



MODEL ANSWER

WINTER -18 EXAMINATION

Subject Title: PHARMACOGNOSY

Subject Code: 0807

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.

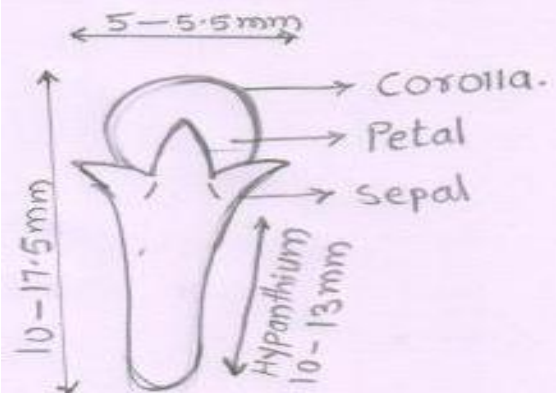
**MODEL ANSWER****WINTER -18 EXAMINATION**

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Q. No.	Sub Q. N.	Answer	Marking Scheme												
1		Answer any TEN of the followings: (2marks each)	20M												
1	a)	When,Where and who coined the term pharmacognosy? In 1815, in the book Analecta pharmacognostica ,a German scientist C.A Seydler coined the term Pharmacognosy.	2M												
1	b)	Differentiate between leaf and leaflets(½ mark each for any 4 points) <table border="1"><thead><tr><th>Leaf</th><th>Leaflet</th></tr></thead><tbody><tr><td>1)Lamina is one entire piece</td><td>1)Lamina is completely divided into separate segment called leaflets</td></tr><tr><td>2) In case of leaf, bud or branch is present in the axil.</td><td>2) It is absent in leaflets.</td></tr><tr><td>3) Leaves are arranged spirally and they are solitary in nature.</td><td>3) Leaflets are arranged in pairs.</td></tr><tr><td>4) Lamina lies in different planes.</td><td>4) Lamina lies in one plane.</td></tr><tr><td>5) Lamina is generally symmetrical at the base. .Ex. Digitalis, Belladona, Vasaka</td><td>5) Lamina is asymmetrical at the base. Ex. Senna, Neem</td></tr></tbody></table>	Leaf	Leaflet	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 lies in different planes.	4) Lamina lies in one plane.	5) Lamina is generally symmetrical at the base. .Ex. Digitalis, Belladona, Vasaka	5) Lamina is asymmetrical at the base. Ex. Senna, Neem	2M
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1	c)	Define – (1 mark each) i) Carminatives: These are the agents that remove gases from gastro intestinal tract. OR These are the agents that act by relieving pain in the stomach and intestine and expel gas from the GI tract by increasing peristalsis. ii) Antihypertensive: The drug which is used in the treatment of high blood pressure is called as antihypertensive drug.	2M												
1	d)	Draw a well labelled diagram showing morphological characters of clove bud.	2M												



			
1	e)	<p>Explain Goldbeater's skin test for tannins.</p> <p>In this test, a piece of gold beater skin, (intestine of ox) is treated with 2% . HCL and washed with distilled water. It is then placed in the solution of tannin for 5 mins, again washed with distilled water and transferred to 1% ferrous sulphate solution. A change in colour of goldbeater's skin to brown or black indicates the presence of tannin.</p>	2M
1	f)	<p>Mention the synonym of following drugs (1/2 mark each)</p> <p>i) Rauwolfia – Rauwolfia root /chhotachand /sarpagandha/ snake root/Chandrika/Pagla kadawa/ Patala – Gandhi / Dhanbura /Covanamipori</p> <p>ii) Gymnema- Gudmar /Madhunashini / Gurmar</p> <p>iii) Gokhru - Punture vine</p> <p>iv) Vinca - Catharanthus/vinca rosea /periwinkle/sadaphuli/ Madagascar periwinkle /Rattanjot</p>	2M
1	g)	<p>Write the biological source with family- (1 mark each)</p> <p>i) Rhubarb : It consist of dried rhizomes of Rheum palmatum ,Rheum emodi and Rheum webbianum belongs to Family-Polygonaceae</p> <p>ii)Tobacco : It consists of dried leaves of Nicotiana tobacum belongs to Family Solanaceae</p>	2M
1	h)	<p>Enlist different types of Ash value. (1/2 mark for each type)</p> <p><u>Types of Ash</u></p> <p>1) Total ash</p> <p>2) Acid insoluble ash</p> <p>3) Water insoluble ash</p>	2M



		4) Sulphated ash	
1	i)	Mention one example of crude drug from the following family – (½ mark each) i) Zingiberaceae- Cardamom/ Ginger /Turmeric ii) Styraceae – Benzoin iii) Ranunculaceae – Aconite iv) Rutaceae- Orange oil / Lemon oil	2M
1	j)	What is Garbling? (2 marks) Garbling is the process applied to remove sand, dirt and foreign organic parts of the same plant, not constituting drug.	2M
1	k)	Identify a drug containing following chemical constituents- (½ mark each) i) Withanolide - Ashwagandha ii) D – linalool - Coriander iii) Allin – Garlic iv) Vitamin A – Shark liver oil	2M
1	l)	Which part of the plant is used as crude drug in case of: (½ mark each) i) Cinchona – dried bark ii) Black pepper – fruit iii) Ephedra- young stem iv) Colchicum- seeds or corm	2M
2		Attempt any THREE of following(4 marks each)	12M
2	a)	Assign the name and explain chemical test for the crude drug containing – (1 mark each for name of the test and explanation of test) i) Tropane alkaloid ii) Mucilage i) Tropane alkaloid : Vitali –Morin test : The tropane alkaloid is treated with fuming nitric acid, followed by evaporation to dryness	4M



		<p>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 indicating the presence of tropane alkaloids.</p> <p>ii) Mucilage : Swelling factor test:</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>	
2	b)	<p>Describe method of collection and preparation of Senna Leaf for market.</p> <p>(2 marks each for collection and preparation)</p> <p>Collection of Senna: Alexandrian senna is collected mainly in September from both wild and cultivated plants. The pods and large stalks are first separated 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>Preparation for market: 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>	4M
2	c)	<p>Enlist various methods for isolation /extraction of volatile oil. Explain any two methods in detail. (1 mark to enlist the methods of extraction , 1 ½ marks each for explanation of any two methods)</p> <p><u>Methods of isolation: (1 mark)</u></p> <ol style="list-style-type: none">1. Distillation Method2. Solvent Extraction3. Ecuelle Method4. Enfleurage Method	4M



	<p><u>Methods of extraction: (any 2 methods – 1 ½ marks each)</u></p> <p>A) Distillation :Most of the oils are obtained by distillation which are of following 3 types</p> <p><u>1. Water distillation</u>-It is mostly applicable to such plant material, which is dried initially in air and the constituents are not degraded by boiling upto 100⁰C</p> <p>e.g Turpentine oil</p> <p><u>2. Water and steam distillation</u> – It is often suitable for plant materials (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 drug that is loaded with sufficient natural moisture and hence no maceration is required e.q. peppermint oil.</p> <p>B) Solvent Extraction :</p> <p>Extraction is done by using some organic solvents like ether, benzene, petroleum etc. Some essential oils are sensitive to heat and hence get decomposed during distillation, in such cases the plant material is directly treated with organic solvent at 50⁰C and the solvent is removed by distillation under reduced pressure.</p> <p>C) Ecuelle Method: is used for extraction of citrus oils, wherein oil cells in rind are ruptured mechanically using pointed projections by twisting raw material over them in clockwise direction either mechanically or manually.</p> <p>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. The process is continued till the fatty layer is saturated with volatile oil which are then extracted with lipid solvent.</p>	
2	<p>d) What are cardiotonics? Write the biological source ,chemical constituents and uses of Arjuna (1 mark for definition and 1 mark each for biological source ,chemical constituents and uses)</p> <p>These are the drugs which gives strength or energy to the activity of the heart. <u>OR</u></p>	4M



		<p>Cardiotonics are the drugs which gives strength or energy to the cardiac muscles.</p> <p><u>Arjuna :</u></p> <p>Biological Source: It consists of dried stem barks of the plant Terminalia arjuna Family: Combretaceae.</p> <p>Chemical constituents: Arjuna contains about 15% of tannins. It also contains triterpenoids saponins, arjunolic acid, arjunic acid, arjunogenin. It also contains β-sitosterol, ellagic acid and arjunic acid.</p> <p>Uses: (any 2 uses)</p> <p>It is used as cardiotonic. It is also styptic, febrifugal and antidysentric. It possesses diuretic and tonic properties.</p>	
2	e)	<p>Define Antiseptics and Disinfectants. Give biological source with family of – (1 mark each for definition and 1 mark each for biological source)</p> <p>Antiseptics: Antiseptics are the chemical sterilizing agents which are used to kill pathogenic microbes or for prevention of their growth. <u>OR</u></p> <p>An antiseptic is an agent which prevents sepsis by destroying or inhibiting the growth of microorganisms on living tissues.</p> <p><u>Disinfectants:</u> Disinfectants are the substances which are used to make a surface free from pathogenic organisms but these substances are applied only on inanimate objects.</p> <p><u>OR</u></p> <p>These are the substances which kill the bacteria as well as their spores.</p> <p>Biological Sources:</p> <p>(i) Neem: It is dried Leaves (aerial parts) & seed oil of Azadirachta indica, belonging to family Meliaceae.</p> <p>ii) Myrrh : It is an Oleo-gum-resin obtained from Commiphora molmol, belongs to family: Burseraceae</p>	4M



3		Attempt any THREE of following (4 marks each)	12M
3	a)	Give the chemical constituents and uses of – (i)Fennel (ii)Sandalwood (1 mark for chemical constituents and 1 mark for any two uses of each drug) (i) Fennel – Chemical constituents - Fennel consist of 3 to 7 % of volatile oil, about 20% each of proteins and fixed oil. The chief active constituents of volatile oil are a ketone, fenchone (about 20%) and phenolic ether, anethole (about 50%). The other constituents are phellandrene, limonene, methyl chavicol, anisic aldehyde. Uses - 1) Carminative, 2) An aromatic and a stimulant. 3) Expectorant. 4) Pharmaceutically, it is used as a flavouring agent. (ii) Sandalwood - Chemical constituents - The main product of sandal wood is the volatile oil (2.5%) called sandal wood oil. All the wood elements of this drug contain volatile oil. Sandal wood oil contains about 95% of two isomeric sesquiterpene alcohols, α - santalol and β – santalol. The oil also contains an aldehyde santalal, santene, santenone, teresantol. Uses- 1) It is used as a source of sandal wood oil. 2) The oil is used for symptomatic treatment of dysurea and in diminishing the frequency of micturition marked in the tuberculosis of the bladder.	4M

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		3) The oil is mainly used as a perfume in cosmetics and in incense sticks. 4) The wood is utilized for other purposes like carvings and manufacture of boxes.																			
3	b)	<p>Explain chemical classification of crude drug with its merits and demerits</p> <p>(2 marks for any four classes with atleast one example, 1 mark each for merits and demerits)</p> <p>This type of classification is based on type of chemicals present in the drugs.</p> <table border="1"><thead><tr><th>Class</th><th>Examples</th></tr></thead><tbody><tr><td>1. Alkaloids</td><td>Aconite, cinchona, nux-vomica, vinca, ipecac, belladonna, opium , tea</td></tr><tr><td>2. Glycosides</td><td>Digitalis, senna, squill, aloe, dioscorea, liquorice, wild cherry.</td></tr><tr><td>3. Lipids</td><td>Castor oil. Peanut oil, mustard, wool fat, cod -liver oil.</td></tr><tr><td>4. Volatile oils</td><td>Peppermint, clove, eucalyptus, valerian.</td></tr><tr><td>5. Tannins</td><td>Myrobalan, kino, catechu, galls</td></tr><tr><td>6. Vitamins</td><td>cod –liver oil, shark-liver oil</td></tr><tr><td>7. Resin and resin combinations</td><td>Benzoin, balsamof tolu, storax, asafoetida, myrrh , colophony, guggul , shellac.</td></tr><tr><td>8. Carbohydrates and derived products</td><td>Yeast, Agar, honey, starch, tragacanth, acacia, Guar gum, sterculia.</td></tr></tbody></table> <p><u>Merits: (any two)</u></p> <p>1. This type of classification is applicable to crude drugs containing similar type of chemicals.</p> <p>2. It is useful for phytochemical studies of crude drugs.</p> <p>3. Combination of drugs can be done for more or better therapeutic action.</p>	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	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	Yeast, Agar, honey, starch, tragacanth, acacia, Guar gum, sterculia.	4M
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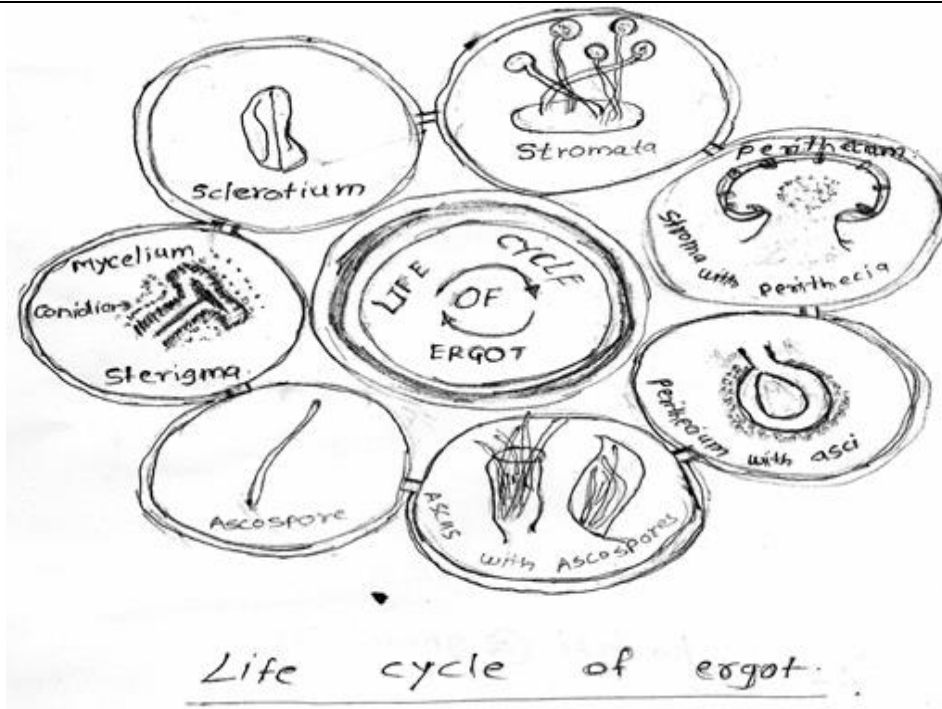
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	<u>Demerits:</u> 1. It is difficult to categorise the drug when it contains two or more active chemical constituents 2. The drugs from various sources are grouped together.													
3	c) How will you distinguish silk fibres from wool fibres using its source, solubility tests and two chemical tests? (2 marks for source, 1 mark for solubility test and 1 mark for chemical test.) <table border="1"><thead><tr><th>Sr No.</th><th>Silk fibre</th><th>Wool fibre</th></tr></thead><tbody><tr><td>1) Source</td><td>These are the fibre obtained from cocoons of Bombyx mori, family Bombycidae</td><td>These are the fibre obtained from fleece of sheep, Ovis aries, family Bovidae</td></tr><tr><td>2) Solubility test</td><td>Silk is soluble in cuoxam, sulphuric acid (66%) and concentrated hydrochloric acid.</td><td>Wool is insoluble in cuoxam, sulphuric acid (66%) and concentrated hydrochloric acid. It is soluble in 1.25M sodiumhydroxide solution.</td></tr><tr><td>3) Chemical test</td><td>Silk does not contain sulphur containing amino acids hence the test with lead acetate & KOH solution does not form black precipitate</td><td>Wool contain sulphur containing amino acids hence it gives black precipitate with lead acetate & KOH solution.</td></tr></tbody></table>	Sr No.	Silk fibre	Wool fibre	1) Source	These are the fibre obtained from cocoons of Bombyx mori, family Bombycidae	These are the fibre obtained from fleece of sheep, Ovis aries, family Bovidae	2) Solubility test	Silk is soluble in cuoxam, sulphuric acid (66%) and concentrated hydrochloric acid.	Wool is insoluble in cuoxam, sulphuric acid (66%) and concentrated hydrochloric acid. It is soluble in 1.25M sodiumhydroxide solution.	3) Chemical test	Silk does not contain sulphur containing amino acids hence the test with lead acetate & KOH solution does not form black precipitate	Wool contain sulphur containing amino acids hence it gives black precipitate with lead acetate & KOH solution.	4M
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3	d)	<p>Describe the life cycle of Ergot. (diagram 2marks & explanation 2 marks)</p> <p>Stages of life-cycle of Ergot are as follows -</p> <p>i) Over wintering stage</p> <p>ii) Stage of sexual reproduction iii) Stage of asexual reproduction</p> <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 contain several asci. Each ascus contains eight threads like ascospores. Ascospores come out & 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 & 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 & is known as honey –dew stage.</p> <p>In second stage , hyphae penetrate deeply into the ovary & develop into mass covering entire ovary which results in formation of elongated sclerotium & known as sclerotium stage. Sclerotium develops , attains maximum size & falls on ground and the cycle begins.</p>	4M
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3

e) Name any two adulterants for –(1 mark for any two adulterants of each drug)

4M

(i) **Senna** – i. Dog senna (Italian senna)

ii. Palthe senna

iii. Arabian senna

(ii) **Clove** – i. Mother clove

ii. Blown clove

iii. Clove stalks

iv. Exhausted clove.

(iii) **Nux-vomica**- i. Dried seeds of *Strychnos nuxblanda*ii. Dried seeds of *Strychnos potatorum*iv) **Digitalis** - i. Leaves of *Verbascum thapsus*

ii. The Primrose leaves

iii. Comfrey leaves



4		Attempt any THREE of following(4 marks each)	12M						
4	a)	<p>Define evaluation of crude drugs. Describe any three leaf constant used for drug evaluation with examples.</p> <p>(1 mark for definition and 1 mark each for any three leaf constants with any one example)</p> <p>Definition: Evaluation of a drug means confirmation of its identity and determination of its quality and purity.</p> <p>The various leaf constant used for drug evaluation are as follows –</p> <p>i. Stomatal number</p> <p>ii. Stomatal index</p> <p>iii. Vein islet number</p> <p>iv. Palisade ratio</p> <p>i. Stomatal number – It is the average number of stomata present per square mm. of the epidermis. Stomatal number is constant for particular species of same age which grows in same environment.</p> <table border="1"><thead><tr><th>Species</th><th>Stomatal number</th></tr></thead><tbody><tr><td>Datura stramonium</td><td>087 (upper epidermis)</td></tr><tr><td>Hyoscyamus niger</td><td>125 (upper epidermis)</td></tr></tbody></table> <p>ii. Stomatal index - It is the percentage which the number of stomata form to the total number of epidermal cells, each stoma being counted as one cell. It can be calculated by the formula :</p> $I = \frac{S \times 100}{E+S}$ <p>Where, I - Stomatal index</p> <p> S – Number of stoma per unit area</p> <p> E – Epidermal cells in same area</p>	Species	Stomatal number	Datura stramonium	087 (upper epidermis)	Hyoscyamus niger	125 (upper epidermis)	4M
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Species	Stomatal Index (lower surface)
Atropa belladonna	20.2 to 23.0
Atropa acuminata	16.2 to 18.3
Indian senna	17.0 to 20.0
Alexandrian senna	10.8 to 12.6

iii. **Vein islet number** – It is the number of Vein islets per square mm. of leaf surface.

Species	Vein islet number
Digitalis purpurea	02 – 5.5
Digitalis thapsi	8.5 – 16
Cassia angustifolia	19 – 23
Cassia acutifolia	25 - 30

iv. **Palisade ratio** – It is the average number of palisade cells, beneath one epidermal cell , using four continuous epidermal cells for the count.

Species	Palisade ratio
Atropa belladonna	06 – 10
Datura stramonium	04 – 07
Digitalis purpurea	3.7 – 4.2

4 b) Draw a well labelled diagram of T.S. of Nux vomica and describe its microscopy by giving minimum four points. (Diagram 2 marks , ½ mark each for any four points.) 4M

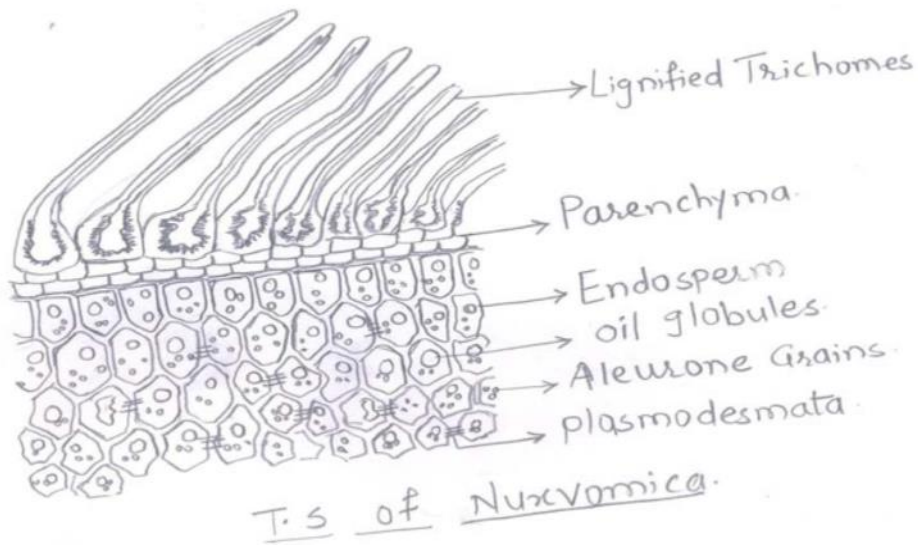


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- 1) Lignified trichomes: Thick walled, bent and twisted lignified trichomes, immerged from epidermis, parallel in one direction. Length: 600 to 1000, diameter about 25 μ
- 2) Epidermal cell: Single layer, forms lignified trichomes, large thick walled with oblique linear pits (base of trichomes).
- 3) Collapsed parenchyma: 2 layers, flattened parenchyma.
- 4) Endosperm: Thick walled cellulosic parenchymatous cells. Cell shows hemicelluloses in the cell wall
- 5) Plasmodesma: fine protoplasmic strands between the walls of endospermic cells.
- 6) Aleurone grains: About 30 μ in diameter. Only globoids are presents.
- 7) Oil globules: fixed oils as small oil droplets in the cells

4

c) Name the drug and their uses belonging to following family. (Any two)

4M

(1 mark for name of the drug, 1 mark for any two uses of any two of the above families.)

(i) **Acanthaceae - Vasaka**

Uses: It is used as an expectorant, bronchodilator and as mild bronchial antispasmodic. Vasicine is reported to possess oxytocic action.

(ii) **Caricaceae - Papaya**

Uses: It is used in clarification of beverages and as a meat tenderiser. It is used in cheese manufacture as a substitute of rennin . Medicinally it is used as digestant and an anti-



	<p>inflammatory agent. It has shown relieving symptoms of episiotomy.</p> <p>(iii) Gentianaceae – Shankpushpi</p> <p>Uses: It is used as bitter and nervine tonic. The fresh juice of the plant is prescribed in insanity, epilepsy and nervous debility. Alcoholic extract possesses antiviral activity against Ranikhet disease virus (chicks). It is also used in hypertension and tranquilizer.</p>																												
4	<p>d) Define pharmaceutical aids. Classify it according to their uses and application with examples. (1 mark – Definition , 3 marks for any 6 classes)</p> <p>Definition: 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><u>Classification with examples (any 6 classes with any one example for 3 marks)</u></p> <table border="1"><thead><tr><th>Sr.No.</th><th>Class</th><th>Example</th></tr></thead><tbody><tr><td>1</td><td>Acidulent</td><td>Tamarind, lemon juice</td></tr><tr><td>2</td><td>Colours</td><td>Turmeric, saffron, indigo, caramel, chlorophyll, β - carotene</td></tr><tr><td>3</td><td>Disintegrating agent</td><td>Starch, CMC, psyllium husk, microcrystalline cellulose.</td></tr><tr><td>4</td><td>Diluents</td><td>Cinnamon water, peppermint water, corn oil, peanut,oil,wild cherry syrup, sesame oil, glucose ,lactose</td></tr><tr><td>5</td><td>Emulsifying & suspending agent</td><td>Acacia, agar, gelatin, alginic acid, bentonite, methyl cellulose ,tragacanth ,guar gum</td></tr><tr><td>6</td><td>filter aid</td><td>Talc, bentonite, ,kieselghur.</td></tr><tr><td>7</td><td>flavours</td><td>Cardamom, rose, nutmeg, cinnamon, benzaldehyde, anethol, lemon oil, orange peel ,nutmeg</td></tr><tr><td>8</td><td>Hardening agents</td><td>Bees wax, hard paraffin</td></tr></tbody></table>	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	4M
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		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	
4	e)	Explain the Bortrager's test and Modified Bortrager's test. Give the significance for each test. (1 mark for each test and 1 mark for significance of each test) Bortrager's test: Boil the powdered leaves with dilute sulphuric acid. Filter immediately, separate the filtrate and cool. Mix the filtrate with double volume of organic solvents like benzene, chloroform or carbon tetrachloride. Shake it well and separate the organic solvent layer. To the layer of organic solvent add equal quantity of dilute ammonia. The ammonical layer becomes pink and finally red indicating the presence of anthraquinone derivatives. Significance: Bortrager's test is mainly used to identify anthraquinones derivatives present in Senna and Rhubarb. Modified Bortrager's test : To 0.1g of drug add 2ml 5% solution of ferric chloride and 2ml of dilute hydrochloric acid, heat on boiling water bath for 5 minutes, cool and shake gently with benzene. Separate benzene layer and add equal volume of dilute ammonia. A pinkish red			4M



		colour is produced with all varieties of aloes. Significance: Modified Borntrager's test is mainly used to identify C – glycoside in Aloe.	
5		Attempt any THREE of following(4 marks each)	12M
5	a)	Define and classify resin and resin combinations with examples.(1 Mark each for definition and 1 mark each for classification with any one example) Definition: Resins are amorphous mixture of essential oils, oxygenated product of terpenes and carboxylic acid and found as an exudation from the trunk of trees. According to the principle constituents ; (1 mark for any 2 classes) 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 Definition: Homogenous combinations of resins with other plant products like volatile oil ,gum etc. are known as resin combinations. The different resin combinations are (1 mark for any 2 combinations) 1.Oleo resin – (volatile oil + resin) e.g Ginger,capsicum etc 2.Oleo gum resin – (volatile oil + gum + resin) e.g. Asafoetida, Myrrh	4M



		<p>3.Glycoresins (Sugar + resin)</p> <p>e.g jalap , ipomoea</p> <p>4.Balsam-(Benzoic acid +cinnamic acid)</p> <p>e.g Tolu balsam, Peru balsam</p>	
5	b)	<p>Describe the method of preparation of cotton fibre.(4 Marks)</p> <p>Fruits (capsules) are 3-5 celled,, which contain numerous seeds..</p> <p>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.</p> <p>Remove impurities (vegetable debries) from raw cotton</p> <p>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.</p>	4M
5	c)	<p>Define with any two examples for each(½ mark for each definition and ½ mark for examples)</p> <p>i) Antitussives: Antitussives are the agents which acts upon the pulmonary membranes that hasten or alter expectoration. OR</p> <p>These are the agents which relieves or suppresses the cough.</p> <p>Example- Vasaka, Tulsi, Tolu balsam.</p> <p>ii) Diuretics: Diuretics are the drugs which increase the flow of urine</p> <p>Examples- Gokhru, Punarnava</p> <p>iii) Enzymes: Enzymes are protein substances, which serve a role of catalyzing the biochemical reactions.</p> <p>Examples- Papaya, Diastase, Yeast.</p> <p>iv) Vitamin: 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.</p>	4M



Examples- Amla, Shark liver oil

		Examples- Amla, Shark liver oil	
5	d)	<p>Assign the name of crude drug for following use with its chemical constituents.(any two) (1 Mark for drug name and 1 mark for chemical constituents)</p> <p>i) Antioxitocic and galactogogue Name of crude drug : Shatavari Chemical constituents: Steroidal saponin glycosides i.e. Shatavarins I-IV. The aglycone moiety of shatavarin is sarsapogenin & glycon moieties are glucose & rhamnose. Shatavarin-I: 3 glucose & 1 rhamnose moieties & in Shatavarin-IV: 2 glucose & 1 rhamnose moieties are attached to sarsapogenin.</p> <p>ii) Brain tonic: Name of crude drug : Shankpushpi Chemical constituents: Alkaloid- Shankpushpine Flavonoid- kampferol Also contain phytosterol, carbohydrates, xanthones & triterpenoides Also contain a bitter substance & an oleo resin.</p> <p>iii) In the preparation of insect repellent coils and sticks. Name of crude drug : Pyrethrum Chemical constituents: Active constituents are collectively known as pyrethrins, which are made up of carboxylic acid & keto-alcohols. Pyrethrin-I, cinerin-I, Jasmolin-I are esters of chrysanthemic acid, while Pyrethrin-II, cinerin-II, Jasmolin-II, are esters of pyrethric acid.</p>	4M
5	e)	<p>Mention the different methods used for drug adulteration with examples.(½ mark for each method & ½ mark for example of that method) Methods of Adulteration: (Any Four Methods)</p> <p>1. Replacement by exhausted drugs: Ex.1.Exhausted saffron is coloured artificially 2.Exhausted Ginger is mixed with starch & coloured.</p> <p>2.Substitution with superficially similar but inferior drugs: Ex.1. Adulteration of cloves by mother cloves. 2. Saffron with dried flower of carthamus tinctorius.</p>	4M



	<p>3.Substitution by artificially manufactured substituent:</p> <p>Ex.1. Paraffin wax is tinged yellow & substituted for yellow bees wax.</p> <p>2. Artificial invert sugar is mixed with honey.</p> <p>4.Substitution by sub- standard commercial varieties:</p> <p>Ex.1. capsicum frutescens(capsicum minimum), substituted by capsicum annum.</p> <p>2. Alexandrian senna with Arabian senna.</p> <p>3. Strychnos nux-vomica adulterated with Strychnos nux-blanda/ S. potatorum seeds.</p> <p>5. Presence of organic matter obtained from the same plant :</p> <p>Ex.1. clove are mixed with clove stalks.</p> <p>2. Caraway & Anethum fruits are mixed with other parts of inflorescence</p> <p>6.Synthetic chemical:</p> <p>Ex.1. Benzyl benzoate to balsam of peru.</p> <p>2. Citral to oil of lemon grass.</p> <p>7.Waste from market:</p> <p>Ex.1. Limestone in asafoetida.</p> <p>2. Pieces of amber coloured glass in colophony.</p>	
6	Explain chemical tests for the following crude drugs.(Any Four)(1 mark for each test)	12M
6	a) <u>Asafoetida: (any 3 tests)</u> i) When triturated with water, it forms yellowish orange emulsion. ii) On fractured surface of drug add sulphuric acid, red or reddish brown colour is observed. iii) Drug when treated with 50% nitric acid gives green colour. 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.	3M
6	b) <u>Pale catechu: (any 3 tests)</u> 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 green fluorescence. 2. Matchstick test: dip the wooden matchstick in the solution of drug and dry it over a flame.	3M

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		<p>Moisten the stick with hydrochloric acid and warm. Purple colour appears on the matchstick due to conversion of catechu into Phloroglucinol.</p> <p>3. Vanilline 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.</p> <p>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.</p> <p>5. With ferric chloride it gives bluish black colour.</p> <p>6. Lime water gives brown colour with aqueous solution pale catechu.</p>	
6	c)	<p><u>Tragacanth</u> :(any 3 tests)</p> <p>1. When warm with NaOH solution gives a canary yellow colour</p> <p>2. With iodine solution gives green colour</p> <p>3. With ruthenium red particles does not acquire pink colour</p> <p>4. Aqueous solution of tragacanth produces a white precipitate with lead acetate solution.</p> <p>5. Hydrolyse the aqueous solution of tragacanth with dil HCl by boiling in water bath. Cool it add equal quantity of fehling's solution A and B, heat again, red precipitate is observed.</p>	3M
6	d)	<p><u>Gelatin</u>: (any 3 tests)</p> <p>1) Aqueous solution of gelatin gives precipitate with solution of trinitrophenol and solution of tannic acid.</p> <p>2) On heating gelatin with soda lime solution, ammonia gas evolved.</p> <p>3) Aqueous solution of gelatin precipitates mercuric nitrate solution forming white colour, which turns brick red on heating.</p> <p>4) Formaldehyde makes gelatin hard and insoluble after drying.</p>	3M

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6	e) <u>Benzoin: (any 3 tests)</u> 1) To a solution of benzoin in alcohol add water. Solution becomes milky & acidic to litmus 2) To the drug add solvent ether, decant ether layer & to it add 2/3 drops of H ₂ SO ₄ A deep reddish brown colour in case of Sumatra Benzoin. A deep purplish-red colour in case of Siam Benzoin. 3) Heat Benzoin in a test tube with solution of KmnO ₄ , it develops Strong odour of benzaldehyde. 4) To the alcoholic solution of Benzoin add FeCl ₃ , Green colour develops in case of Sumatra Benzoin. 5) Heat small quantity of benzoin in dry test, cover the opening of test tube with clean dry glass slide, cool it and observe glass slide under microscope, cinnamic acid crystals are observed.	3M
6	f) <u>Honey: (any 3 tests)</u> 1) Stir 10ml of honey with 5ml of solvent ether for 5-10 minutes, 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 resorcinol in hydrochloric acid, Pure honey should not give cherry red colour. As artificial honey contains furfural it gives red colour. 2) Fehling's Test: Take 2 ml of aqueous solution of honey and to it add Fehling's solution A and B. The reaction mixture is heated on a steam bath for 5-10 minutes. A brick red colour is produced due to presence of reducing sugars. 3) Benedict's Test: To 1 ml of aqueous solution add 2 ml (10 drops) of Benedict's reagent (CuSO ₄). The solution is then heated in a boiling water bath for 3-5 minutes. Reddish precipitate is observed 4) Molisch's Test: To 2 ml of aqueous solution of honey add 5 drops of Molisch's reagent mix well and add 2ml of Conc. H ₂ SO ₄ from the side of the test tube. Violet/purple ring is observed at the junction of two liquids. 5) Tommer's Test: To 2 ml of aqueous solution of honey add tommers reagent (NaOH+CuSO ₄), boil for 2 minutes & cool. Red colour is observed. 6) Barfoed's Test: To 2 ml of aqueous solution of honey add Barfoed's reagent, boil for 2 minutes & cool. Brick red precipitate is observed.	3M