



**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.



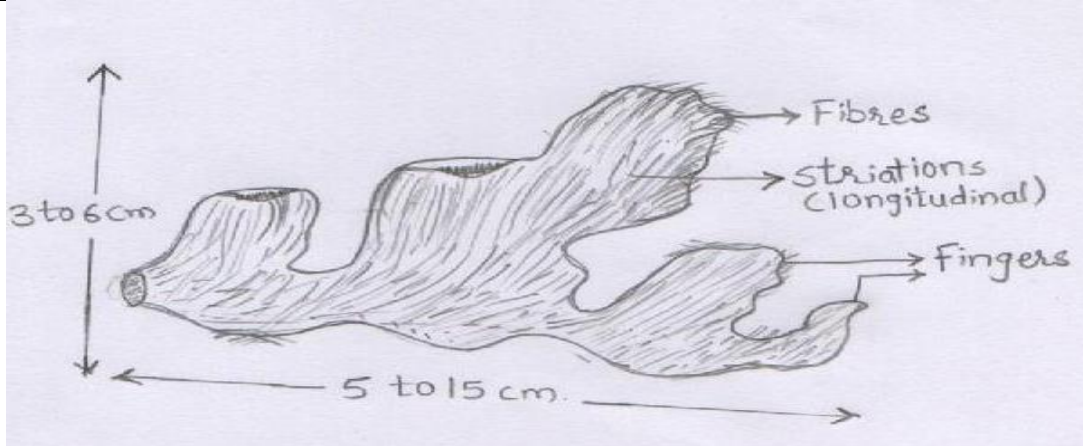
Q. No.	Sub Q. N.	Answer	Marking Scheme
<b>1</b>		<b>Answer any <u>EIGHT</u> of the followings: ( 2marks each)</b>	<b>16M</b>
<b>1</b>	<b>a)</b>	<b>Define the following: (1 mark for each definition.)</b>  <b>(i) Oxytocic</b>  <b>(ii)Antitussives</b>  <b>(i)Oxytocics:</b> These are the drugs which have stimulant effect on the motility of the uterus.  <b>OR</b>  An agent that causes expulsion of the contents of uterus by contracting the uterine smooth muscles.  <b>(ii)Antitussives:</b> These are the agents which act upon the pulmonary membrane that hasten or alter expectoration.  <b>OR</b>  An agent which relieves cough is called as antitussives.	<b>2M</b>
<b>1</b>	<b>b)</b>	<b>Name the family to which the following crude drugs belong to: ( ½ mark each)</b>  <b>(i) Pyrethrum-Compositae</b>  <b>(ii) Garlic -Liliaceae</b>  <b>(iii) Myrrh -Burseraceae</b>  <b>(iv) Coriander-Umbelliferae.</b>	<b>2M</b>



1	c)	<p><b>What are pharmaceutical aids? Give examples. (1mark for definition, ½ mark each for any two examples.)</b></p> <p>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.</p> <p>Examples-Acacia, agar, tragacanth, honey, cardamom, cinnamon, beeswax etc.</p>	2M
1	d)	<p><b>Write contribution of following scientist to pharmacognosy. ( 1 mark each)</b></p> <p>(i)Sushruta</p> <p>(ii) Galen.</p> <p>(i) <b>Sushruta:</b> Sushruta wrote Sushruta Samhita which describes procedure for surgery.</p> <p>(ii)<b>Galen:</b> Galen was Greek pharmacist; he worked on extraction of chemical constituent from the plants. He developed various methods of extraction therefore the branch of pharmacy which deals with extraction of chemical constituent from plants &amp; animals is called as galenical Pharmacy</p>	2M
1	e)	<p><b>Write the synonym of the following crude drugs: ( ½ mark for any one synonym for each drug.)</b></p> <p>(i) <b>Rauwolfia-</b> Indian snake root, sarpagandha, rauwolfia root, pagla ka dawa, chhotachand.</p> <p>(ii) <b>Tulsi</b> - Holy basil, sacred basil.</p> <p>(iii) <b>Ashwagandha-</b> Withania roots, asgand, aswagandha, Indian ginseng.</p> <p>(iv) <b>Chaulmoogra oil-</b>Hydnocarpus oil, Gynocardia oil.</p>	2M
1	f)	<p><b>Mention which part of the plant is used as crude drug in case of: ( ½ mark each)</b></p> <p>(i) <b>Arjuna-</b> Bark</p>	2M



		(ii) <b>Ginger- Rhizome</b>  (iii) <b>Belladonna- Leaves or leaves and other aerial parts</b>  (iv) <b>Aconite- Roots</b>	
<b>1</b>	<b>g)</b>	<b>Name the drug which contains the following chemical constituents : ( ½ mark each)</b>  (i) <b>Vasicine – Vasaka.</b>  (ii) <b>Emetine- Ipecacunha.</b>  (iii) <b>Vincristine- Vinca</b>  (iv) <b>Purpurea glycosides A and B- Digitalis.</b>	<b>2M</b>
<b>1</b>	<b>h)</b>	<b>Write ideal properties of sutures. ( ½ mark for each property)</b>  i) They must be sterile and should cause no irritation.  ii) They should have finest possible gauge and adequate strength.  iii) If absorbable their time of absorption must be known.  iv) They are intended to be used for one occasion only.	<b>2M</b>
<b>1</b>	<b>i)</b>	<b>Describe morphological characters of ginger with diagram. ( 1 mark each for diagram and morphology)</b>  Colour- Externally it is buff coloured.  Odour- Agreeable and aromatic.  Taste - Agreeable and pungent.  Size - Rhizomes are about 5 to 15*1.5 to 6.5 cm.  Shape- Rhizomes are laterally compressed bearing short, flat, ovate and oblique branches on the upper side.	<b>2M</b>



1	j)	<b>Enlist various leaf constants used for drug evaluation. (1/2 mark each for any four leaf constant)</b>  i) Stomatal number  ii) Stomatal index  iii) Vein islet number  iv) Palisade ratio  v) Vein islet termination number.	2M
1	k)	<b>State the uses of following crude drugs. (1/2 mark each for any two uses of each drug.)</b>  (i) Glycyrrhiza:  1) It is used as demulscent .  2)Mild expectorant.  3) Antispasmodic.  4)Anti-inflammatory.  5) Antiulcer drug  6) It is also used as flavouring agent.	2M



		<p>7) It is also used as sweetening agent.</p> <p><b>(ii) Yeast:</b> 1) It is used in manufacture of alcohol, beer and various wines and in bread industry.</p> <p>2) Irradiated yeast has been used as a source of vitamin B.</p> <p>3) Glutathion and invertase are also manufactured from yeast.</p> <p>4) It is a good source of protein.</p>	
<b>1</b>	<b>1)</b>	<p><b>Mention the adulterants of dried clove flower bud. ( ½ mark each)</b></p> <p>The common adulterants of dried clove flower bud are as follows:</p> <p>1) Mother clove.                      3) Blown clove.</p> <p>2) Clove stalks                      4) Exhausted cloves.</p>	<b>2M</b>
<b>2</b>		<p><b>Attempt any <u>FOUR</u> of the followings :( 3marks each)</b></p>	<b>12M</b>
<b>2</b>	<b>a)</b>	<p><b>Explain pharmacological system of classification of crude drugs along with its advantages and disadvantages. (1 mark for explanation, 1mark each for two advantages and disadvantages.)</b></p> <p>Under this system of classification, the crude drugs are classified according to pharmacological action of their chief chemical constituents. Thus the crude drugs showing similar pharmacological action are put together regardless of their morphology, biological behavior and chemical nature.</p> <p>Examples –</p> <p>Carminatives – Coriender ,Fennel, Cinnamon ,Clove etc</p> <p>Purgatives –Senna ,Rhubarb,Aloe etc</p> <p>Cardiotonics –Digitalis ,Arjuna</p>	



		<p>Astringents – Black and pale catechu</p> <p><b><u>Advantages: ( any 2)</u></b></p> <p>1)The main advantage of this method is that even if the chemical constituents of the crude drugs are not known, they can be classified properly on the basis of therapeutic or pharmacological property.</p> <p>2) The medicinal uses of crude drugs are known by this method.</p> <p>3) Combination of drug can be used to improve its action.</p> <p><b><u>Disadvantages: ( any 2)</u></b></p> <p>1) Crude drugs used as pharmaceutical aids cannot be classified by this method.</p> <p>2) Drugs which are dissimilar in their action of mechanism, even though their therapeutic effect is same are put together.</p> <p>3)It does not show chemical constituents or morphology of drug.</p> <p>4. Some drug shows more than one pharmacological actions are difficult to put in any category</p>	
<b>2</b>	<b>b)</b>	<p><b>Explain life cycle of Ergot. (2 marks for explanation, 1 mark for diagram.)</b></p> <p>The stages of life cycle of Ergot can be described as-</p> <p>(i) Over wintering stage.</p> <p>(ii) Stage of sexual reproduction, and</p> <p>(iii) Stage of asexual reproduction</p> <p>The sclerotia are produced in the late summer. They fall on the ground in autumn. When the favourable conditions for the germination are available, these sclerotium germinate in the spring to produce small purple coloured stalks which on further growth form a flattened spherical stromatic head at the top. The head of the stroma contains several perithecia. Each perithecium contains several elongated asci. Each ascus contains eight thread like ascospores. The ascospores come out of the perithecium and get dispersed by the</p>	<b>3M</b>

air current. The dispersal of ascospores takes place at the time of flowering of rye plant which is the host. The ascospores become entangled with the feathery stigmas of host and produce mycelia which penetrate through the ovary. The mycelia give rise to conidia, produced from the surface of the ovary. The honey dew is sweet in taste and attracts the insects. Along with honey dew, conidia are carried from one place to another by insects. The stage is either known as the honey dew stage or sphacelia stage.

In the second stage, hyphae penetrate deeply into the ovary and develop into a mass covering the entire ovary which results in the formation of elongated sclerotium. This stage is known as sclerotium stage. Sclerotium develops further, attains the maximum size and falls on the ground along with the seeds of the host.



2	c)	<b>Write biological source, chemical constituents and uses of Amla or Cinchona.</b>	<b>3M</b>
(1mark for Biological source,1 mark for chemical constituents, ½ mark each for any two			





uses of **any one drug**)

**Amla-**

Biological source: This consist of dried as well as fresh fruits of the plants Emblica officinalis, belonging to family Euphorbiaceae.

Chemical constituents: Amla fruit is a rich natural source of vitamin C (Ascorbic acid) and contains 600 to 750 mg per hundred gram of fresh pulp. Apart from that fruit also contains about 0.5% fat , phyllembin and 5% tannin. Amla fruit also contains mineral matters like phosphorus, iron and calcium. It also contains pectin.

Uses: 1) It is used as a source of vitamin C.

2) Acrid,

3) Diuretic,

4)Refrigerant,

5) Laxative,

6) Dried fruits are given in diarrhorea and dysentery

7) They are also given in jaundice, dyspepsia and anaemia alongwith iron compounds.

8) Seeds of the Amla fruits are given in treatment of asthama and bronchitis.

9)Alcoholic extract of the fruit is anti-viral.

10) The leaves are used as fodder.

11) The fruits of Amla are used in preparation of inks, hair oils and shampoos.

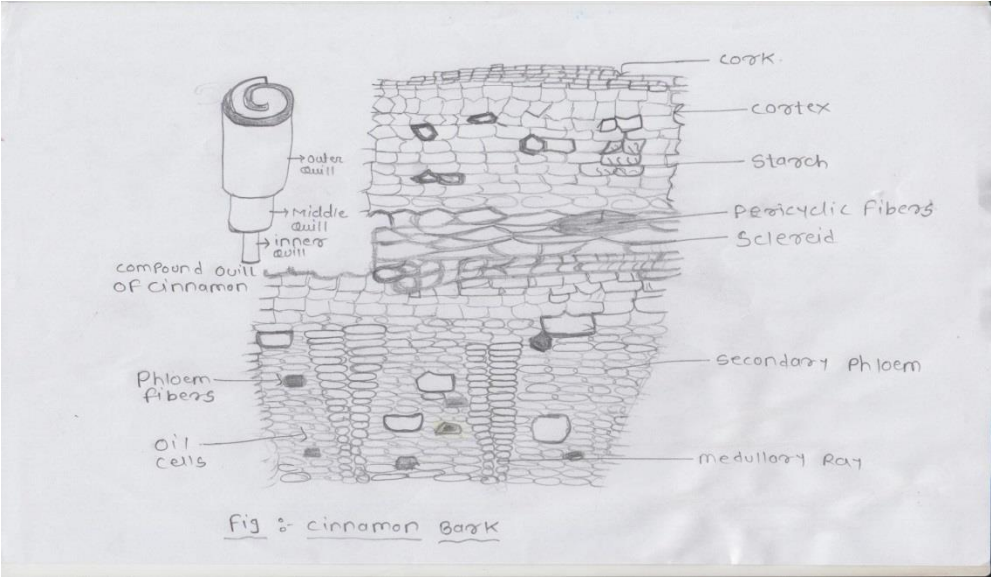
**OR**

**CINCHONA:**

Biological source: Cinchona is the dried bark of cultivated trees of Cinchona calisaya, Cinchona ledgeriana, Cinchona officinalis, Cinchona succirubra etc or hybrid of either of



	<p>last two species with either of the first two belonging to family Rubiaceae.</p> <p>Chemical constituents: Cinchona contains about 25 alkaloids in the range of 5 to 10%. Out of 25 alkaloids, only four are therapeutically important and are named as quinine, quinidine, cinchonine and cinchinidine.</p> <p>In addition to the alkaloids cinchona bark also contains bitter glycosides quinoic, cinchofulvic, cinchotannic acid and quinic acid. It also contains red colouring matter known as cinchona red, tannins, calcium oxalate and starch.</p> <p>Uses: Cinchona bark is used as- 1) Antimalarial 2)Antipyretic.</p> <p>3) Bitter tonic 4)Stomachic 5) Cinchonidine is used in rheumatism and neuralgia. 6) Quinidine is employed as cardiac depressant.</p>	
<b>2</b>	<p><b>d) Write about Ayurveda system of medicine.</b></p> <p>It is the oldest system of medicine in India .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>1.Vata(space+air)</p> <p>2.Pitta(energy +liquid)</p> <p>3.Kapha(solid+liquid)</p> <p>The seven forms of Tri dosh are called as ‘SAPTADHATU’. These saptadhatu undergo wear and tear processes and form excretory material or <u>mala</u>.</p> <p>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 and in Sushrut Samhita emphasis is given on surgery.</p>	<b>3M</b>

2	e)	<p><b>Define the following with examples( 1 mark for each definition and ½ mark for respective example)</b></p> <p><b>i)Carminatives:</b> These are the agents that removes gases from gastro intestinal tract.</p> <p>Examples: Fennel, coriander, Cardamom, cinnamon, clove, ginger, black pepper</p> <p><b>(ii)Laxatives:</b> Drugs that loosen the bowels</p> <p style="text-align: center;">OR</p> <p>The drugs producing, increasing and hastening intestinal evacuation.</p> <p style="text-align: center;">OR</p> <p>The drugs which promote defecation.</p> <p>Examples: Aloe, Rhubarb, Senna, Castor oil, Ispaghula etc</p>	3M
2.	f)	<p><b>Draw a neat and well labelled diagram of T.S. of Cinnamon bark.</b></p>  <p style="text-align: center;">Fig :- cinnamon bark</p>	3M



<b>3</b>		<b>Attempt any <u>FOUR</u> of the followings</b>	<b>12M</b>
<b>3</b>	<b>a)</b>	<p><b>What are the different means by which crude drugs are adulterated? ( 1 mark each for any 3 methods along with examples)</b></p> <p><b>Methods of Adulteration:</b></p> <p><b>1. Replacement by exhausted drugs</b></p> <p>Ex.1.Exhausted saffron is coloured artificially</p> <p>2.Ginger is mixed with starch &amp; coloured.</p> <p><b>2. Substitution with superficially similar but inferior drugs</b></p> <p>Ex.1. Adulteration of cloves by mother cloves.</p> <p>2. Saffron with dried flower of carthamus tinctorius.</p> <p><b>3. Substitution by artificially manufactured substituent</b></p> <p>Ex.1. Paraffin wax is tinged yellow &amp; substituted for yellow bees wax.</p> <p>2. Artificial invert sugar is mixed with honey.</p> <p><b>4. Substitution by sub- standard commercial varieties</b></p> <ul style="list-style-type: none"><li>• Ex.1. capsicum frutescens( capsicum minimum), substituted by capsicum annum.</li><li>2. Alexandrian senna with Arabian senna.</li><li>3. Strychnos nux-vomica adulterated with Strychnos nux-blanda/ S. potatorum seeds.</li></ul> <p><b>5. Presence of organic matter obtained from the same plant</b></p> <ul style="list-style-type: none"><li>• Ex.1. clove are mixed with clove stalks.</li><li>2. Caraway &amp; Anethum fruits are mixed with other parts of inflorescence</li></ul> <p><b>6. Synthetic chemical</b></p>	<b>3M</b>



		<ul style="list-style-type: none"><li>• Ex.1. Benzyl benzoate to balsam of peru.</li><li>2. Citral to oil of lemon grass.</li></ul> <p><b>7. Waste from market</b></p> <ul style="list-style-type: none"><li>• Ex.1. Limestone in asafoetida.</li><li>2. Pieces of amber coloured glass in colophony.</li></ul>	
<b>3</b>	<b>b)</b>	<p><b>Describe method of collection and preparation of “ Senna Leaves” for market.</b></p> <p><b>( 1 ½ mark each for collection and preparation)</b></p> <p><b>Collection of senna:</b> Alexandrian senna is collected mainly in September from both wild and cultivated plants. The pods and large stalks are first saperated by means of sieves. By the tossing process leaves get separated from the heavier stalks. The leaves are then graded, partly by means of sieves and partly by hand picking into 1. Whole leaves 2. Whole leaves and half leaves mix.</p> <p><b>Preparation for market:</b> The harvested leaves are spread on the floor under the shade without overlapping .The leaves are shuffled to attain uniform drying .Leaves loose about 50 -60 % of their weight on drying . After drying leaves are packed in bales under hydraulic press and store it away from light and send to market.</p>	<b>3M</b>
<b>3</b>	<b>c)</b>	<p><b>What are alkaloids? Name the reagents used for identification of alkaloids by precipitation method.(1mark for alkaloids, ½ mark each for reagent)</b></p> <p><b>Alkaloids:</b> Alkaloids are basic, nitrogenous, organic compounds or products of plant origin having marked physiological action when it is administered by oral route in small dose.</p> <p><b>Name of the reagents :</b> i) Mayer’s reagent    ii) Dragendorff’s reagent iii) Hagar’s reagent    iv) Wagner’s reagents.</p>	<b>3M</b>



3	d)	<p><b>Write the Biological source, chemical constituents and uses of Gokhru or Nutmeg .</b></p> <p><b>( 1mark each for Biological source, chemical constituents, uses)</b></p> <p><b>Gokhru :</b></p> <p><b>Biological source :</b> Gokhru consist of dried ripe fruits of plant Tribulus terrestries Linn. <b>Family:</b> Zygophyllaceae.</p> <p><b>Chemical constituents :</b> It contains steroidal saponin glycosides such as Furostanol bisglycosides protodioscin on hydrolysis gives diosgenin, ruscogenin, tigogenin, neotigogenin , gitogenin. Tribulosides and 3-rhamnosides, Alkaloids such as Harman and harmin.</p> <p><b>Uses :</b> <b>i)</b> It is used as diuretic <b>ii)</b> For the treatment of kidney stone <b>iii)</b> Nephritic <b>iv)</b> Ayurvedic preparations such as Dashmularishtha and chyavanprash.</p> <p style="text-align: center;"><b><u>OR</u></b></p> <p><b>Nutmeg :</b></p> <p><b>Biological source:</b> Nutmeg consists of dried kernels of the seeds of plant Myristica fragrance houtten. Family: Myristicaceae.</p> <p><b>Chemical constituents:</b> It contains 5 to 15% volatile oil, which contains 4 to 8 % Myristicin, elemicin, Fats 21% called nutmeg butter, Fixed oil contain Fatty acids such as myristic acid 60%, plamitic acid.</p> <p><b>Uses :</b> <b>i)</b> It is used as carminative <b>ii)</b> Aromatic <b>iii)</b> Flavouring agent <b>iv)</b> Nutmeg butter is used in the soap known as Banda soap.</p>	3M
3	e)	<p><b>Explain the following :(1 mark each for Mace, Balsam, Resins)</b></p> <p><b>i) Mace:</b> The arillus of the seeds of nutmeg is known as mace which arises in the region of hilum, before the flowers open and fertilization takes place. The mace is an orange coloured modification of nutmeg seed. It contains amyloextrin. Mace is used as a condiment, aromatic, carminative and flavouring agent.</p>	3M



		<p><b>ii) Balsam:</b> Balsam is the resin which contains predominant quantity of cinnamic acid, benzoic acid and their esters. It is called as abnormal or pathological product of plant metabolism produced as a result of any wound, abnormal circumstances or after injury to the plant.</p> <p><b>iii) Resins:</b> Resins are amorphous products of complex chemical nature. These are amorphous mixture of essential oil, oxygenated product of terpenes and carboxylic acids.</p>	
3	f)	<p><b>Describe the method of preparation for silk fibres. (3 Marks for method of preparation)</b></p> <p>The larvae of the silk worm produce silk fibroin fibres from the glands in their mouth. These fibroin fibres get united with a gum like secretion known as sericin and forms cocoons within 8 days. These cocoons are collected and heated to 60-80° C by exposing them to steam. The exposed cocoons are boiled with water to dissolve the gum and to separate the fibres. The fibres are washed, dried, sterilized and packed.</p>	3M
4		<b>Attempt any <u>FOUR</u> of the following: ( 3marks each)</b>	12M
4	a)	<p><b>What are volatile oils? Explain “Enfleurage method” for extraction of volatile oils. (1 mark for meaning and 2 marks for Enfleurage method)</b></p> <p><b>Volatile oils:</b> Volatile oils are odorous or volatile constituents of plants and animals, they volatilize or evaporate at an ordinary temperature.</p> <p><b>Enfleurage :</b> These method is used for extraction of delicate perfumes. In this method fresh flower petals are mechanically spread on layer of fatty material and allowed to imbibe and exhausted petals are replaced by fresh material. This process is continued till the fatty layer is saturated with volatile principles which are then extracted with lipid solvent. The mixture of lipid solvent and volatile oil is separate out by distillation under reduced pressure.</p>	3M
4	b)	<p><b>What is Drug evaluation? Explain “Morphological evaluation”.</b> <b>( 1 mark for meaning, 2 marks for morphological method)</b></p> <p><b>Drug evaluation:</b> Drug evaluation means confirmation of identity, determination of purity and quality or activity of drug.</p> <p><b>Morphological evaluation:</b> Morphological evaluation means evaluation of crude drugs by means of organs of sense or sensory characters and systematic morphological</p>	3M



		<p>characters which includes colour, odour, taste, size, shape, texture, fracture and surface. This method is used for confirmation of identity and detection of adulterants of organized and unorganized crude drugs.</p> <p><b>For eg.</b></p> <ol style="list-style-type: none"><li>1. Aromatic odour of umbelliferous fruits and sweet taste of liquorice.</li><li>2. The Ovoid tears of gum acacia ,ribbon shape characteristics of Tragacanth, disc shape structure of Nux vomica ,Quills of cinnamon etc</li></ol>	
4	c)	<p><b>Name the crude drugs used as Astringent. Write the biological source and chemical constituents of any one. ( ½ mark each for names, 1 mark each for biological source and chemical constituents)</b></p> <p><b>Astringent crude drugs are :</b> i) Black catechu ii) Pale catechu.</p> <p><b>i) Black catechu :</b></p> <p><b>Biological source:</b> Black catechu consists of dried aqueous extract of the heart wood of the plant Acacia catechu wild. Family: Leguminosae.</p> <p><b>Chemical constituents:</b> It contains about 4 to 12% condensed tannins Acacatechin. Acacatechin is also known as Acaciacatechin. Acacatechin On oxidation produce catechu tannic acid about 30%. It also contains catechu red or phlobaphene and gum 20 to 30%.</p> <p><b>ii) Pale catechu :</b></p> <p><b>Biological source:</b> Pale catechu consists of dried aqueous extract of leaves and young twigs of shrub Uncaria gambier . Family: Rubiaceae.</p> <p><b>Chemical constituents:</b> It contains catechu tannic acid about 22-50%. It also contains catechin ,catechu red , quercetin and Gambier fluorescin, and chlorophyll.Catechutannic acid on decomposition yields insoluble dark coloured phlobaphene.</p>	3M
4	d)	<p><b>What are glycosides? Explain “Saponin Glycosides”. (1 mark for meaning, 2 marks for saponin glycosides)</b></p> <p><b>Glycosides:</b> Glycosides are basically naturally occurring organic compounds widely distributed in plants which on hydrolysis in presence of acid or enzymes give one or more molecules of sugar called glycon and one molecule of non sugar called aglycone or genin.</p> <p><b>Saponin glycosides :</b></p> <p>Saponin glycosides are plant glycosides and are commercially and medicinally important glycosides but as the name indicates that aglycone part of saponin glycosides have soap</p>	3M





		<p>like action. They exhibit physical properties like foaming action with water or distinctive frothing property and to form colloidal soapy solution with water, hence they are called as saponin glycosides.</p> <p>These glycosides are considered as haemotoxic because they cause haemolysis of blood and are used as poisons for cold blooded animals like fish and used as a fish poisons. They are also used as good detergents and emulsifier.</p> <p>Saponin glycosides may be of two types such as i) Steroidal saponin glycosides. Eg. Diosgenin, Shatavarin. ii) Triterpene saponin glycosides. Eg. Glycyrrhizin.</p>	
<b>4</b>	<b>e)</b>	<p><b>Write biological source, chemical constituents and uses of “Lemon oil” or Sandalwood. (1 mark each for biological source, chemical constituents and uses)</b></p> <p><b>Lemon oil :</b></p> <p><b>Biological source:</b> Lemon oil is a volatile oil obtained by expression from the fresh peel of the ripe or nearly ripe fruits of Citrus limonis. Family: Rutaceae.</p> <p><b>Chemical constituents:</b> Lemon oil mainly contains terpenes. About 90% is Limonene and other terpenes about 10% such as citral and citronellol.</p> <p><b>Uses:</b> 1. It is used as flavouring agent ii) In perfumery iii) Aromatic, iv) It is used for the preparation of terpeneless lemon oil.</p> <p style="text-align: center;"><b><u>OR</u></b></p> <p><b>Sandalwood :</b></p> <p><b>Biological source:</b> Sandalwood consists of dried heart wood of Santalum album Family: Santalaceae.</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> i) It is used as source of sandalwood oil ii) It is used as perfume in cosmetic iii) The wood is utilised for the purposes like carvings and manufacturing of boxes.</p>	<b>3M</b>



4	f)	<p><b>Define Antidiabetics? Give examples of antidiabetic crude drug and write the biological source of any one drug. (1 mark for definition, ½ mark for each example, 1 mark for biological source)</b></p> <p><b>Antidiabetics :</b> Antidiabetics means substances used in treatment of diabetes (i.e. Diabetes mellitus) to lower the elevated blood glucose level by increasing the secretion of sufficient quantity of insulin.</p> <p style="text-align: center;"><b><u>OR</u></b></p> <p>Antidiabetics are the drugs which are used in the treatment of diabetes.</p> <p><b>Examples:</b> i) Gymnema ii) Pterocarpus.</p> <p><b>i) Gymnema :</b></p> <p><b>Biological source:</b> Gymnema consist of dried leaves of plant Gymnema sylvestre. Family: Asclepiadaceae.</p> <p style="text-align: center;"><b><u>OR</u></b></p> <p><b>ii) Pterocarpus :</b></p> <p><b>Biological source :</b> Pterocarpus consist of dried juice obtained by making vertical incisions from stem bark of plant Pterocarpus marsupium. Family: Leguminosae.</p>	3M
5		<b>Attempt any <u>FOUR</u> of the followings :( 3marks each)</b>	12M
5	a)	<p><b>What are tannins? Classify them. ( 1 mark for explanation and 2 marks for classification with example.)</b></p> <p><b>Tannins:</b> These are derivatives of polyhydroxy benzoic acid. They are high molecular weight phenolic compounds capable of precipitation of animal proteins in hides and converting them into leather.</p> <p style="text-align: center;"><b><u>Classification of Tannins:</u></b></p> <div style="text-align: center;"><pre>graph TD; A[Classification of Tannins] --&gt; B[True Tannins (High molecular weight compounds)]; A --&gt; C[Pseudotannins Low molecular weight compounds e.g. Gallic acid, Flavan-3,4-diol]; B --&gt; D[Hydrolysable Tannins (Pyrogallol)]; B --&gt; E[Condensed Tannins (Catechol)];</pre></div> <p><b>1) <u>Pyrogallol Tannins:</u></b> Composed of central sugars with all its OH esterified with</p>	3M



	<p>Phenolic acids (gallic or ellagic acid).- Produce pyrogallol on dry distillation.</p> <p>They can be hydrolyzed by acids or enzymes and produce</p> <p>1) Gallic acid and is known as Gallitannins. (Ex.Clove, rhubarb)</p> <p>2) Ellagic acid and is known as .Ellagitannins. (Ex. myrobalans, pomegranate bark)</p> <p><b>2) <u>Catechol (Condensed) Tannins:</u></b> Condensation product of Flavan-3,4-diol.</p> <p>They resist hydrolysis.</p> <ul style="list-style-type: none"> <li>- Upon prolonged heating they decompose into Phlobaphene (reddish color).</li> <li>- Produce catechol on dry distillation.</li> <li>- Present in Cinchona, Cinnamon, Green tea.</li> </ul> <p><b>3) Pseudo Tannins:</b> These are low molecular weight compounds.They do not respond to Gold beaters skin test.</p>													
<p><b>5</b></p>	<p><b>b) Differentiate between organised and unorganised crude drugs with example. ( any 3 points – 1 mark each)</b></p> <table border="1" data-bbox="242 1361 1417 2098"> <thead> <tr> <th data-bbox="242 1361 791 1447"><b>Organized crude drug</b></th> <th data-bbox="791 1361 1417 1447"><b>Unorganized crude drug</b></th> </tr> </thead> <tbody> <tr> <td data-bbox="242 1447 791 1630"> <p>1. It is obtained from definite anatomic parts of the plants such as flowers, leaves, fruits etc</p> </td> <td data-bbox="791 1447 1417 1630"> <p>1. It is obtained from plants or animals by means of physical process such as drying ,, incision ,extraction such as juices ,resins.</p> </td> </tr> <tr> <td data-bbox="242 1630 791 1733"> <p>2. It is made up of definite tissue and cell.</p> </td> <td data-bbox="791 1630 1417 1733"> <p>2. It does not have cellular structure.</p> </td> </tr> <tr> <td data-bbox="242 1733 791 1814"> <p>3. It is solid in nature</p> </td> <td data-bbox="791 1733 1417 1814"> <p>3. It is solid, semi-solid and liquid in nature.</p> </td> </tr> <tr> <td data-bbox="242 1814 791 1957"> <p>4. Microscopical characters are used for identification.</p> </td> <td data-bbox="791 1814 1417 1957"> <p>4. Chemical tests and physical standards are used for identification.</p> </td> </tr> <tr> <td data-bbox="242 1957 791 2098"> <p>5.Botanical and zoological terminology can be used to describe</p> </td> <td data-bbox="791 1957 1417 2098"> <p>5. Botanical and zoological terminology is inadequate. To describe these drugs,</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>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 is made up of definite tissue and cell.</p>	<p>2. It does not have cellular structure.</p>	<p>3. It is solid in nature</p>	<p>3. It is solid, semi-solid and liquid in nature.</p>	<p>4. Microscopical characters are used for identification.</p>	<p>4. Chemical tests and physical standards are used for identification.</p>	<p>5.Botanical and zoological terminology can be used to describe</p>	<p>5. Botanical and zoological terminology is inadequate. To describe these drugs,</p>	<p><b>3M</b></p>
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		the drug Ex. Coriander , fennel, datura, etc	physical characters such as solubility, optical rotation, refractive index are used. Ex.Aloe , bees wax, tragacanth, asafoetida etc	
5	c)	<b>Expalin the characteristics features of umbelliferous drug.</b> ( any 6 points – ½ mark each) 1. Schizocarp (spliting fruits)- these fruits are able to 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. The number of vittae and its arrangement is the characteristic features for e.g. in case of Fennel fruit each mericarp contains 6 vittae- 4 on dorsal surface and 2 on commissural surface. 8. Each mericarp contains a single seed. 9. All umbelliferous fruits contains Volatile oil. 10 .The drug belongs to family Umbelliferae are called umbelliferous drug.		3M
5	d)	<b>Write biological source of Honey. Explain ‘Fiehe’s test’.</b> ( 1 mark for biological source and 2 marks for test) Biological source: It is sugar secretion deposited in honey comb by the bees of Apis mellifica, Apis dorsata <b>Family-</b> Apidae		3M



		<b>Fiehe's test:</b> Stir 10ml of honey with 5ml of solvent ether, allow it separate and draw off 2ml of ethereal layer into a small petridish. Allow ethereal layer to evaporate, to the residue add 1 drop of resorsinol in HCl. Pure honey does not gives cherry red colour, while adulterated honey which contain invert sugar gives cherry red colour.	
<b>5</b>	<b>e)</b>	<b>What are surgical dressings? Write the official requirements of surgical dressings. ( 1 mark for surgical dressings, 2 marks for any 4 requirements)</b> A dressing is described as a material applied to protect a wound & favours its healing. <b>Official requirements of surgical dressings ( any 4)</b> <ol style="list-style-type: none"><li>1. They should be easily sterilized before use.</li><li>2. Should not adhere to the granulating surfaces.</li><li>3. Should be easy to handle at all stage.</li><li>4. Should be durable.</li><li>5. Should be free from loose threads, ends &amp; fibres.</li><li>6. Should be stored in a dry ,well ,ventillated place at a temp not exceeding 25<sup>0</sup>c.</li><li>7. They should not be dyed unless mentioned in the monograph .</li></ol>	<b>3M</b>
<b>5</b>	<b>f)</b>	<b>Write chemical test for Asafoetida.( any 3 tests – 1 mark each)</b> <ol style="list-style-type: none"><li>i) When triturated with water, it forms yellowish orange emulsion.</li><li>ii) On fractured surface of drug add sulphuric acid, red or reddish brown colour is observed.</li><li>iii) Drug when treated with 50% nitric acid gives green color.</li><li>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.</li></ol>	<b>3M</b>
<b>6</b>		<b>Write chemical tests for the following crude drugs ( any <u>FOUR</u> ):( 4 marks each)</b>	<b>16M</b>
<b>6</b>	<b>a)</b>	<b>Aloe : ( any 4 tests-1 mark each)</b> Preparation of test solution:-1% solution of aloe is prepared by boiling with water and add 0.5% Kiesulguhr to it and filter. The filtrate is used for the following test. <b>1.Borax Test (Schoeteten's test)</b> :-0.5gm borax is added to a 5ml test solution (T.S) and heated .This solution when diluted with water gives green fluorescence due to aloe emodin.	<b>4M</b>



	<p><b><u>2.Bromine test-</u></b> Add equal quantity of test solution and bromine water (freshly prepared) gives yellow colour precipitate of tetra-barbaloin( tetrabromide)</p> <p><b><u>3.Nitrous acid test</u></b></p> <p>2ml of nitric acid is added to 5ml of Test Solution Different colors are produce as given below</p> <ol style="list-style-type: none"><li>1.Cape aloee- yellowish brown to green</li><li>2.Curacao aloee-Reddish orange</li><li>3.socotrine ( Zanziber ) aloee-Pale brownish yellow</li></ol> <p>4.<b><u>Klunge's test:-</u></b> To an aq. solution of aloee add a drop of saturated copper sulphate solution (buffer solution) followed by Nacl 0.5g and 2ml of 90% alcohol.</p> <ol style="list-style-type: none"><li>1.Cape aloee- Faint coloration</li><li>2.Curacao aloee- Wine Red</li><li>3.Zanziber ( socotrine ) aloee – Do not respond.</li></ol> <p><b><u>5.Modified BornTrager's test:-</u></b></p> <ol style="list-style-type: none"><li>1.To the 0.1g of drug add 2ml of 5% ferric chloride solution and 2ml of dil. Hcl</li><li>2.Heat on a boiling water bath for 5mins,cool and shake it with benzene.</li><li>3.Saperate the benzene layer and add equal volume of Dil. Ammonia. Pinkish red color is produced with all varieties of aloee.</li></ol>	
<b>6</b>	<p><b>b) <u>Benzoin</u> ( any 4 tests-1 mark each)</b></p> <p>i) To a solution of benzoin in alcohol add water. Solution becomes milky &amp; acidic to litmus</p> <p>ii) To the drug add solvent ether, decant ether layer &amp; to it add 2/3 drops of H<sub>2</sub>SO<sub>4</sub></p> <p>A deep reddish brown colour in case of Sumatra Benzoin .</p> <p>A deep purplish-red colour in case of Siam Benzoin.</p> <p>iii) Heat Benzoin in a test tube with solution of KmnO<sub>4</sub>, it develops Strong odour of benzaldehyde.</p> <p>iv)To the alcoholic solution of Benzoin add FeCl<sub>3</sub>,Green colour develops in case of Sumatra Benzoin.</p> <p>v) Heat small quantity of benzoin in dry test, cover the opening of test tube with clean dry</p>	<b>4M</b>



		glass slide, cool it and observe glass slide under microscope, cinnamic acid crystals are observed.	
<b>6</b>	<b>c)</b>	<b>Gelatin : ( any 4 tests-1 mark each)</b>  i) Aqueous solution of drug gives precipitate with solution of trinitrophenol.  ii) On heating gelatin solution with soda lime, ammonia gas is evolved.  iii) Aqueous solution of gelatin precipitates mercuric nitrate solution (Millon's reagent) forming white colour, which turns 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.	<b>4M</b>
<b>6</b>	<b>d)</b>	<b>Wool : (any 4 tests -1mark each)</b>  i) Wool is insoluble in 66% sulphuric acid, concentrated hydrochloric acid & Cuoxam reagent.  ii) When lead acetate is added to solution of wool in caustic soda, a black precipitate is formed owing to high sulphur content amino acid.  iii) Wool hairs are stained black with ammoniacal copper oxide solution.  iv) Wool hair is soluble in 1.25M sodium hydroxide solution.  v) Moisten wool 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.	<b>4M</b>



6	e)	<b>d) <u>Nux vomica</u> (1mark each)</b>			4M
		Test	Observation	Inference	
		T. S. of drug + ammonium vanadate + H <sub>2</sub> SO <sub>4</sub>	Endosperm stained purple	Strychnine present	
		T. S. of drug + Pot. Dichromate + H <sub>2</sub> SO <sub>4</sub>	Endosperm stained Violet color	Strychnine present	
		T. S. + Conc. HNO <sub>3</sub>	Endosperm stained Yellow to Orange	Brucine present	
		T.S + test solution of Thionine ,wait for 10 mins wash with alcohol	Bluish violet	Lignified cells	
6	f)	<b>Ergot: ( 1 mark each)</b>  1. To defatted ergot powder add 50% potassium hydroxide solution and heat at 170 <sup>0</sup> C for 1hrs, cool, wash thoroughly with alcohol and to it add first iodine solution and then 20% sulphuric acid, violet colour is produced.  2. Extract about 1gm of powdered ergot with 10ml of solvent ether along with 0.5ml of dilute sulphuric acid. Filter the extract and to the filtrate add about 1ml of cold saturated solution of sodium biocarbonate. The aqueous layer becomes red or violet (due to Sclererythrin).  3. In UV light, ergot powder shows red fluorescence.  4. Extract ergot with chloroform and sodium carbonate and to extract add paradimethylaminobenzaldehyde, 35% sulphuric acid and 0.5% ferric chloride solution. A blue colour is produced. (Ergotoxin test)			4M