
- iii) Vitali-Morin test – Datura
- iv) Keller-Killiani test – Digitals

e) Mention which part of the plant is useful as a drug in case of(1/2 mark for each part used)

- i) Gymnema – Leaves
- ii) Nutmeg – Kernals/Seeds
- iii) Liquorice – dried peeled or unpeeled roots & stolons
- iv) Black pepper – unripe fruit



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f) For identification of which crude drugs swelling factor is determined. Describe how will you determine it? (1mark for name of drug, 1 marks for procedure to determine)

Name of drug is **Ispaghula**

It is determined by putting 1gm. of the drug in the measuring cylinder (25ml capacity) in 20 ml water with occasional shaking. The volume occupied by the seeds after 24 hours of swelling is measured.

Swelling factor for Isapgol seeds is 10 to 14.

g) Write chemical tests for ergot.(2 marks for any two tests)

(1) To defatted ergot powder, add 50% KOH solution & heat at 170°C for 1hr, cool , wash thoroughly with alcohol & then add to it iodine solution & then 20% H₂SO₄ which gives violet colour

(2) Extract 1g of powdered ergot with 10ml of solvent ether along with 0.5ml of dil. H₂SO₄. Filter it, to the filtrate add approx. 1ml of cold saturated solution of sodium bicarbonate. The aqueous layer becomes red or violet (due to sclererythrin)

(3) In UV- light, ergot powder shows red fluorescence.

(4) Extract ergot powder with CHCl₃ & Sodium carbonate & to the extract add paradimethyl amino benzaldehyde, 35% H₂SO₄ & 0.5% ferric chloride solution. A blue colour is produced.

h) Method of preparation of absorbent cotton(2 marks)

Fruits of cotton (capsules) are 3-5 celled,, which contain numerous seeds..

Seeds covered with hair, known as Balls. Balls are collected, dried & taken to ginning press, where in trichomes are separated from seeds. Raw cotton obtain from above is subjected to a process called combing. This saperates the long and short fibres .The long fibres are spun and woven as cloth and short fibres are called linters. This is used for manufacturing of absorbent cotton. Remove impurities (vegetable debries) from raw cotton



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To remove wax, fatty material & colouring matter, raw cotton is taken to the machine, cotton opener & followed by treatment with dil. Soda solution or soda ash solution under pressure for about 10-15 hrs. Washed with water & treated with suitable bleaching agent. Again washed, dried & make a flat sheet .Finally packed in paper wrappers & sterilized.

i) What are balsams? Name balsams used in pharmacy.(1 mark for definition & 1mark for any 2 examples)

Aromatic resinous substances of plant origin containing balsamic acids(i.e. benzoic and cinnamic acid)are known as balsam.

e.g. Balsam of tolu, benzoin, storax and balsam of peru.

j)What do you know about ‘Ayurveda’ as traditional Indian system of medicines?(2 marks)

It is the oldest system of medicine in India .In Ayurveda there is a supposition that every thing in universe is made up of 5 basic elements (Panchamahabhuta) like solid , liquid ,air, space, and energy .These 5 elements exist in the body in combined form like Vata,Pitta,Kapha.These three forms are together called as “Tri-dosh”. The seven forms of Tri dosh are called as ‘SAPTADHATU’. These saptadhatu under goes wear and tear processes and form excretory material or mala.

When these tri dosh ,saptadhatu and mala are in balanced form ,the condition is healthy. But if it is in imbalanced form there are pathological disorders.In Ayurveda Charak Samhita and Sushrut Samhita are two well known treaties in Charak Samhita descriptions of plants used as medicine are included .in Sushrut Samhita emphasis is given on surgery

Q 2 Answer any FOUR of the following: (3 marks each)

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a) Give two examples of crude drugs from family: (1 mark for any 2 examples from each family)

i) Burseraceae – Guggule, Myrrh



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ii) Apocynaceae – Rauwolfia, Vinca

iii) Scrophulariaceae – Digitalis, Picrorrhiza

b) Define evaluation of crude drugs. Describe any two microscopical methods of drug evaluation. (1 mark for definition & 2 marks for any two microscopical methods)

Evaluation of a crude drug means confirmation of its identity and determination of its quality and purity

Microscopical methods of drug evaluation are:

1) Stomatal number: It is the average number of stomata present per square mm of the epidermis.

Stomatal no. is relatively a constant for particular species of same age, hence use as a diagnostic character for identification of a leaf drug.

Species	Stomatal number
Ex. Datura stramonium-	87
Hyoscyamus niger -	141

2) Stomatal Index:

It is the % which the number of stomata forms to the total number of epidermal cells, each stoma being counted as one cell.

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

(E+S)

I = Stomatal index

S = Number of stomata per unit area

E = Epidermal cells in the same area



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3) Vein islet number:

A vein-islet is the small area of green tissue surrounded by the veinlets. It is the number of vein islets per sq. mm of leaf surface.

It is a constant for a given species of

Ex. Digitalis purpurea – 02 - 5.5

Erythroxyton coca- 08- 12

Cassia angustifolia- 19 -23

4) Palisade Ratio:

It is the average number of palisade cells, beneath one epidermal cell, using four continuous epidermal cells for the count.

It is a constant for a species.

Ex. Atropa belladonna – 06 – 10

Datura stramonium- 04 – 07

5) Quantitative Microscopy(Lycopodium spore Method):

A powdered drug is evaluated by this technique. if it contains :

- i) well defined particles which may be counted e.g. starch or pollen grains
- ii) single layered cells or tissues, the area of which may be traced under suitable magnification and actual area calculated or
- iii) the object of uniform thickness

The % purity of an authentic powdered ginger is calculated as

$$\frac{N \times W \times 94000 \times 100}{S \times M \times P}$$

$$S \times M \times P$$

N = No. of characteristic structures(e.g. Starch grains) in 25 fields.

W = Wt. in mg of lycopodium taken.



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S = No. of lycopodium spores in the same 25 fields.

M = Wt. in mg of the same sample,

P = 2,86,000 in case of ginger starch grains powder.

This method can be used for evaluation of powdered clove, ginger, cardamom, nutmeg & umbelliferous fruits

c) What are surgical dressing? Give an ideal requirements of surgical dressing.(1 mark for definition and 2 marks for any four requirements)

Surgical dressing is used to include all the materials either used alone or in combination to cover the wound.

Ideal requirements are (any four)

- 1) They should be sterilized before use.
- 2) They should be stored in dry well- ventilated place at a temperature not exceeding 25°C.
- 3) They should be used with permitted antiseptics in prescribed concentration only.
- 4) They should not be dyed unless mentioned in the monograph.
- 5) Adhesive products should not be allowed to freeze.
- 6) There should not be any loose threads, fibre-ends in dressings.

d) Define and classify Pharmaceutical aids with examples.(1 mark for definition, 2 marks for any four pharmaceutical aids with examples)

The substance which are of little or no therapeutic value but are essentially used in manufacturing or compounding of various pharmaceuticals are known as pharmaceutical aids.

Classification of Pharmaceutical aids



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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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g) Write differentiating points between organised and unorganised crude drugs with examples (Any four differentiating points can be mentioned, 1/2 mark for each point & 1/2 mark for example of each)

Organized crude drug	Unorganized crude drug
<ol style="list-style-type: none">1. It is obtained from definite anatomic parts of the plants such as flowers, leaves, fruits etc2. It is made up of definite tissue and cell.3. It is solid in nature4. Microscopical characters are used for identification.5. Botanical and zoological terminology can be used to describe the drug <p>Ex. Coriander , fennel, datura, etc</p>	<ol style="list-style-type: none">1. It is obtained from plants or animals by means of physical process such as drying , incision , extraction such as juices , resins.2. It does not have cellular structure.3. It is solid, semi-solid and liquid in nature.4. Chemical tests and physical standards are used for identification.5. Botanical and zoological terminology is inadequate. To describe these drugs, physical characters such as solubility, optical rotation, refractive index are used. <p>Ex. Aloe , bees wax, tragacanth, asafoetida</p>

f) Define perfumes and flavouring agents. Give biological source and chemical constituents of any one: (1/2 mark for each definition & 1 mark for biological Source & 1 mark for Chemical constituents of any one drug)

Perfumes: are an agents used for creating pleasant odour.

Flavouring agents: are an agents used to impart flavour for oral pharmaceutical preparation, by masking unacceptable odour & taste.

Biological source of Peppermint oil:



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It is the Volatile oil, obtained by steam distillation of fresh flowering tops of *Mentha piperita* Linn. belonging to family Labiatae.

Chemical constituents: It consist of 1-menthol(70%), Terpenes: menthone, methyl acetate, 1-limonene, cineole, pinene, camphene, etc.

ii) **Biological source of Lemon grass oil**

It is a Volatile oil obtained by steam distillation from the leaves and aerial parts of the plants *Cymbopogon flexuosus*, *C. citrates*, etc. belonging to family Graminae.

Chemical constituents :It consist of citral, methyl heptenol, nerol & geraniol.

3. Answer any FOUR of the following: (3 marks each)

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a) Define volatile oil. Explain methods of isolation of Volatile oil.

(Definition 1 mark , any two methods of isolation carry 1 mark each.)

Volatile oils are odourous and colourless principles of plants and animal sources these are evaporated when exposed to air.

Methods of extraction:

1) DISTILLATION

Most of the oils are obtained by distillation which are of following 3 types

1. Water distillation -is mostly applicable to such plant material, which is dried initially in air and the constituents are not degraded by boiling upto 100⁰C

e.g Turpentine oil

2. WATER and steam distillation – It is often suitable for such plant mtrl whether fresh or dried the constituents of which undergo degradation by direct boiling e .g Clove oil



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3.Direct steam distillation- it is invariably applicable to fresh drugs that is loaded with sufficient natural moisture and hence no maceration is required e.q. peppermint oil.

B)Solvent Extraction

Extraction is done by using some organic solvents like ether, benzene,petroleum etc.

C) Ecuelle Method

In this method the oil cells of the citrus fruits are ruptured mechanically using pointed projections and thus citrus oil is extracted.

D) Enfleurage Method - it is used in the extraction of delicate perfumes. The fresh flower petals are spread on a fatty material. The spread petals are exhausted after sometime as the fatty material absorbs the oil. These exhausted petals are replaced by fresh petals and then the oil is collected from the fatty material.

b.) i) What are enzymes?(1/2 mark) Give biological source of diastase (1mark)

Enzymes are the protein substances, which serve a role of catalyzing the biochemical reactions

Biological source: It is one of the amylolytic enzymes present in saliva i.e. Salivary diastase or ptylin &

pancreatic diastase or amylopsin, found in the digestive tract of the animals called animal diastase.

ii) Define Tannins .Write Chemical test for tannins.(1/2 mark –Definition, 1 mark for any one chemical test)

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



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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 precipitates 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. Match stick test: Dip the match stick in an extract of drug and moisten with conc HCL and warm over a flame. Match stick turns pinkish purple.

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

6. Vanillin- hydrochloric acid test: Tannins gives pink colour with vanillin hydrochloric acid solution.

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

Explanation of method with examples 1 ½ mark

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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Pharmacological category Examples

e.g Carminative -	fennel, coriander, etc.
Laxative -	castor oil, senna, aloe, rhubarb
Antihypertensive –	rauwolfia
Anti-tumor -	Vinca
Anti-tussive –	Tulsi, vasaka, tolu balsam

Merits: (1/2 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 1 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-diarrheal action.
3. Crude drug used as a pharmaceutical aid, do not find any place.

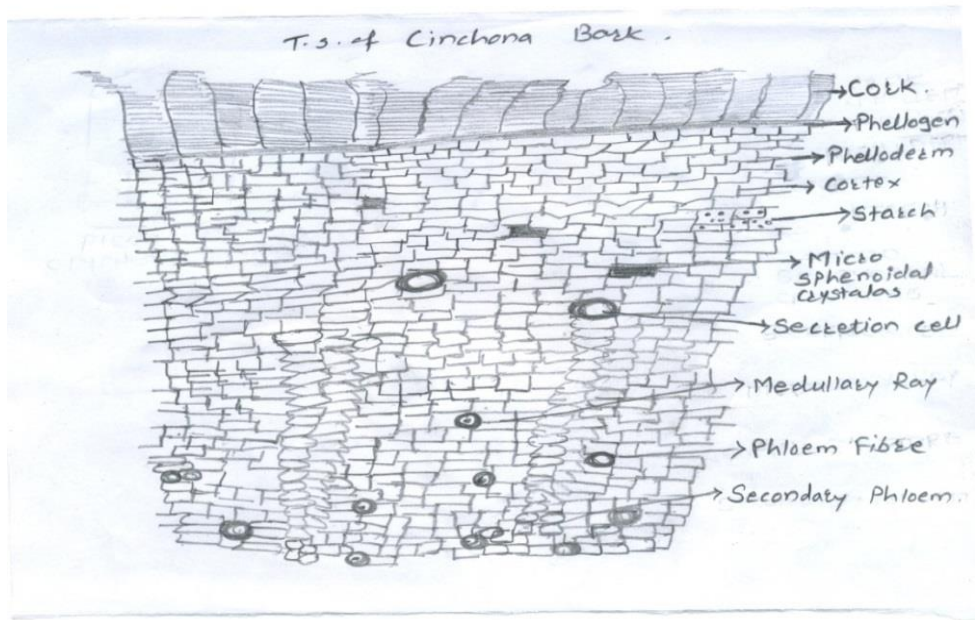
d) Draw a well labelled cellular diagram of T.S of bark used as antimalarial. Describe any two microscopic characters. (2 marks for well labelled diagram, 1 mark for any two microscopic characters)

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1) Periderm

Cork : Several layers of thin walled, flat polygonal cells.

Phellogen : 2 to 3 layers thin walled cells without any cellular content.

Pheloderm : 6 to 8 layers of thin walled rectangular cells without any cellular content.

2) Cortex:

Several layers of thin walled tangentially elongated cells. Starch grains are present.

Sclereides are absent and cavities (secretion canals) are present



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3) Secondary Phloem:

Sieve tubes: most of the sieve tubes are compressed & collapsed.

Fibers: Numerous large lignified phloem fibers.

Phloem parenchyma: Thin dark –reddish brown cells with micro prisms of calcium oxalate.

Medullary rays: One to three seriate, extended up to cortex cells, radially elongated and contain starch grain.

e) Describe method of collection and preparation of Digitalis for market.(3 marks)

Collection of Digitalis: (2marks)

1. The leaves of Digitalis are picked up in the afternoon during August and September in the first and second year, when 2/3 rd of the flowers are fully developed. The basal leaves and the leaves at the top are collected at the end.
2. The discolored leaves are rejected. While collecting the leaves, dry weather is specially selected.
3. After plucking, the leaves are immediately dried in vacuum dryers.

Preparation for Market: (1 mark)

The dried leaves are packed into air tight containers , containing suitable dehydrating agents. The temperature at which the leaves are dried should not exceed 60⁰c , otherwise it makes them to loose potency due to chemical degradation.

f) Write biological source, chemical constituents and uses of Garlic.(1 mark each)

Biological source: It is Dried bulbs of Allium sativum Linn, belonging to Family: Liliaceae

Chemical constituents : Volatile oil-Allicin(responsible for odour), allyl propyl disulphide, diallyl di-sulphide & alliin

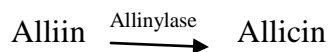


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Carbohydrate(29%),Protein(56%),Fat (0.1%) & mucilage

Uses: (Any two important uses)

1. Used as carminative, aphrodisiac, stimulant, expectorant
2. Oil of garlic is used as anthelmintic & rubifacient
3. It decreases cholesterol level & used in hypertension& atherosclerosis
4. The Allicin & Alliin are potent antibacterial ingredient against gram +ve & gram-ve bacteria.

4. Answer any FOUR of the following: (3 marks each)

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a) How will you differentiate :

i) Plant Fibre and Animal Fibre (1 ½ marks – any 3 points)

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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ii) Leaf and leaflet (1 ½ marks – any 3 points)

Leaf	Leaflet
1. In case of leaves, bud or branch is present in the axil	1. It is absent in leaflets.
2. Leaves are arranged spirally and they are solitary in nature.	2. Leaflets are arranged in pairs.
3. Leaves lie in different planes.	3. Leaflets lie in the same plane.
4. Leaves are generally symmetrical at the bases. Eg. Digitalis, Belladonna, vasaka	4. Leaflets are asymmetrical at the bases. Eg. Senna, Neem, rose

b) Define antiseptic. Give biological source, chemical constituents of benzoin (1 mark each for definition, biological source, chemical constituents)

Antiseptics are chemical sterilizing substances which are used to kill pathogenic microbes or for prevention of their growth.

Biological source: Benzoin is a balsamic resin obtained from *Styrax benzoin*, *Styraceae* or *Styrax paralleloneurus* or *Styrax tonkinesis*. belonging to Family –*Styraceae*.

Chemical constituent: Free balsamic acids (benzoic & cinnamic acids) & their esters.

Also contain triterpenoid acids like sumaresinolic & siaresinolic acids.

Also contain vanillin & phenyl propyl cinnamate.

c) Write biological source and use of : i) Neem ii) Shatavari

(1 mark – biological source, ½ mark for any 1 use)

i) **Neem** : It is dried Leaves (aerial parts) & seed oil of *Azadirachta indica*, belonging to family *Meliaceae*.



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Uses: (any one)

Neem leaves & Neem oil used as antiseptics & insecticides & in skin diseases.

Also used as antifertility, antifungal & antimicrobial against gram+ve & gram-ve bacteria.

Also used in the treatment of AIDS.

ii) Shatavari : It is Dried roots & leaves of *Asparagus racemosus* belonging to **Family:**
Liliaceae

Uses : Used as galactagogue, tonic & diuretic

Shatavarin -I is possess antioxytotic property.

Oil of roots used in the treatment of rheumatism & in Nervine disorders.

d) Define sutures and ligatures. Write ideal requirement of sutures.(½ mark for each definition and 2 marks for any 4 requirements)

Sutures: 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.

Ligatures: Ligatures are used for tying the tissues.

Requirements

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 .



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e) Explain the significance of following in evaluation of crude drugs with suitable examples:

i) **Alcohol soluble extractives: (1 ½ marks)**

Alcohol is an ideal solvent for extraction of tannins and resins. 1.This method is used to determine the approximate resin content of drug.

2. This is an official method for assay in case of myrrh and asafoetida.

Drug	Alcohol soluble extractives (Not less than-NLT)
Asafoetida	NLT 45% w/w
Ginger	NLT 4.5% w/w
Benzoin	NLT 90% w/w (Siam benzoin) NLT 75% w/w (Sumatra benzoin)

ii) **Optical rotation: (1 ½ marks)**

Certain substances are found to have the property of rotating the plane of polarized light in pure state or in the solution.thus they are described to be optically active and this property is known as optical rotation.plane of polarized rotated towards right (dextrorotatory) or left (Laevorotary). Thus this method is used to determine the purity of the substance .

Drug	Optical Rotation
Clove oil	0° to -1.5°
Honey	+3° to - 15°
Caraway oil	+70° to +80°
Castor oil	Not less than +3.5°



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f) Define resin and resin combinations. Classify it with suitable examples.

(1/2 mark for the definition of resin , 1/2 mark for the definition of resin combinations ,1 mark for the classification of resin and 1 mark for the classification of resin combinations)

Resin : Resins are amorphous mixture of essential oils, oxygenated product of terpenes and carboxylic acid and found as an exudation from the trunk of trees.

Classification of resins:

1.Acid Resins- Acid is the main constituent of the resins.

e.g. Abiatic acid (colophony), Commiphoric Acid (Myrrh).

2.Ester Resins - Ester is the main constituent of the resins

e.g. Benzyl Benzoate (benzoin), Ethyl cinnamate(storax)

3.Resin Alcohol - The contents are the complex alcohols of high molecular weight. they are either in free state or as esters.

e.g. Peruresinotannol (peru balsam), Toluresinotannol(tolubalsam)

RESIN COMBINATION : Homogenous combinations of resins with other plant products like volatile oil, gum etc. are known as. resin combinations .

Classification of resin combinations:

1. Oleo resin -(volatile oil + resin) e.g. Ginger, capsicum etc

2. Oleo gum resin -(volatile oil + gum + resin) e.g. Asafoetida, Myrrh

3. Glycoresins (Sugar + resin) e.g. jalap , ipomoea

4. Balsam-(Benzoic acid +cinnamic acid) e.g. tolubalsam, peru balsam



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5 Answer any FOUR of the following: (3 marks each) (12)

a) Define and classify alkaloids with examples of crude drugs.(Definition 1 mark any 4 classes with examples 2 marks)

Alkaloids are basic nitrogenous organic compounds of plant origin, shows marked physiological action when administered internally. **OR**

These are organic products of natural or synthetic origin, which are basic in nature & contain one or more nitrogen atom, normally of heterocyclic nature & possess specific physiological action on human or animals.

TYPES OF ALKALOID	SOURCES
Tropane Alkaloid	Datura , cocca
Quinoline Alkaloid	Cinchona
Isoquinoline Alkaloid	Opium , ipecac
Indole Alkaloid	Rauwolfia , vinca
Phenanthrine Alkaloid	Opium
Purine Alkaloid	Coffee
Pyrone Alkaloid	Tobacco
Pyridine Alkaloid	Castor seeds
Imidazole Alkaloid	Pilocarpus
Steroidal Alkaloid	Kurchi
Terpenoidal Alkaloid	Aconite
Alkaloidal amine	Ephedra

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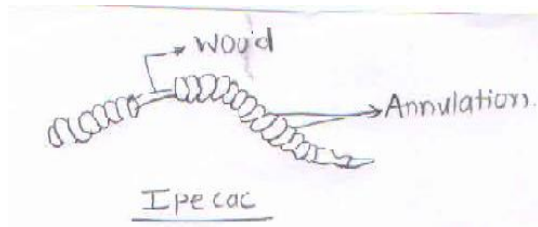
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**b) Write morphological characters of Ipecac, along with diagram
(for morphological characters 2 marks , for labeled diagram 1 mark,)**

Morphological characters -

- i) Size - Upto 150 mm in length and 6 mm in thickness
- i) Shape - Cylindrical
- ii) Colour - Brick red to dark brown
- iii) Odour - Faint
- iv) Taste - Bitter
- vi) Extra Features- Shows annulated rings and ridges. Fracture is short



**c) Define adulteration. Give various methods of adulteration with suitable examples.
(for definition 1 mark, 2 marks for any 4 methods with examples)**

Adulteration is the debasement of an article.

Methods of Adulteration :

1. Replacement by exhausted drugs

Ex.1.Exhausted saffron is coloured artificially

2.Exhausted Ginger is mixed with starch & coloured.



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2.Substitution with superficially similar but inferior drugs

Ex.1. Adulteration of cloves by mother cloves.

2. Saffron with dried flower of *Carthamus tinctorius*.

3.Substitution by artificially manufactured substituent

Ex.1. Paraffin wax is tinged yellow & substituted for yellow bees wax.

2. Artificial invert sugar is mixed with honey.

4.Substitution by sub- standard commercial varieties

Ex.1. *Capsicum frutescens*(*capsicum minimum*), substituted by *capsicum annum*.

2. Alexandrian senna with Arabian senna.

3. *Strychnos nux-vomica* adulterated with *Strychnos nux-blanda*/ *S. potatorum* seeds.

5. Presence of organic matter obtained from the same plant

Ex.1. clove are mixed with clove stalks.

2. Caraway & Anethum fruits are mixed with other parts of inflorescence

6.Synthetic chemical

Ex.1. Benzyl benzoate to balsam of peru.

2. Citral to oil of lemon grass.

7.Waste from market

Ex.1. Limestone in *asafoetida*.

2. Pieces of amber coloured glass in colophony.

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d) Which umbelliferous fruit mainly contains a chemical constituent linolol? Write its morphological characters with with diagram.

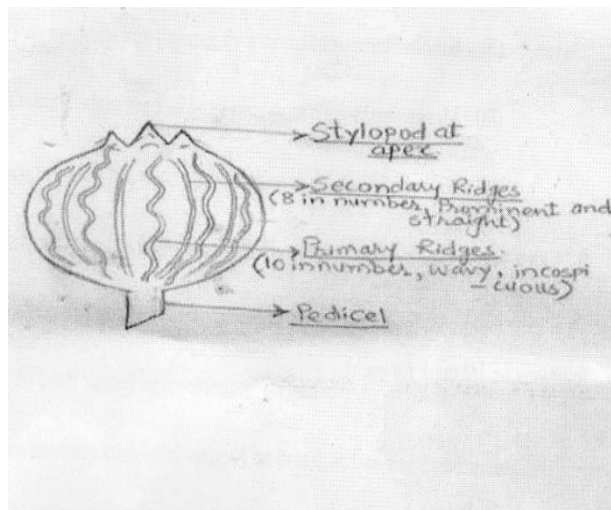
(1 mark each for name of the drug, diagram and morphological characters)

Name of drug containing Linolool is **Coriander**

Morphological characters -

- i) Size - 2 to 4 mm in diameter and 4 to 8 mm in length
- ii) Shape - subglobular
- iii) Colour - yellowish brown to brown
- iv) Odour - aromatic,
- v) Taste - spicy and characteristic
- vi) **Extra Features-** Pedicel at base. Primary ridges are straight and faint.

Secondary ridges are wavy and prominent A pair of stylopods at apex





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e) Define with examples of crude drugs (any three)

(Definition with example 1 mark each)

i) Oxytocics -Oxytocic is an agent that causes expulsion of the contents of uterus by contracting the uterine muscles.

e.g. - Ergot, vasaka

ii) Astringents - Astringents are the agents which precipitate proteins and causes contraction of smooth muscles.

e.g. – pale and black catechu, clove, cinnamon, Amla

iii) Carminatives - Carminatives are the drugs that expel gases from gastrointestinal tract by increasing peristalsis.

e.g. - Fennel, coriander, ginger, clove, **etc**

iv) Antitumor - Antitumor are the drugs which are used in the treatment of cancer.

e.g. - Vinca

f) Define diuretics. Write biological source, chemical constituents of punarnava.

(For definition 1 mark, for biological source and chemical constituents 1 mark each)

Definition - Diuretics are the drugs which increase the flow of urine.

OR

Diuretics are the drugs which increases the production and excretion of urine

Biological source of Punarnava-

It consists of fresh as well as dried herb of Boerhavia diffusa Family- Nyctaginaceae

Chemical constituents - Alkaloids like punarnavine, Salt - Potassium nitrate

Ursolic acid and oily substance



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Q.No.6. Write chemical tests for crude drugs (any FOUR) (16)

(4 marks for any 2 chemical tests of each drug)

a) Nux vomica

Test	Observation	Inference
T. S. of drug + ammonium vanadate + H ₂ SO ₄	Endosperm stained purple	Strychnine present
T. S. of drug + Pot. Dichromate + H ₂ SO ₄	Endosperm stained Violet color	Strychnine present
T. S. + Conc. HNO ₃	Endosperm stained Yellow to Orange	Brucine present
T.S + test solution of Thionine ,wait for 10 mins wash with alcohol	Bluish violet	Lignified cells

b)Turmeric

- i) Powdered drug with sulphuric acid gives crimson colour.
- ii) Powdered drug with Alkali gives crimson colour.
- iii) Aqueous solution of drug with boric acid produce reddish colour which on addition of alkali changes to greenish blue.
- iv) With acetic anhydride & conc. sulphuric acid, it gives violet colour. This test under UV light red fluorescence is seen.



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v) Prepare tincture of turmeric & impregnate a filter paper with it. Treat same paper with borax solution, green colour is produced.

c) Shark liver oil.

1. Dissolve 1 gm of Shark liver oil in 1ml of Chloroform And treat with 0.5 ml of H_2SO_4 . It acquires light violet colour changing to purple and finally to brown due to Vit. A

2. Dissolve the drug in 10 ml of Chloroform and treat with saturated solution of antimony trichloride in chloroform ,Shake it well , A blue color is develop due to Vit A

d) Datura

1. **Vitali- Morin Reaction:** The tropane alkaloid is treated with fuming nitric acid, followed by evaporation to dryness and addition of methanolic potassium hydroxide solution to an acetone solution of nitrated residue.violet colouration takes place due to tropane derivatives.

2. On addition of silver nitrate solution to solution of hyoscine hydrobomide ,yellowish white precipitate is formed,which is insoluble in nitric acid but soluble in dil. Ammonia.

e) Wool

i)Wool is insoluble in 66% sulphuric acid , concentrated hydrochloric acid & cuoxam.

ii) when lead acetate is added to solution of wool in caustic soda, a black ppt is formed owing to high sulphur content.

iii) Wool hairs are stained with ammonical copper oxide solution.

iv) Wool hair is soluble in 1.25M sodium hydroxide solution.

v) moisten wol with N/50 iodine solution followed by drop of 8% w/w sulphuric acid solution, yellow colour is produced.

vi) Warm with picric acid solution, permanent yellow colour is produced.

vii) warm with millon's reagent, red stain is produced.



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f) Acacia:

1. Solution of Lead sub acetate gelatinized aq. solution of acacia.
2. Acacia does not produce pink colour with ruthenium red.
3. An aq. Solution of acacia when treated with H_2O_2 and benzidine in alcohol produces a blue colour due to Oxidase Enzyme.
4. An aq solution of acacia is boiled with dil HCl acid. After cooling Fehlings solution A and B are added, in equal quantity a red ppt. is produced
5. To an aq. Solution of acacia add N/50 iodine solution does not produce crimson red colour.