



**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 anyequivalent 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.



Q. No.	Sub Q. N.	Answer	Marking Scheme
1		<b>Answer any <u>EIGHT</u> of the followings: ( 2marks each)</b>	<b>16M</b>
1	a)	<p><b>What is Ayurveda? Describe contribution of “ Sushrut” in Indian History.( 1mark each for description of Ayurveda and contribution of “ Sushrut )</b></p> <p>It is the ancient system of medicine in India .The word Ayurveda is derived from Ayus ( r ) ,meaning life and Veda, meaning knowledge .In Ayurveda there is a supposition that everything 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”.</p> <p>The seven forms of Tri dosh are called as ‘SAPTADHATU’. These saptadhatu undergo wear and tear processes and form excretory material or mala.</p> <p>Sushrut was an Indian physician and surgeon. He knew about 1500 formulations of natural products obtained from plants, animals and minerals. He used to operate on various systems and organs in human body and animals. His collection is known as "Sushrutsamhita"</p>	<b>2M</b>
1	b)	<p><b>Why Saponin glycosides are not safe for intravenous administration ?</b></p> <p>When Saponin glycosides are dissolved in water colloidal solutions are formed.</p> <p>When the solution of saponin glycosides is administered intravenously, it comes in contact with blood, causing haemolysis. The haemolysis is harmful for the health of a patient. Therefore saponin glycosides are not safe for intravenous administration.</p>	<b>2M</b>
1	c)	<p><b>Define and write one example of ( ½ mark each for- definition and any one example)</b></p> <p><b>i)Antiseptic</b></p> <p><b>ii) Diuretics</b></p> <p><b>i) Antiseptics:</b> Antiseptics are the chemical sterilizing agents which are used to prevent sepsis or which prevent the growth of pathogenic microbes</p> <p><b>Example ( any one ) – Benzoin, Myrrh, Curcuma (Turmeric),Neem,</b></p> <p><b>ii) Diuretics:</b> Diuretics are the drugs which increases the flow of urine.</p>	<b>2M</b>

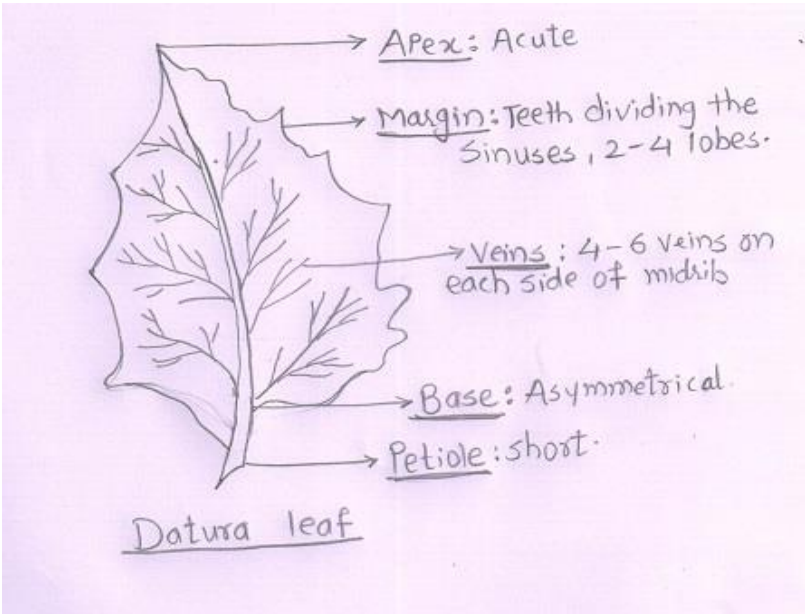


		<b>OR</b>  Diuretics are the drugs which increase formation and excretion of urine.  <b>Example ( any one )-</b> Gokhru / Punarnava	
<b>1</b>	<b>d)</b>	<b>Which parts of the plant is used as a drug in case of, (½ mark for each)</b>  i) <b>Aloe</b> – Dried juice ii) <b>Gymnema</b> – Dried leaf iii) <b>Coriender</b> – Dried or fresh Fruit i) <b>Rauwolfia</b> – Dried Roots	<b>2M</b>
<b>1</b>	<b>e)</b>	<b>Write the name of drug for which each of following chemical test is applicable ( ½ mark each )</b>  i) <b>Borntrager Test-</b> Senna, Rhubarb ii) <b>Klunge’s test</b> – Aloe iii) <b>Fiehe’s test</b> – Honey iv) <b>Keller-Killiani test</b> – Digitalis	<b>2M</b>
<b>1</b>	<b>f)</b>	<b>Define Pharmacognosy. Give the contribution of Hippocrates.( 1mark each for definition and contribution )</b>  <b>Definition:</b> 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.  <b>Hippocrates:</b> 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.	<b>2M</b>
<b>1</b>	<b>g)</b>	<b>Give any four characteristics features of Umbelliferous fruits ( ½ mark for each feature)</b>  1. Schizocarp (splliting fruits)- Dry fruits from syncarpus 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	<b>2M</b>



		<p>4. Primary ridges are 5 or more runs from apex to base.</p> <p>5. Each mericarp has a disc like structure at the apex called as stylopod.</p> <p>6. Each mericarp has 2 surfaces</p> <p style="padding-left: 40px;">a) Outer dorsal or curved surface</p> <p style="padding-left: 40px;">b) Inner ventral or commissural surface.</p> <p>7. Presence and number of vittae ( oil ducts ) is characteristics feature of umbelliferous fruits. For example in case of Fennel, each mericarp contains 6 vittae- 4 on dorsal surface and 2 on commissural surface.</p> <p>8. Each mericarp contains a single seed.</p> <p>9. All umbelliferous fruits contain Volatile oil.</p>	
<b>1</b>	<b>h)</b>	<p><b>Mention the synonym of following drugs. ( ½ mark for each synonym. Any one of the mentioned synonyms for respective drug)</b></p> <p>(i) <b>Asafoetida:</b> Hing, Devil's dung, Gum asafoetida</p> <p>(ii) <b>Dioscorea:</b> Yam, Rheumatism root</p> <p>(iii) <b>Castor oil :</b> Oleum ricini, Erand ka tel</p> <p>(iv) <b>Cinnamon :</b> Kalmi –dalchini , Ceylon cinnamon, Cinnamon bark</p>	<b>2M</b>



1	i)	<p><b>Draw a well labelled diagram showing morphological characters of “ Datura leaf”.</b></p>  <p><b>Datura leaf</b></p>	2M
1	j)	<p><b>Name the family of following crude drugs : (½ mark each)</b></p> <ul style="list-style-type: none"><li>(i) <b>Colchicum - Liliaceae</b></li><li>(ii) <b>Ashwagandha- Solanaceae</b></li><li>(iii) <b>Ginger - Zingiberaceae</b></li><li>(iv) <b>Tragacanth - Leguminosae</b></li></ul>	2M
1	k)	<p><b>Suggest the drug containing following chemical constituents : (½ mark each)</b></p> <ul style="list-style-type: none"><li>i) <b>Reserpine – Rauwolfia</b></li><li>ii) <b>Rhein – Rhubarb , Aloe ( any one)</b></li><li>iii) <b>Bassorin – Tragacanth</b></li><li>iv) <b>Quinine , quinidine - Cinchona</b></li></ul>	2M



1	1)	<p><b>Differentiate between organised crude drug and unorganised crude drug.(Any 4 points for 2 marks,i.e ½ marks for each point)</b></p> <table border="1" data-bbox="248 573 1417 1697"><thead><tr><th data-bbox="248 573 762 658"><b>Organized crude drug</b></th><th data-bbox="762 573 1417 658"><b>Unorganized crude drug</b></th></tr></thead><tbody><tr><td data-bbox="248 658 762 1697"><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></td><td data-bbox="762 658 1417 1697"><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></td></tr></tbody></table>	<b>Organized crude drug</b>	<b>Unorganized crude drug</b>	<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>	2M
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2		<b>Attempt any THREE of following (4 marks each)</b>	12M				
2	a)	<p><b>Explain the chemical method of classification with its merits and demerits</b></p> <p><b>Chemical method of classification of crude drugs: ( 2 marks for any 4 classes with example, 1 mark each for merits and demerits)</b></p> <p>This type of classification is based on type of chemicals present in the drugs. For example</p>	4M				



Class	Examples
1. Alkaloids	Aconite, cinchona, nux-vomica, vinca, ipecac, belladonna, opium , tea
2. Glycosides	Digitalis, senna, squill, aloe, dioscorea, liquorice, wild cherry.
3. Lipids	Castor oil. Peanut oil, mustard, wool fat, cod -liver oil.
4. Volatile oils	Peppermint, clove, eucalyptus, valerian.
5. Tannins	Myrobalan, kino, catechu, galls
6. Vitamins	Yeast, cod –liver oil, shark-liver oil
7. Resin and resin combinations	Benzoin, balsamof tolu, storax, asafoetida, myrrh , colophony, guggul , shellac.
8. Carbohydrates and derived products	Agar, honey, starch, tragacanth, acacia, Guar gum, sterculia.

**Merits: ( 1 mark)**

1. This type of classification is applicable to crude drugs containing similar type of chemicals.
2. It is useful for phytochemical studies of crude drugs.

**Demerits: ( 1 mark)**

1. This type of classification fails in proper placement of drugs containing two different types of chemicals.

e.g- Certain drugs contain alkaloids and glycosides (Cinchona), Fixed oil and volatile oil (nutmeg), Fixed oil and enzyme( Bitter almond). Hence makes it difficult to categorize them properly.

2. The drugs from various sources are grouped together.

**2****b)**

**Define Pharmaceutical aids. Give the classification of it with examples.( 1 mark – Definition , 3 marks for any 6 classes 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.

**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, psylliumhusk, microcrystalline cellulose.
4	Diluents	Cinnamon water, peppermint water, corneal oil, peanut oil, wild cherry syrup, sesame oil, glucose, lactose
5	Emulsifying & suspending agent	Acacia, agar, gelatin, alginic acid, bentonite, methylcellulose, 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.

**4M**





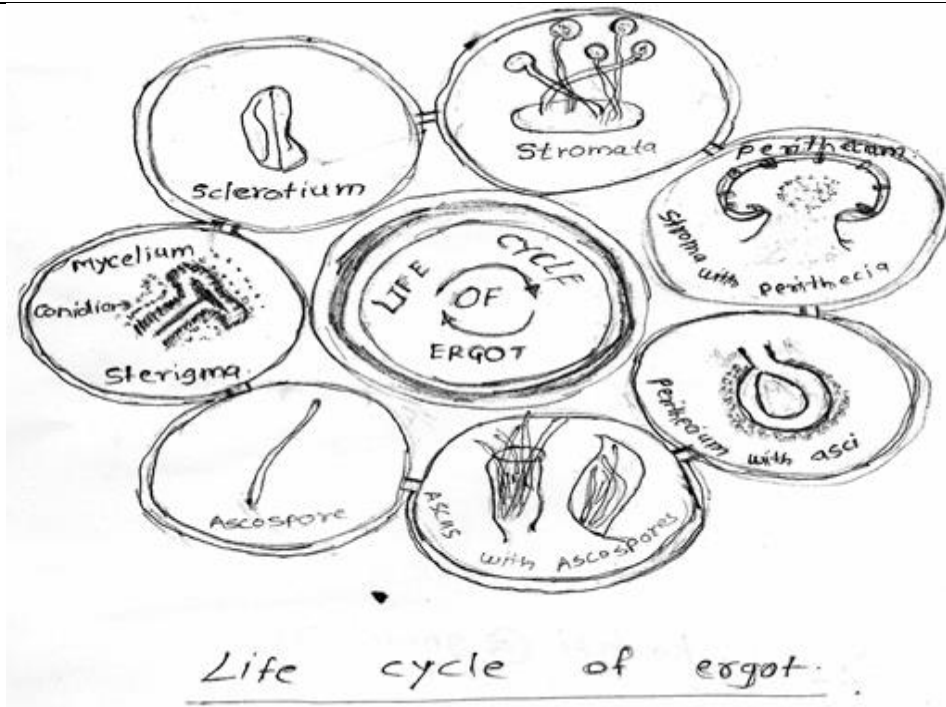
		12	Ointment bases	Bees wax ,lanolin ,polyethylene glycol, paraffin, petroleum jelly, spermaceti, wool fat	
		13	Thickening agents	Pectin, tragacanth, methyl cellulose.	
		14	vehicles	Arachisoil, honey ,sesame oil	
2	c)	<b>Describe method of cultivation ,collection and preparation for market of opium</b> <b>Cultivation of Opium: ( 2 marks)</b>  Being narcotic drug, its cultivation, processing and marketing are controlled by narcotic Commissioner of India. Cultivation is done by sowing seeds by broadcasting method. About 3 to 4 kg of seeds per hector are required. They are mixed with sand and are sown. Distance of 25cm between two plants is maintained. Maximum height of plant is 1m.  <b>Collection and preparation of opium: ( 2 marks)</b>  Collection starts late in February and may extend up to May. Unripen capsules which change colour green to yellowish in winter are incised in afternoon vertically from top to bottom of capsules. Whitish pink 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 alternate days till no more latex is left. When sufficient latex is collected, it is kneaded into balls that are wrapped in poppy leaves and dried in the shade.			4M
2	d)	<b>What are Volatile oil? What are the methods of extraction of volatile oil.( 1 mark for definition of volatile oil , 3 marks for any three methods of extraction)</b>  Volatile oils are odorous and colourless principles of plants and animal sources, which are evaporated when exposed to air.  <b><u>Methods of extraction:</u></b>  <b>A) Distillation :</b>  Most of the oils are obtained by distillation which are of following 3 types  <b><u>1. Water distillation</u></b> -is mostly applicable to such plant material, which is dried initially in air and the constituents are not degraded by boiling upto 100 <sup>0</sup> C			4M



	<p>e.g Turpentine oil</p> <p><u>2. Water and steam distillation</u> – It is often suitable for such plant material whether fresh or dried the constituents of which undergo degradation by direct boiling e .g Clove oil</p> <p><u>3. Direct steam distillation</u>- it is invariably applicable to fresh drugs that is loaded with sufficient natural moisture and hence no maceration is required e.q. peppermint oil.</p> <p><b>B) Solvent Extraction :</b></p> <p>Extraction is done by using some organic solvents like ether, benzene, petroleum etc.</p> <p><b>C) Ecuelle Method:</b> In this method the oil cells of the citrus fruits are ruptured mechanically using pointed projections and thus citrus oil is extracted.</p> <p><b>D) Enfleurage Method:</b> 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.</p>	
2	<p>e) <b>Write the name of the drug which passes the following Chemical test and explain it.</b></p> <p><b>( ½ mark for name of the drug and 1 ½ mark description of the test)</b></p> <p>i) <b>Vitali –Morin test</b></p> <p>ii) <b>Swelling factor test</b></p> <p>a) <b>Vitali –Morin test : Datura , Hyocyamus, Belladonna ( any 1 example )</b></p> <p>The tropane alkaloid is treated with fuming nitric acid, followed by evaporation to dryness and to the residue methanolic potassium hydroxide solution is added .It gives a bright purple (violet) colouration that changes to red and finally fades to colourless.</p> <p><b>b) Swelling factor test: Isapghula</b></p> <p>It is determined by putting 1 g of the drug in 25ml of measuring cylinder. Add 20 ml of water with occasional shaking, keep it for 24hrs. After 24hrs, the seeds swell. The volume occupied by seeds is the swelling factor.</p>	4M



<b>3</b>		<b>Attempt any THREE of following(4 marks each)</b>	<b>12M</b>
<b>3</b>	<b>a)</b>	<p><b>Describe life cycle of Ergot (diagram 2marks &amp; explanation 2 marks)</b></p> <p>Stages of life-cycle are as</p> <ul style="list-style-type: none"><li>i) Over wintering stage</li><li>ii) Stage of sexual reproduction</li><li>iii) Stage of asexual reproduction</li></ul> <p>The sclerotia are produced in late summer. They fall on the ground in autumn. When the favourable conditions for germination are available, these sclerotia germinate in the spring to produce purple coloured stalks which on further growth form flattened spherical cavities known as perithecia. Each perithecium contains several asci. Each ascus contains eight threads like ascospores. Ascospores come out &amp; get dispersed by air. The dispersal of ascospores takes place at time of flowering of rye plant. Ascospore become entangled with the stigma of host &amp; produce mycelia which penetrate through ovary. The mycelia give rise to conidia, produced from the surface of ovary. Honey –dew attracts insects, along with it conidia are carried from one place to another by insects &amp; is known as honey –dew stage.</p> <p>In second stage, hyphae penetrate deeply into the ovary &amp; develop into mass covering entire ovary which results in formation of elongated sclerotium &amp; known as sclerotium stage. Sclerotium develops , attains maximum size &amp;</p> <p>falls on ground and the cycle begins.</p>	<b>4M</b>



3

b) Write the synonyms, biological source of (any two) ( 1 mark each for synonyms and biological source)

4M

i) **Liquorice**

**Synonym:** Liquorice root, Glycyrrhiza, Mulethi

**Biological Source:** It consist of dried peeled or unpeeled roots and stolon of the plant Glycyrrhiza glabra, Family: Leguminosae

ii) **Gokhru :**

**Synonym:** Puncture vine

**Biological source :** Gokhru consist of dried ripe fruits of plant Tribulus terrestries

**Family:** Zygophyllaceae. **OR**

Gokhru consist of dried ripe fruits of plant Pedallium murex Linn. Family: Pedaliaceae



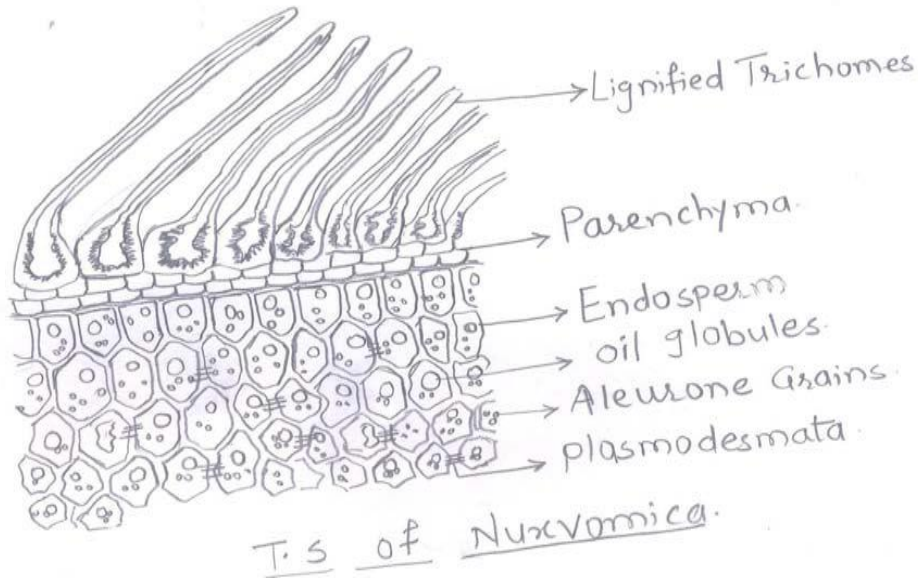
		<p><b>iii) Sandalwood :</b></p> <p><b>Synonym:</b> Yellow sandal wood, Lignum Santali, chandan</p> <p><b>Biological source:</b> Sandalwood consists of dried heart wood of Santalum album</p> <p>Family: Santalaceae.</p>	
<b>3</b>	<b>c)</b>	<p><b>What is Ash value? Write its types and give the importance of ash value in evaluation of drug.( 1 mark for Ash value, 2 marks for Types and 1 mark for Importance)</b></p> <p>The residue remaining after incineration is the ash content of the drug which is called as ash value.</p> <p><b><u>Types of Ash</u></b></p> <p><b>1) Total ash:</b> Total ash is the inorganic ash obtained on incineration of the drug and it consist of carbonates, silicates, phosphate and silica.</p> <p><b>2) Acid insoluble ash:</b> This is a part of total ash insoluble in dilute HCL.</p> <p><b>3) Water soluble ash:</b> it is used to detect presence of material exhausted by water in the genuine drug.</p> <p><b>4) Sulphated ash value:</b> it is calculated by incinerating the powdered drug at a temp of about 600<sup>0</sup>C with dil H<sub>2</sub>SO<sub>4</sub> before ignition due to this process all the oxides and carbonate are converted to sulphated salt.</p> <p><b>Importance of ash value:</b></p> <p>Ash content simply represents the inorganic salts naturally occurring in drug or adhering to drug or deliberately added to it as a form of adulteration. Therefore it is a criterion to judge the identity or purity of crude drugs.</p> <p>It indicates to some extent the care taken in the collection and preparation of the drug .</p>	<b>4M</b>
<b>3</b>	<b>d)</b>	<p><b>Mention the adulterants and substituents of (any two) ( 1 mark each for adulterants and substituents)</b></p> <p><b>i) <u>Digitalis</u></b></p> <p><b>Adulterants: ( any 2 for 1 mark)</b></p> <p>1) Verbascum Thapsus</p> <p>2) The Primrose leaves</p> <p>3) Comfrey leaves</p>	<b>4M</b>



	<p><b>Substituents: ( any 2 for 1 mark)</b></p> <ol style="list-style-type: none"><li>1) Digitalis lanata</li><li>2) Digitalis lutea or straw foxglove</li><li>3) Digitalis thapsi or Spanish foxglove</li></ol> <p><b>ii) <u>Clove</u></b></p> <p><b>Adulterants: ( 1 mark)</b></p> <ol style="list-style-type: none"><li>1) Clove stalks</li><li>2) Exhausted cloves</li></ol> <p><b>Substituents:( 1 mark)</b></p> <ol style="list-style-type: none"><li>1) Mother clove</li><li>2) Blown cloves</li></ol> <p><b>iii) <u>Nux- Vomica</u></b></p> <p><b>Adulterants:( 1 mark)</b></p> <ol style="list-style-type: none"><li>1) Strychnos nuxblanda</li><li>2) Strychnos potatorum</li></ol> <p><b>Substituents:( 1 mark)</b></p> <ol style="list-style-type: none"><li>1) Strychnos wallichiana</li><li>2) Strychnos ignatii</li></ol>	
<b>3</b>	<p><b>e) Give the chemical constituents and uses of (any two) ( 1 mark for chemical constituents and 1 mark for uses)</b></p> <p><b>i) <u>Sandalwood</u></b></p> <p><b>Chemical constituents:</b> It contains volatile oil about 2.5% called sandalwood oil. Sandalwood oil contains about 95% terpene alcohols such as <math>\alpha</math> – santalol and <math>\beta</math> – santalol. It also contains an aldehyde such as santalal, santene, santanone.</p> <p><b>Uses:</b></p> <p>It is used as a source of sandal wood oil. The wood is utilised for the purposes like carving and manufacturing of boxes. It is also used in cosmetics and perfumery industry</p> <p><b>ii) <u>Vasaka leaf</u></b></p> <p><b>Chemical constituents:</b> It contains very small amount of essential oil and quinazoline alkaloids such as vasicine and vasicinone. It also contains yellow colouring matter and vasakin, non-nitrogenous crystalline substances.</p> <p><b>Uses:</b> It is used as an expectorants, bronchodilator and as mild bronchial antispasmodic.</p>	<b>4M</b>



		<p>Vasicine is reported to possess oxytocic action</p> <p>iii) <b>Garlic</b></p> <p><b>Chemical constituents:</b> Garlic bulbs contain 29% carbohydrate, about 56% protein, 0.1% fat, mucilage and phosphorus, iron and copper.</p> <p>Also contain volatile oil- allyl propyl disulphide, diallyl disulphide, alliin and allicin. Alliin, by the action of enzyme allinylase, is converted into allicin.</p> <p><b>Uses:</b> Garlic is used as carminatives, aphrodisiac, expectorant, stimulants and disinfectant in the treatment of pulmonary conditions. It also used as condiments. Oil of garlic is used as anthelmintic, rubifacient and useful in high blood pressure and atherosclerosis. Allicin is antibacterial.</p>	
<b>4</b>		<b>Attempt any THREE of following(4 marks each)</b>	<b>12M</b>
<b>4</b>	<b>a)</b>	<p><b>Draw a well labelled diagram of T. S. of Nux- Vomica seed and describe the same.</b></p> <p><b>(2marks for Description and 2 marks for Diagram with labels)</b></p> <p><b>1.TESTA:</b></p> <p>Lignified trichomes: Thick walled, bent and twisted lignified trichomes, immersed from epidermis, parallel in one direction. Length: 600 to 1000, diameter about 25<math>\mu</math></p> <p>Epidermal cell: Single layer, forms lignified trichomes, large thick walled with oblique linear pits (base of trichomes). Collapsed parenchyma: 2 layers, flattened parenchyma.</p> <p><b>2. ENDOSPERM:</b></p> <p>Thick walled cellulosic parenchymatous cells. Cell shows hemicelluloses in the cell wall and following characteristics:</p> <p>Plasmodesma: fine protoplasmic strands between the walls of endospermic cells.</p> <p>Aleurone grains: About 30<math>\mu</math> in diameter. Only globoids are presents.</p> <p>Oil globules: fixed oils as small oil droplets in the cells.</p>	<b>4M</b>



T.S of Nuxvomica.

4	b)	<p><b>Define Sutures and Ligature. Write the ideal requirements of Surgical dressings. ( 1mark for each definition and 2 marks for any 4 requirements)</b></p> <p><b>Sutures:</b> Sutures are sterile thread like strings or strands specially prepared for sewing, stitching tissues like skin, muscles, tendons etc. by a needle.</p> <p><b>Ligatures:</b> Ligatures are sterile thread like strings or strands specially prepared for tying the broken blood vessels. <b>OR</b></p> <p>A ligature consists of a piece of thread tied around an anatomical structure, usually a blood vessel or another hollow structure to shut it off.</p> <p><b>Ideal requirements : (any 4)</b></p> <ol style="list-style-type: none"><li>1. They should be sterilized before use.</li><li>2. They should be stored in dry well- ventilated place at a temperature not exceeding 25<sup>0</sup>C.</li><li>3. They should be used with permitted antiseptics in prescribed concentration only.</li><li>4. They should not be dyed unless mentioned in the monograph.</li><li>5. Adhesive products should not be allowed to freeze.</li><li>6. There should not be any loose threads, fibre-ends in dressings</li></ol>	4M
4	c)	<p><b>Differentiate between ( 2marks each for any 4 differentiating points)</b></p>	4M





**i) Gum and mucilage :( 2marks)**

**ii) Leaf and leaflet :( 2marks)**

<b>Gum</b>	<b>Mucilage</b>
1)These are pathological products	1)These are normal products
2) Gums are produced outside the cells of plant by process “Gummosis.”	2) Mucilages are produced inside the cells of plant.
3)These are plant exudates	3)These are not plant exudates
4)Gives no red colour with ruthenium red	4)Gives red colour with ruthenium red
5)Gums are plant hydrocolloids	5)Mucilages are esters of sulphuric acid
6) They form viscous adhesive solution with water. Ex Acacia, Tragacanth,Guar gum etc	6) It forms slimy masses with water.  Ex. Isapghula

<b>Leaf</b>	<b>Leaflet</b>
1)Lamina is one entire piece	1)Lamina is completely divided into separate segment called leaflets
2) In case of leaf, bud or branch is present in the axil.	2) It is absent in leaflets.
3) Leaves are arranged spirally and they are solitary in nature.	3) Leaflets are arranged in pairs.
4) Lamina lie in different planes.	4) Lamina lie in one planes.
5) Lamina generally symmetrical at the base. .Ex. Digitalis, Belladona, Vasaka	5) Lamina is asymmetrical at the base. Ex. Senna, Neem

**4**

**d) Define Antirheumatic. Give the example of it and write biological source, chemical constituents of any one drug. ( 1mark each for Definition, any 2 examples , biological source and chemical constituents )**

**Definition :** The drugs used to relieve or used in the treatment of rheumatism are known as antirheumatics. ( **1 mark**)

**Examples:** Indian Bdellium ( Guggul ), Indian colchicum, Colchicum corm ( **1 mark**)

**4M**



	<p><b><u>Indian Bdellium ( Guggul )</u></b></p> <p><b>Biological source:</b> It is the oleo- gum- resin obtained by the incision of the bark of the plant Commiphora weightii( Commiphora mukul), Family: Burseraceae.</p> <p><b>Chemical constituents:</b> It contains approximately 60% gum, 30% resin, around 1.5% Volatile oil, 5% moisture, 3-4% foreign organic matter. Volatile oil contains myrcene, dimyrcene, polymyrcene and caryophyllene. The resin contains therapeutically active steroids called z-guggulsterone and e-guggulsterone.</p> <p>Resin also contains sterols known as guggulsterol I,II and III.</p> <p style="text-align: center;"><b>OR</b></p> <p><b><u>Indian Colchicum</u></b></p> <p><b>Biological source:</b> It consist of dried seeds of the plant Colchicum luteum, Family: Liliaceae</p> <p><b>Chemical constituents:</b> The alkaloids present in the drug are colchicine and demecolcine.It also contains colchicoresin, starch and 5% fixed oil.</p> <p style="text-align: center;"><b>OR</b></p> <p><b><u>Colchicum Corm</u></b></p> <p><b>Biological source:</b>It consists of fresh and dried corms of Colchicum autumnale, Family: Liliaceae.</p> <p><b>Chemical constituents:</b>The main alkaloid present in the drug is colchicine.It also contain demecolcine, colchocoresin, colchicoside (colchicum glucoside), starch, gum, tannins, sugar, colouring matter and fat .</p>	
<b>4</b>	<p>e) <b>Define “Drug Adulteration”. Describe any four methods of adulteration with suitable examples. ( 1 mark for definition and 3 marks for methods of adulteration)</b></p> <p><b>Definition:</b> Adulteration is the debasement of an article.</p> <p><b>Methods of Adulteration :</b></p> <p><b>1. Replacement by exhausted drugs</b></p> <p>Ex. a).Exhausted saffron is coloured artificially</p> <p style="padding-left: 40px;">b)Exhausted Ginger is mixed with starch &amp; coloured.</p> <p><b>2.Substitution with superficially similar but inferior drugs</b></p> <p>Ex.a). Adulteration of cloves by mother cloves.</p> <p style="padding-left: 40px;">b). Saffron with dried flower of carthamus tinctorius.</p> <p><b>3.Substitution by artificially manufactured substituent</b></p> <p>Ex.a) Paraffin wax is tinged yellow &amp; substituted for yellow bees wax.</p>	<b>4M</b>



		<p>b). Artificial invert sugar is mixed with honey.</p> <p><b>4.Substitution by sub- standard commercial varieties</b></p> <p>Ex. a) capsicum frutescens ( capsicum minimum), substituted by capsicum annum.</p> <p>b) Alexandrian senna with Arabian senna.</p> <p>c) Strychnos nux-vomica adulterated with Strychnos nux-blanda/ S. potatorum seeds.</p> <p><b>5. Presence of organic matter obtained from the same plant</b></p> <p>Ex .a) clove are mixed with clove stalks.</p> <p>b) Caraway &amp;Anethum fruits are mixed with other parts of inflorescence</p> <p><b>6.Synthetic chemical</b></p> <p>Ex. a) Benzyl benzoate to balsam of peru.</p> <p>b) Citral to oil of lemon grass.</p> <p>c) Camphor oil and eucalyptus oil in oil of rosemary.</p> <p><b>7.Waste from market</b></p> <p>Ex .a) Limestone in asafoetida.</p> <p>b) Pieces of amber coloured glass in colophony.</p> <p>c) White oil in oil of Coconut.</p> <p>d) Stearin or paraffin in cocoa butter.</p>	
<b>5</b>		<b>Attempt any THREE of following (4 marks each)</b>	<b>12M</b>
<b>5</b>	<b>a)</b>	<p><b>Define fibres. Describe the method of preparation of cotton fibre.( 1mark for definition, 3 marks for method of preparation.)</b></p> <p><b>Definition-</b> Fibres are elongated thick walled cells with pointed ends, cell walls of which may consist of cellulose and may or may not contain lignin.</p> <p><b>Method of preparation:</b> The plant after flowering bears fruits known as capsules. Each capsule contains numerous seeds. The seeds covered with hairs are known as bolls. The bolls are collected, dried and taken to the ginning press, wherein the trichomes are separated from the seeds. Various devices are used to separate short and long hairs.</p> <p>The hairs with short length are known as linters and are used in the manufacture of absorbent cotton, while long hairs are used in the preparation of cloth .The raw cotton obtained in this way is full of impurities, like wax, fat, colouring matter, vegetable debris etc. It is processed to get rid of most of the impurities. It is taken to the machine known as cotton opener and followed by treatment with dilute soda solution or soda ash solution under pressure for about</p>	<b>4M</b>



		10 to 15 hours. The wax, fatty material and colouring matter are removed by this treatment. It is then washed with water and treated with suitable bleaching agent. It is again washed with water, dried and carded into flat sheets. It is finally packed into wrappers and sterilized.	
5	b)	<p><b>Define the following with example: ( ½ mark for each definition , ½ mark for any one example each)</b></p> <p>(i) <b>Antihypertensives</b></p> <p>(ii) <b>Antileprotics</b></p> <p>(iii) <b>Enzymes</b></p> <p>(iv) <b>Antitussives.</b></p> <p>(i) <b>Antihypertensives</b> : The medicaments given in the treatment of high blood pressure are known as antihypertensive drugs. <b>Example-</b> Rauwolfia root.</p> <p>(ii) <b>Antileprotics</b> : The drugs used in the treatment of leprosy are known as antileprotics. <b>Example-</b> Chaulmoogra oil.</p> <p>(iii) <b>Enzymes</b>: Enzymes are protein substances, which serve a role of catalyzing the biochemical reactions. <b>Example-</b> Papain (Papaya), Diastase, Yeast.</p> <p>(iv) <b>Antitussive</b>: Antitussives are the agents which act upon the pulmonary membranes that hasten or alter expectoration. <b>OR</b></p> <p>These are the agents which relieves or suppresses the cough.</p> <p><b>Example-</b> Vasaka, Tulsi, Tolu balsam.</p>	4M
5	c)	<p><b>What are vitamins? Describe biological source, chemical constituents and uses of drug containing vitamin 'C'. (1 mark for definition, 1mark each for biological source, chemical constituents and any two uses.)</b></p> <p>Vitamins are the substances which are considered to be essential for the maintenance of normal metabolic functions, but are not synthesized by human body on its own, and hence to be supplied from outside sources. ( 1 mark)</p>	4M



	<p><b>Amla :</b></p> <p><b>Biological Source :</b> This consist of dried as well as fresh fruits of the plant <i>Emblica officinalis</i> , belonging to the family Euphorbiaceae. ( <b>1 mark</b>)</p> <p><b>Chemical constituents :</b> Amla fruit is a rich natural source of vitamin c and contains 600 to 750mg per hundred gram of the fresh pulp. It also contains about 0.5% fat, phyllembelin and 5% tannin. Amla fruits are also rich in mineral matters like phosphorus, iron and calcium. Amla also contains pectin. ( <b>1 mark</b>)</p> <p><b>Uses: ( 1 mark for any 2 uses)</b></p> <ol style="list-style-type: none"><li>1) Amla fruits are used as a source of vitamin C.</li><li>2) It is used as an acrid, diuretic, refrigerant and laxative.</li><li>3) Dried fruits are also given in diarrhoea and dysentery.</li><li>4) Amla is also administered in jaundice, dyspepsia and anaemia along with iron compounds.</li><li>5) Amla fruits are also used in preparation of inks, hair oils and shampoo.</li><li>6) Seeds of amla fruits are given in treatment of asthma and bronchitis. Alcoholic extract of the fruit is anti-viral.</li><li>7) It is one of the ingredients of 'Triphala' and 'Chyavanprash'.</li></ol>	
<b>5</b>	<p><b>d) Define resin. Classify resin combination with example. ( 1 mark for definition, 1 mark each for any three resin combination with example )</b></p> <p><b>Resin:</b> Resins are amorphous products of complex chemical nature. These are amorphous mixtures of essential oil, oxygenated products of terpenes and carboxylic acids found as exudation from the trunk of various trees.</p> <p><b>Classification of Resin combination:</b> The homogenous combination of resin with other plant products like volatile oils, gums etc. are known as Resin combination.</p> <p><b>i) Oleoresin:</b> Resin and volatile oil in homogenous mixture.</p> <p>Example- Copaiba, Canada balsam, ginger, capsicum.</p>	<b>4M</b>



	<p><b>ii) Oleo-gum-resin</b> : The homogenous mixture of volatile oil , gum and resin.</p> <p>Example- Myrrh, Asafoetida.</p> <p><b>iii) Glycoresin</b> : The homogenous mixture of resin and sugar.</p> <p>Example- Jalap, Ipomoea.</p> <p><b>iv) Balsam</b>: If resin contains benzoic acid and / or cinnamic acid it is called balsam.</p> <p>Example- Balsam of tolu, balsam of peru, benzoin.</p>	
<b>6</b>	<p><b>Write chemical tests of crude drugs (any Four): (4 mark for each drug)</b></p> <p><b>a) Benzoin</b></p> <p><b>b) wool</b></p> <p><b>c) Starch</b></p> <p><b>d) Gelatin</b></p> <p><b>e) Acacia</b></p> <p><b>f) Pale catechu</b></p>	<b>16M</b>
<b>6</b>	<p><b>a) Benzoin: ( 1 mark for each test)</b></p> <p>1. Alcoholic solution of benzoin with water gives milky white solution, which is acidic to litmus.</p> <p>2. Heat the small quantity of benzoin in a dry test tube covering opening of test tube with a glass plate. Examine the glass plate under microscope. The crystals of cinnamic acid is observed.</p> <p>3. To 2.5 g of benzoin, add 10 ml of ether, shake it well and pour 2 to 3 ml of this extract in a porceline dish, add 2 to 3 drops of sulphuric acid. A deep brown colour is produced in case of Sumatra benzoin and a deep purplish red colour is obtained in case of Siam benzoin.</p>	



6	b)	<p>4) Add 4 ml of solution of potassium permanganate to 1 g of benzoin and warm. Odour of benzaldehyde is produced in case of Sumatra benzoin.</p> <p><b>Wool: ( 1 mark each for any 4 test)</b></p> <p>1) Wool is insoluble in 66% sulphuric acid, concentrated hydrochloric acid and cuoxam reagent.</p> <p>2) When lead acetate is added to a solution of wool in caustic soda, a black precipitate is formed due to high sulphur content.</p> <p>3) Wool hairs are soluble in 1.25 M sodium hydroxide solution.</p> <p>4) Wool are stained with ammonical copper oxide solution.</p> <p>5)Moisten the wool fibres with N/50 iodine solution followed by a drop of 80% w/w sulphuric acid, a yellow colour is produced.</p> <p>6) Warm/ boil wool fibres with picric acid. Then rinse with water, permanent yellow stain is produced.</p> <p>7) Warm with Millons reagent , red stain is produced.</p>
6	c)	<p><b>Starch: ( 1 mark each for any 4 test)</b></p> <p>1) Boil 1 g of starch with 15 ml of water and cool. The translucent viscous jelly is produced.</p> <p>2) The above jelly turns deep blue by the addition of solution of iodine.</p> <p>3) The above blue colour disappears on warming and reappears on cooling.</p> <p>4) 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.</p> <p>5) To the solution Of starch add Molisch reagent and add H<sub>2</sub> SO<sub>4</sub> from the side of test tube.</p> <p><b>Gelatin: (1 mark each for any 4 test.)</b></p>
6	d)	<p>1) Aqueous solution of drug gives precipitate with solution of trinitrophenol and solution of</p>



		<p>tannic acid.</p> <p>2) On heating gelatin solution with soda lime, ammonia gas is evolved.</p> <p>3) Aqueous solution of gelatin precipitates mercuric nitrate solution forming white colour, which turns black-red on heating.</p> <p>4) Formaldehyde makes gelatin hard &amp; insoluble after drying.</p> <p>5) To aqueous solution of drug, add drop of picric acid or tannic acid solution, precipitate is produced.</p> <p><b>Acacia: ( 1 mark each for any 4 test)</b></p>
<b>6</b>	<b>e)</b>	<p>1) Solution of lead sub-acetate gelatinizes aqueous solution of Indian gum.</p> <p>2) Mount a small quantity of acacia powder in ruthenium red solution and examine under microscope. The particles do not get red colour.</p> <p>3) To 0.1 g of powder, add 1 ml of N/50 iodine. The mixture does not acquire crimson colour.</p> <p>4) Hydrolyse the aqueous solution of gum acacia in presence of dilute hydrochloric acid by boiling . To it add Fehling's A and B and heat again. Red precipitate is observed, which confirms the presence of reducing sugar as the product of hydrolysis.</p> <p>5) To the aqueous solution of gum acacia, add 0.5 ml solution of hydrogen peroxide and 0.5 ml solution of benzidine in alcohol (1% solution), shake it well. A blue colour is produced (due to oxidase enzyme)</p> <p>6)Aqueous solution of drug is treated with dilute hydrochloric acid &amp; heated. To it barium chloride solution is added. No precipitate is formed</p> <p><b>Pale Catechu: ( 1 mark each for any 4 test)</b></p>
<b>6</b>	<b>f)</b>	<p>1. Gambier fluorescin test.: Boil a little powdered drug with alcohol, filter and add sodium hydroxide solution to the filtrate, stir and add few ml of light petroleum. Petroleum layer shows</p>





green fluorescence.

2. Matchstick test: dip the wooden matchstick in the solution of drug and dry it over a flame. Moisten the stick with hydrochloric acid and warm. Purple colour appears on the matchstick due to conversion of catechu into Phloroglucinol.

3. Vanillin hydrochloric acid test: Make solution containing vanilline 1ml, alcohol 10ml and dilute hydrochloric acid 10ml, it gives pink or red colour due to the formation of Phloroglucinol.

4. Heat about 0.5gm of powdered drug with 5 ml of chloroform in a dish and evaporate the filtrate on a water bath. A greenish yellow residue is left due to the presence of chlorophyll in the drug.

5) With ferric chloride solution it gives bluish black colour.

6) Lime water gives brown color with aqueous solution of black catechu.