



Subject Title: PHARMACOGNOSY

Subject Code:

20113

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 the 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, the examiner may give credit for principal components indicated in the figure. The figures drawn by candidate and model answer may vary. The examiner may give credit for any equivalent figure drawn.
- 5) Credits may be given step wise for numerical problems. In some cases, the assumed constant values may vary and there may be some difference in the candidate's answers and model answers.
- 6) In case of some questions credit may be given by judgement on part of the examiner of relevant answers based on the candidate's understanding.
- 7) For programming language papers, credit may be given to any other program based on an equivalent concept.

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20113

Q. No.	Sub Q.N.	Answer	Marking Scheme
1		Answer any SIX of the following	30 M
1	a)	<p>Write biological source and chemical constituents and uses of Belladonna and Ephedra.(1 Mark for B.S of each drug, ½ Mark for Chemical Constituents each drugs and 1Mark for any two uses of each drug)</p> <p>Belladonna</p> <p>Biological Source- It consists of dried leaves & other aerial parts of Atropa belladonna or Atropa acuminata belonging to the family Solanaceae.</p> <p>Chemical constituents</p> <ol style="list-style-type: none">1.Tropane alkaloid- Atropine(Hyoscyamine) & Scopolamine(Hyoscine).2.Also contains apoatropine, asparagine & cholin, pyridine, N-methyl pyrroline3.Florescence substance β-methyl aesculatin (scopoletin) gives blue fluorescence with alcoholic ammonia4.Calcium oxalate <p>Uses (any two)</p> <ol style="list-style-type: none">1.Decrease sweat gland secretion- Antiperspirant2.Decrease salivary & gastric secretion3.Antispasmodic in case of intestinal gripping.4.Bronchial muscle relaxant, used in asthma, bronchitis, whooping cough.5.In ulcer6.Mydriatic (means- dilation of the pupil of the eye)7.CNS Depressant8.Used in motion sickness.9.Antidote in opium & chloral hydrate poisoning.	2½ M



Ephedra

Biological source. : It consists of dried young stems of Ephedra gerardiana and Ephedra nebrodensis belonging to the family Genetaceae or Ephedraceae.

Chemical constituents

- 1.Contains about 1-1.5% Phenyl ethyl amine type of alkaloid- Ephedrine(30-90%)
- 2.Other alkaloids are : pseudo ephedrine,L- methyl ephedrine, Dimethyl ephedrine Norephedrine

USES (any two)

- 1.Ephedrine is Sympathomimetic Drug used as bronchodilator
- 2.It is used for relief of asthma, rhinitis ,whooping cough and hay fever
- 3.CNS Stimulant
- 4.Due to Vasoconstriction shows rise in B.P.
- 5..Mydriasis.

2½ M

1 b) Explain pharmacological system of classification of crude drugs with merits and demerits. (2Marks for description, 1 ½Marks for Merits and 1½ Marks for Demerits)

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 behaviour and chemical nature.

Examples –

- Carminatives – Coriander ,Fennel, Cinnamon ,Clove etc
Purgatives –Senna ,Rhubarb,Aloe etc
Cardiotonics –Digitalis ,Arjuna
Astringents – Black and pale catechu
Antihypertensive –Rauwolfia
Anti-tumor –Vinca

2M



		<p>Antirheumatics- Colchicum, Guggul</p> <p>Merits:</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 drugs can be used to improve its action.</p> <p>Demerits:</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 effects are the same are put together.</p> <p>3)It does not show chemical constituents or morphology of drugs.</p> <p>4. Some drugs show more than one pharmacological action that is difficult to put in any category.</p>	<p>1½M</p> <p>1½M</p>
1	c)	<p>Which parameters are considered for the evaluation of crude drug. Write any four methods or adulterations and substitutions. (1Mark for Parameters, 4Marks for any four Methods,)</p> <p>Parameters:</p> <p>Confirmation of identity, purity and quality are the three parameters used in drug evaluation. Such an evaluation can be done by examining characteristics under the Organoleptic evaluation, Microscopic evaluation, Physical evaluation , Chemical evaluation and Biological evaluation.</p> <p>Methods of Adulteration :(Any Four)</p> <p>1. Replacement by exhausted drugs</p> <p>Ex. a).Exhausted saffron is coloured artificially</p> <p>b)Exhausted Ginger is mixed with starch & coloured.</p> <p>2.Substitution with superficially similar but inferior drugs</p>	<p>1M</p> <p>4M</p>



Ex.a). Adulteration of cloves by mother cloves.
b). Saffron with dried flower of carthamus tinctorius.

3.Substitution by artificially manufactured substituent

Ex.a) Paraffin wax is tinged yellow & substituted for yellow beeswax.
b). Artificial invert sugar is mixed with honey.

4.Substitution by sub- standard commercial varieties

Ex. a) capsicum frutescens (capsicum minimum), substituted by capsicum annum.
b) Alexandrian senna with Arabian senna.
c) Strychnos nux-vomica adulterated with Strychnos nux-blanda/ S. potatorum seeds.

5. Presence of organic matter obtained from the same plant

Ex .a) cloves are mixed with clove stalks.
b) Caraway & Anethum fruits are mixed with other parts of inflorescence

6.Synthetic chemical

Ex. a) Benzyl benzoate to the balsam of peru.
b) Citral to oil of lemon grass.
c) Camphor oil and eucalyptus oil in the oil of rosemary.

7.Waste from market

Ex .a) Limestone in asafoetida.
b) Pieces of amber coloured glass in colophony.
c) White oil in oil of Coconut.
d) Stearin or paraffin in cocoa butter.

1 **d)** **Define alkaloids and volatile oil. Explain the test which performed for the identification of anthraquinone glycosides and tropane alkaloids.**
(1Mark for each Definition, 1½ Marks for Anthraquinone glycoside test, 1½ Marks for tropane alkaloid test)

Alkaloids: Alkaloids are basic, nitrogenous, organic compounds or products of plant origin having marked physiological action when it is administered by oral route in small doses.

1M

**Subject Title: PHARMACOGNOSY**

Subject Code:

20113

	<p>Volatile oils: Volatile oils are odorous and colourless principles of plants and animal sources which get evaporated when exposed to air.</p> <p>Identification Test:</p> <p>Tropane alkaloid : Vitali –Morin test :</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 indicating the presence of tropane alkaloids.</p> <p>Anthraquinone glycoside</p> <p>Borntrager’s test: Boil the powdered leaves with dilute sulphuric acid. Filter immediately, separate the filtrate and cool. Mix the filtrate with a 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 an equal quantity of dilute ammonia. The ammoniacal layer becomes pink and finally red indicating the presence of anthraquinone derivatives.</p> <p>Significance: Borntrager’s test is mainly used to identify anthraquinones derivatives present in Senna .</p> <p style="text-align: center;">OR</p> <p>Modified Borntrager’s test : To 0.1g of drug add 2ml 5% solution of ferric chloride and 2ml of dilute hydrochloric acid, heat in 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 colour is produced with all varieties of aloes.</p> <p>Significance: Modified Borntrager’s test is mainly used to identify C – glycoside in Aloe.</p>	<p>1M</p> <p>1½ M</p> <p>1½ M</p>
1	e)	Define Oxytocics. Explain Ergot life cycle with a diagram.(1Mark for Definition,

**2Marks for explanation & 2Marks for diagram)**

Oxytocics: These are the drugs which have stimulant effect on the motility of the uterus.

OR

An agent that causes expulsion of the contents of the uterus by contracting the uterine smooth muscles.

Ergot life cycle with a diagram

The stages of life cycle of Ergot can be described as-

- (i) Overwintering stage.
- (ii) Stage of sexual reproduction, and
- (iii) Stage of asexual reproduction

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 air current. The dispersal of ascospores takes place at the time of flowering of the rye plant which is the host. The ascospores become entangled with the feathery stigmas of the host and produce mycelia which penetrate through the ovary. The mycelia give rise to conidia, produced from the surface of the ovary. The honeydew is sweet in taste and attracts 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.

Diagram:

1M**2M**



2M



Fig°- Life cycle of Ergot

1

f)

Explain basic principles involved in Ayurvedic and Homeopathic system of medicine (2½Marks for each principle)

Ayurvedic System of medicines:

Principle:

Ayurveda is based on following Three fundamentals principles:-

(1) Panchmahabhuta:- 5 elements- Mahabhutas:-

- i).Pruthvi (Earth),
- ii).Apa (Water),
- iii)Teja (Fire),
- iv)Vayu (Air),

2½ M



v) Akash (Void/space)

Every substance- Made of 5 Elements- each possesses its own characteristic, property, effect, etc. Body takes these elements from nature and again releases it. Imbalance causes unhealthy conditions.

(2) Tridosha Theory:

Basic factors- Vata, Pitta, Kapha.

i). Vata(space+air)

ii). Pitta(energy+liquid)

iii). Kapha(solid+liquid)

The seven forms of Tridosha are called 'SAPTADHATU'. These saptadhatu undergo wear and tear processes and form excretory material or mala.

When these tri dosh, saptadhatu and mala are in balanced form, the condition is healthy. But if it is in imbalanced form there are pathological disorders.

(3) Guna, Rasa, Virya, Vipaka, Prabhava.

The five important pharmacological principles of Dravya or drug substance are-

Guna- Quality

Rasa- Therapeutically active agent

Virya- Active principle by which potency is characterized.

Vipaka- End product of digestion.

Prabhava- Actual therapeutic activity.

These are 5 important principles of drug. These are called as Phanchsheel- 5 pillars of ayurvedic therapeutics which covers entire range of diseases.

Homeopathic system of medicines:

Principle:

Homeopathic medicine system works on the principle of "Similia Similibus Curentur" – It means that like diseases are cured by like medicine. (Means 'Likes are cured by likes'). Drugs produce similar symptoms as the disease (in healthy human beings) are administered.

Fundamental principles of Homeopathy: (Any of the following five points)

2½ M



MODEL ANSWER
SUMMER- 22 EXAMINATION

Subject Title: PHARMACOGNOSY

Subject Code:

20113

1. Law of Simillia: Drug used in the disease (if given to a healthy person) which produces similar symptoms in a healthy person as found in the diseases. Thus the symptoms of the disease are to be matched with the pathogenesis caused by the drug.

2. Individualization- No two individuals are alike in the world. Two individuals suffering from the same disease show different responses hence medicine should be different.

3. Law of Simplex:- single and simple medicine are prescribed at a time. (Combination is not allowed)

4. Law of minimum dose:- Drugs are administered in minimum quantity to prevent any hypersensitivity. Also, chances of adverse effects are reduced or avoided if minute dosage is used.

5. Drug proving:- Curative power of a drug is judged by its ability to produce disease-like symptoms in a healthy individual. Thus, exhibition of disease-like symptoms in an healthy individual by the drug proves its curative power.

6. Drug dynamization or Potentialization – Potency of drugs can be enhanced by dilution. Dilution removes the unwanted toxic principles of drugs. Hence no adverse effects (but dynamically more effective)

7. Vital force- Disease: disharmonious flow of the vital force.
Treatment: restore disordered vital force to normal.
Disease and health are two different quantitative states of this vital force.

1 g) Define laxatives. Write chemical tests of i) Turmeric ii) Asafoetida (1Mark for Definition, 2Marks for each chemical test)

Laxatives: Drugs that loosen the bowels

OR

The drugs producing, increasing and hastening intestinal evacuation.

OR

The drugs which promote defecation.

Chemical test for Asafoetida.(Any two)

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

1M

2M



MODEL ANSWER
SUMMER- 22 EXAMINATION

Subject Title: PHARMACOGNOSY

Subject Code:

20113

	<p>ii) On fractured surface of drug add sulphuric acid, red or reddish brown colour is observed.</p> <p>iii) Drug when treated with 50% nitric acid gives green colour.</p> <p>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.</p> <p>Chemical test for Turmeric. (Any two)</p> <ol style="list-style-type: none">1. Powdered drug with sulphuric acid gives crimson colour.2. The aqueous solution of turmeric with boric acid gives reddish colour which on addition of alkali changes to greenish blue.3. With acetic anhydride and concentrated sulphuric acid, it gives violet colour, When this test is observed under U.V. light, red fluorescence is seen.4. Prepare a tincture of turmeric and impregnate a filter paper with it. Treat the impregnate paper with borax solution, a green colour is produced.5. Take powdered turmeric in a test tube or on slide and add a solution of sodium hydroxide or potassium hydroxide, the powder gives red to violet colour.	2M
2	Answer any TEN of the following	30 M
2	<p>a) Define Pharmacognosy. Write the name of a scientist who described the method of extraction. Also explain galenical pharmacy.(1Mark for definition, 1Mark for name of scientist and 1Mark for Galenical pharmacy)</p> <p>Definition: Pharmacognosy is defined as the scientific and systematic study of structural, physical and biological characters of crude drugs along with their history, method of cultivation , collection and preparation for the market.</p> <p>Scientist: Galen described the methods of extraction.</p> <p>Galenical Pharmacy:</p> <p>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</p>	1M 1M 1M



		which deals with extraction of chemical constituent from plants & animals is called as galenical Pharmacy	
b)	Define herbal Formulations. Write two examples of herbal solid dosage forms. Give therapeutic applications of Garlic.(1Mark for definition, 1Mark for any two examples and 1Mark for any two therapeutic applications)		
	Definition: Herbal formulation means a dosage form consisting of one or more herbs or medicinal plants or processed herbs in a specified quantities to provide specific nutritional, cosmetic benefits and/or other benefits meant for use to diagnose,treat and mitigate diseases of human beings or animals and/or alter the physiological function of human beings or animals.		1M
	Examples of herbal solid dosage forms: (Any Two) i) Herbal tea ii) Herbal powder iii) Herbal granules iv) Pills v) Herbal Tablets vi) Capsules vii) Lozenges		1M
	Therapeutic applications of Garlic: (Any Two) 1. aphrodisiac, 2. antispasmodic, 3. expectorant 4. anthelmintic 5. rubefacient 6. It decreases cholesterol level & used in hypertension & atherosclerosis		1M



	<p>7. The Allicin & Alliin are potent antibacterial ingredients against gram +ve & gram-ve bacteria.</p> <p>8. Garlic has been reported to reduce the risk of colon cancer and lung carcinoma.</p>	
c)	<p>Explain and write the significance of Ash value and extractive value.(1½Marks for explanation and significance of each)</p> <p>Ash value: The residue remaining after incineration is the ash content of the drug.It can be calculated as Total Ash value,Acid insoluble ash value,Water soluble ash value and Sulphated ash value</p> <p>Significance of ash value: 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>Extractive value: Extractive values which are determined by exhausting the crude drugs with different solvents are indicative of total soluble constituents of the drug in that particular solvent. It can be determined as Water soluble extractives,Alcohol soluble extractives,Alcohol insoluble extractives and Ether soluble extractives.</p> <p>Significance of Extractive value: It is used to assess quality, purity and to detect adulteration.</p>	<p>1½ M</p> <p>1½ M</p>
d)	<p>Define surgical dressings, State the Ideal requirements of surgical dressings (1Mark for definition, 2Mark for any four ideal requirements)</p> <p>Definition of Surgical dressings:</p> <p>Surgical dressing term is utilized to incorporate all structures whether used alone or in conjunction with others to cover a wound.</p> <p style="text-align: center;">OR</p> <p>Surgical dressings are the materials used for covering the wounds or injuries and to be applied singly or in combination.</p> <p>Ideal requirements of surgical dressings : (Any four)</p> <p>i) They should be sterilized before use.</p> <p>ii) They should be stored in a dry well- ventilated place at a temp. not exceeding 25°C.</p>	<p>1M</p> <p>2M</p>



MODEL ANSWER
SUMMER- 22 EXAMINATION

Subject Title: PHARMACOGNOSY

Subject Code:

20113

	<p>iii) They should be used with permitted antiseptics in prescribed concentration only. iv) They should not be dyed unless mentioned in the monograph. v) Adhesive products should not be allowed to freeze. vi) There should not be any loose threads, fibre-ends in dressings. .</p>	
e)	<p>State the therapeutic applications of Ipecac, Artemisia and Ephedra.(1Mark for any two therapeutic application of each drug)</p> <p>Therapeutic applications of Ipecac: (Any Two)</p> <ol style="list-style-type: none">1. Emetine is used in treatment of amoebic dysentery.2. Emetic,3. In small doses used as expectorant <p>Therapeutic applications of Artemisia: (Any Two)</p> <ol style="list-style-type: none">1. Artemisinin shows antimalarial effects by its rapid blood schizonticidal activity.2. Artemisinin is the most potent drug for treating cerebral malaria.3. Artemisinin has shown Anti- HIV activity.4. Artemisinic acid is used as an antibacterial , anti-inflammatory. <p>Therapeutic applications of Ephedra: (Any Two)</p> <ol style="list-style-type: none">1. Ephedrine is a Sympathomimetic2. Drug used as bronchodilator,3. CNS Stimulant.4. Due to Vasoconstriction shows rise in B.P.	<p>1M</p> <p>1M</p> <p>1M</p>
f)	<p>Write uses of Spirulina and prebiotics.(1½Mark for any three uses for each)</p> <p>Uses of Spirulina: (Any Three)</p> <ol style="list-style-type: none">1. Immunostimulant activity2. Used in treatment and management of HIV and other viral infections such as Herpes, Influenza, mumps and measles virus.3. It stimulates the activity of spleen, and bone marrow stem cells.4. Antioxidant, due to presence of enzymes superoxide dismutase so used in treatment of atherosclerosis, arthritis, cataract, diabetes and ageing process.5. Gamma linolenic acid of spirulina helps to reduce cholesterol levels. It has	<p>1½ M</p>



appetite suppressing activity.

Uses of Prebiotics: (Any Three)

1. Health benefits include improved calcium absorption, decreases in allergy risk, improved immune system defense and other positive effects on metabolism.
2. Used in the treatment of irritable bowel syndrome.
3. Neutralises the toxins.
4. Prebiotics stimulate the growth of beneficial microbes in the gut, which in turn reduce colonial luminal pH.
5. A healthy microbiome is also associated with improved mucosal barrier integrity, and protecting the gut lining from damage and increased permeability.

1½ M

g) Differentiate between:(1½Marks for any three differentiate points for each)

i) Antiseptics and Disinfectants with examples. (Any Three)

Sr. No.	Antiseptics	Disinfectants
1	An antiseptic is a substance that stops or slows down the growth of microorganisms on the external surfaces of the body and helps to prevent the infections	Disinfectant is the substance which kills microbes & their spores.
2	Can be applied on living tissues or on wounds.	Can be applied on non- living surfaces.
3	Used to prevent sepsis	Used to clean non- living surfaces & sterilize glass apparatus, drainage systems.
4	Are not as strong as disinfectant	Disinfectants are stronger & more toxic than antiseptics.

1½ M



MODEL ANSWER
SUMMER- 22 EXAMINATION

Subject Title: PHARMACOGNOSY

Subject Code:

20113

5	Ex. Neem, Turmeric, Benzoin	Ex. Formaldehyde, Alcohol, phenol
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ii) Organised and Unorganised crude drugs with examples.(Any Three)

Sr.No	Organized crude drug	Unorganized crude drug
1	It is obtained from definite anatomic parts of the plants such as flowers, leaves, fruits etc.	It is obtained from plants or animals by means of physical process such as drying, incision, extraction such as juices, resins.
2	It is made up of definite tissue and cells.	It does not have cellular structure
3	It is solid in nature	It is solid, semi-solid and liquid in nature.
4	Microscopical characters are used for identification.	Chemical tests and physical standards are used for identification.
5	Botanical and zoological terminology can be used to describe the drug	Botanical and zoological terminology is inadequate. To describe these drugs, physical characters such as solubility, optical rotation, refractive index are used.
6	Ex. Coriander , fennel, datura, etc	Ex.Aloe , bees wax, tragacanth, asafoetida etc.

1½ M

h) Define nutraceuticals and antioxidants. Also give their therapeutic applications. (½ Mark for each definition , 1Mark for therapeutic applications of each)

Definition of Nutraceuticals:

Nutraceuticals is defined as a substance which can be considered as food or part of food which in addition to its normal nutritive value provides health benefits including

½ M



prevention and treatment of disease.

Therapeutic applications: (Any Two)

1. Nutraceuticals provide several therapeutic benefits such as anti- arthritic, cold and cough, sleeping disorders, and digestion.
2. Nutraceuticals are used to prevent certain cancers.
3. They are used in osteoporosis, blood pressure, cholesterol control, pain killers, depression and diabetes.
4. Nutraceuticals are also used in the management of diverse clinical conditions such as Allergy, Eye infection, Alzheimer's disease, Parkinsonism, Cardiovascular diseases, diabetes, etc.
5. Nutraceuticals are widely used in the food and pharmaceutical industries.

1M

Definition of Antioxidants:

Antioxidants or inhibitors of oxidation are compounds which retard or prevent the oxidation in general and prolong the life of the oxidisable matter.

½ M

Therapeutic applications: (Any Two)

1. Antioxidants are substances that may protect cells from the damage caused by unstable molecules known as free radicals.
2. They prevent heart and liver diseases, some cancers, arthritis, accelerated aging, eye sight deterioration and neurodegenerative diseases.
3. Beta- carotene and vitamins are shown to cause antioxidant effects and immune enhancement.
4. Vitamin E (Tocopherol) is a major radical trapper in lipid membranes and is found clinically useful in cardiac damage and carcinogenicity.

1M

- i) **Define medicinal and aromatic plants. State the role of medicinal and aromatic plants in the national economy. (½ Mark for each definition and 2 Marks for role of MAPs in the national economy)**

Definition:

Medicinal plants: are those plants that have a recognized medicinal value.

½ M

OR



Medicinal plants can be defined as the plants that possess therapeutic properties or exert beneficial pharmacological effect on the human

Aromatic plants: are those that contain aromatic compounds basically essential oils

Role of medicinal and aromatic plants in the national economy:

- 1) Medicinal and aromatic plants form a numerically large group of economically important plants which provide basic raw materials for medicines, perfumes, flavours and cosmetics.
- 2) A recent study indicates that the herbal drug market continues to grow at the rate of 15% annually.
- 3) Several hundred genera are used in herbal remedies and in traditional or folklore medicines throughout the world.
- 4) The World Health Organisation(WHO) estimated that 80% of the population of developing countries rely on herbal medicines for their treatment.
- 5) Medicinal and aromatic plants and their products not only serve as a valuable source of income for small land holder farmers and entrepreneurs but also earn valuable foreign exchange by way of export.
- 6) Medicinal and aromatic plants are a good resource to develop new medicines and treat the body and mind which is known as naturopathy. They are useful for improving health and life.
- 7) Many synthetic medicines are based on plant extracts, which are used to create new modern medicines.

½ M**2M****j)**

Write the method of preparation of Arishta and Gutika.(1½Marks for each)

Method of preparation of Arishta

Decoction is prepared from coarsely powdered drugs as per the formula
Strained decoction is placed in a fermenting vessel and a weighted quantity of sugar, jaggery or honey is dissolved, heated and added. Prakshepa dravyas are added. Then Dhataki- pushpa (Dhayati-flowers), if mentioned in the formula, are then added. The opening of the vessel is then closed with lid & Sealed with clay smeared cloth with 7 consecutive layers.
After a specified period, the contents are examined to ensure the fermentation

1½ M



MODEL ANSWER
SUMMER- 22 EXAMINATION

Subject Title: PHARMACOGNOSY

Subject Code:

20113

	<p>(Sadhana) is complete.</p> <p>Finally, the fluid is decanted and strained after 2-3 days and then bottled.</p> <p>Method of preparation of Gutika:</p> <p>Drugs of Plant origin are dried & made into fine powders separately.</p> <p>The Minerals are Made into bhasmas or sinduras, unless otherwise mentioned.</p> <p>Where Parada (Mercury) & gandhaka (Sulphur) are mentioned. Kajjali is made first with other drugs added one by one according to the formula.</p> <p>They are Put into Khalva (Mortar) & ground to soft Paste with the prescribed fluids. When the mass is Properly ground & is in a condition to be made into pills Sugandh dravyas are added & ground again.</p> <p>The Final pill mass should not stick to the fingers when rolled.</p> <p>Pills may be dried in shade or in the sun.</p> <p>When Sugar/ jaggery is mentioned is mixed when still warm and & dried in shade.</p>	<p>1½ M</p>
<p>k)</p>	<p>Write biological source and uses of lavender oil and sandalwood oil. (½ Mark for biological source and 1 Mark for two important uses of each drug)</p> <p>Biological Source of Lavender oil:</p> <p>It consist of essential oil obtained by distillation of the flower spikes of Lavandula angustifolia and Lavandula officinalis belonging to the family Labiatae</p> <p>Uses of Lavender oil: (Any two)</p> <ol style="list-style-type: none">1. It has antiseptic and anti- inflammatory properties, thus can be used as anti- acne agent, thus beneficial for healing burns as well as the scars caused by them.2. It promotes hair growth and treats various hair problems like hair loss, itchy scalp, dandruff, and prevents greying of hair.3. Prevents wrinkles around the eyes.4. Reduces stretch marks5. Lavender aromatherapy has been utilized to increase mental capacity and diminish fatigue, to improve mood and perceived levels of anxiety.6. Oil is used in making soaps, face washes and body lotions.	<p>½ M</p> <p>1M</p>



		<p>Biological source of Sandalwood oil:</p> <p>It consists of volatile oil obtained by steam distillation of heartwood of plant Santalum album belonging to the family Santalaceae.</p> <p>Uses of Sandalwood oil:(Any two)</p> <p>(i)It removes scars, blemishes, thus useful to get clean bright and flawless skin.</p> <p>(ii)It is a common ingredient in face packs and cosmetic cream.</p> <p>(iii)Due to its potent antimicrobial property, it is useful in acne infection as well as in itchy skin.</p> <p>(iv)The antioxidant action of oil produces beneficial effect in skin ageing and wrinkles</p> <p>(v)In hair care cosmetics, it is being used to control dandruff and cure itchy scalp.</p> <p>(vi)It is a common fixative agent for most of the perfumes and deodorants.</p>	<p>½ M</p> <p>1M</p>
3		Answer ALL Questions of the following	20M
	a)	Name the fibre which contains Keratin. Ans: Wool.	1M
	b)	Name the drug called as banda soap Ans: Nutmeg	1M
	c)	Write the name or drug having the synonym bishop's weed. Ans: Ajowan	1M
	d)	Name the drug which contain shogaol. Ans: Ginger	1M
	e)	Which drug is used in treatment of Rheumatism. Ans: Colchicum seed OR Guggul	1M
	f)	Name the drug which contain Reserpine Ans: Rauwolfia	1M
	g)	Write the name of drug having synonym puncture vine Ans: Gokhru	1M



MODEL ANSWER
SUMMER- 22 EXAMINATION

Subject Title: PHARMACOGNOSY

Subject Code:

20113

	<p>h) Give one example of Probiotics Ans:Yogurt , kombucha, sauerkraut, pickles, kimchi, certain breads and some cheeses (Any one)</p>	1M
	<p>i) In case of vasaka and Clove which part of the plant is used as a drug. Ans: Vasaka: dried as well as fresh leaves Clove : dried flower buds.</p>	½ M each
	<p>j) Write two main constituents of Guggul. Ans: Z-Guggulsterone and E-Guggulsterone, Guggulsterol-I,II,III, Myrcene,Dimyrcene,Polymyrcene,Caryophyllene.(Any Two)</p>	½ M each
	<p>k) Write two cosmetic uses of olive oil. Ans: Cosmetic Uses: (Any Two) 1)The presence of phytosterols and triterpenic compounds in olive oil confers lenitive and revitalizing properties for dry and wrinkled skin. 2)The antioxidant action of vitamin E and A prevents skin irritation from aging and maintains the soft smooth and natural elasticity of the skin. 3)It also has hair strengthening properties. 4) It has emollient, moisturizing and skin softening property, thus important components of hand lotion, lip balms, shampoo and oil for bath massage.</p>	½ M each,
	<p>l) Name the drug which contain alillin Ans: Garlic</p>	1M
	<p>m) Name the drug belonging to combretaceae family Ans: Arjuna OR Myrobalan</p>	1M
	<p>n) Name the drug for which thalloquin test is performed Ans: Cinchona</p>	1M
	<p>o) Write one commercial preparation of aloe vera gel. Ans: Nyle Natural Clean and Shine shampoo OR Dabur Vatika Aloe vera Hair Oil OR Aloe moisturizing Hand cream,etc..(Any other commercial preparation can be considered)</p>	1M

**MODEL ANSWER**

SUMMER- 22 EXAMINATION

Subject Title: PHARMACOGNOSY

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20113

p)	Name the drug for which Keller killani test is performed. Ans: Digitalis	1M
q)	Write two main constituents of rosemary oil. Ans: Main constituents of rosemary oil: (Any two) Monocyclic and bicyclic terpenoids such as alpha-pinene, borneol, camphor, bornyl acetate, camphene, 1,8-cineol and limonene. The plant contains various antioxidant polyphenols, mainly phenolic diterpenoids such as carnosic acid, carnosol and rosmarinic acid.	1/2 M each
r)	Name the phytoconstituents for which Libbermann burchard test is performed Ans: Steroids and Terpenoids	1/2 M each
s)	Give one example of modern herbal formulation. Ans: Phytosomes, Liposome, Nanoparticle, Ethosomes, Microemulsions, Implants, Micropellets (Any one of these examples)	1M
t)	Enffleurage method is use for the isolation of which phytochemicals. Ans: Volatile oil.	1M