

BOARD SOLVED QUESTION
WITH ANSWER

Year : 2023

Subject : Pharmacognosy

Subject Code : ER20-13T

Subject In-Charge : Adyasha Senapati



DO NOT WRITE ANYTHING ON YOUR QUESTION PAPER EXCEPT YOUR ROLL NO.
QUESTION PAPER CONTAINING ANYTHING WOULD BE TREATED AS MALPRACTICE

Answer the questions serially and continuously

Subject: PHARMACOGNOSY (Theory)

Full Mark -80

Time -3 hrs.

1. Long Answer type question (Answer any six) (6x5)
- Define the term Herbal cosmetic. Write biological source, chemical constituent, commercial preparation & cosmetic uses of Chandan.
 - Discuss about the role of medicinal & aromatic plants in national economy & their export potential.
 - Write down the methods of preparation of asava formulation.
 - Define the term Nutraceuticals & classify it. Write note on spirulina.
 - Describe in detail about the pharmacognostic study of wool.
 - Write details about the Phytochemical test used for glycosides and alkaloids.
- g/ write a short note on Engat.
2. Short answer type questions (answer 10 out of 11) (10x3)
- Differentiate between pale catechu and black catechu.
 - Write a short note on Umbelliferous fruits.
 - Define stomatal number and stomatal index.
 - Write details on scope of Pharmacognosy.
 - Write the biological source and chemical constituents of Gokhru & Punarnava.
 - What do you mean by refractive index ?
 - Write short notes on Phytosomes.
 - What are prebiotics & probiotics ?
 - Write short notes on Carminative & G.I. regulators.
 - Write down the basic principles of Siddha system of medicine.
 - Write the biological source, chemical constituents & uses of senna.
3. Write down the biological sources of the following (within twenty words): (1x20)
- | | | | |
|-----------------|----------------|-----------------|-----------------|
| i) Isapaghula | ii) Ipecac | iii) Myrrh | iv) Ashwagandha |
| v) Saffron | vi) Asafoetida | vii) Gum acacia | viii) Vinca |
| ix) Kaolin | x) Silk | xi) Artemisia | xii) Castor oil |
| xiii) Guggul | xiv) Squill | xv) Rauwolfia | xvi) Colchicum |
| xvii) Shatavari | xviii) Papaya | xix) Datura | xx) Arjuna |

1) Long Answer type question?

a) Define the term herbal cosmetic. Write biological source, chemical constituent, commercial preparation and cosmetic uses of chandan.

Ans:- Herbal cosmetic!-

→ Herbal cosmetic are personal care products that are formulated with plant-based ingredients and herbs. These products use natural extracts and oils to improve the health and appearance of skin, hair, and nails, while being less likely to cause irritation or side effects compared to synthetic chemicals. They are often used for their therapeutic properties such as moisturizing, rejuvenating, cleansing, or anti-aging effects.

As chandan

→ Biological source:

chandan, commonly known as sandalwood, is derived from the Santalum genus, with Santalum album being the most well-known species.

#) Chemical Constituents :-

→ The primary active chemical constituent in sandalwood is santalol, which exists in two isomeric forms: alpha-santalol and beta-santalol.

#) Commercial Preparation :-

a) sandalwood oil :- Extracted from the heartwood of the sandalwood tree, this oil is commonly used in perfumes, soaps, creams, lotions and massage oils.

b) sandalwood powder :- often included in face packs, masks, and skin cleansers.

c) sandalwood paste :- used as a facial mask or for soothing skin irritations.

Cosmetic uses :

skin care, Anti-aging, moisturizing, cooling effect, fragrance

b) discuss about the role of medicinal & aromatic plants in national economy & their export potential.

Ans: Medicinal and aromatic plants (MAPs) play a significant role in the national economy of many countries, particularly in developing nations.

#) Role in National Economy :-

1) Employment generation: MAPs provide livelihood opportunities for rural communities, farmers, and laborers involved in cultivation, harvesting, and processing.

2) Income generation :- sales of MAPs contribute to household incomes, improving living standards.

3) Foreign exchange earnings :- Export of MAPs generate foreign exchange, boosting national economies.

4) Rural development :- MAPs cultivation promotes rural development, reducing urban-rural disparities.

5) Health care :- MAPs provide affordable, traditional medicines, improving health care accessibility.

* Export potential :-

1) Global demand :- Growing demand for natural products, pharmaceuticals, and cosmetics drives export potential.

2) Diversified markets :- MAPs are exported to various countries, reducing dependence on single markets.

3) Value-added products :- Processing and manufacturing MAPs into value-added products (e.g. essential oils, herbal extracts) increase export value.

c) Write down the methods of preparation of asava formulation.

Ans: Asava formulation preparation methods :-

step-1 :- selection and cleaning of raw materials
1) choose fresh or dried herbs, roots, or other plant materials.

2) clean and wash the materials to remove impurities

step-2 :- Extraction of plant juice :-

- 1) crush or grind the plant material.
- 2) Extract the juice using mechanical process or solvent extraction methods.

step-3 :- preparation of kwatha

- 1) combine the plant juice with water
- 2) Boil until the mixture reduces to $1/4$ or $1/8$ of its original volume.

step-4 :- ~~for~~ Addition of other ingredients

- 1) Add aromatic substance (eg. essential oils, spices)
- 2) Add preservatives (eg. honey, sugar)
- 3) Add other herbal extracts or minerals (if required)

step-5 :- Fermentation

- 1) transfer the mixture to clay pots or wooden vats.
- 2) Allow fermentation for 1-3 months, depending on the formulation.
- 3) Monitor temperature, pH, and microbial growth.

step 6 :- filtering and packaging

- 1) filter the Asava through cloth or paper
- 2) fill into clean, dry containers (eg. glass bottles)
- 3) seal and label the containers.

Types of Asava formulation :-

- 1) Arishta :- Fermented liquid preparation
- 2) Asava :- Non-fermented liquid preparation
- 3) Avalaha :- semi-solid preparation

d) Define the term nutraceuticals & classify it.
write note on spirulina.

Ans:- Definition of nutraceuticals:-

→ Nutraceuticals are dietary supplements that combine the words nutrition and pharmaceuticals. They are food products or ingredients that provide medical or health benefits, including prevention or treatment of disease. Nutraceuticals can be:

- 1) Dietary supplements: (eg:- vitamins, minerals, herbs)
- 2) Functional foods (eg, fortified cereals, probiotic yogurt)
- 3) Medicinal foods (eg:- omega-3 fatty acid-rich foods).

Classification of Nutraceutical:-

1) Dietary supplements:

- vitamins and minerals
- Herbal extracts (eg-turmeric, ginseng)
- probiotics

• omega-3 fatty acids

2) Functional foods:

- Fortified foods (eg:- calcium-enriched milk)
- cereals with added fiber
- probiotic-containing yogurt
- Energy bars

3) Medicinal foods:-

- Infant formula
- medical nutrition therapy products
- foods for special dietary needs (eg:- gluten-free)

* spirulina :-

→ spirulina is a microalgae, a type of cyanobacteria that grows in freshwater lakes and ponds. It's considered a superfood due to its high nutritional value.

Nutritional composition :-

- 1) protein (60-70%)
 - 2) vitamins (B12, E, K)
 - 3) minerals (iron, calcium, potassium)
 - 4) Antioxidant (phycocyanin, chlorophyll)
 - 5) Essential fatty acids (gamma-linolenic acid)
- e) Describe in detail about the pharmacognostic study of wool.

Ans: Introduction :- wool, obtained from sheep, goats, camels, and other animals, has been used for centuries in traditional medicine, particularly in Ayurveda and unani system.

* pharmacognostic characteristics :-

1) Macroscopic Examination :- wool fibers are elongated, cylindrical, and curved. color varies from white to dark brown.

2) Microscopic Examination :- wool fibers show:

- scales on the surface
- cortical cells with spindle-shaped nuclei
- medulla may be present or absent

3) chemical composition:-

- keratin
- Lipids
- water-soluble proteins
- pigments

*5) pharmacological properties:-

- 1) wound healing: wool's keratin stimulates collagen synthesis, promoting wound healing.
- 2) Thermal Insulation: wool's natural insulation properties help regulate body temperature.
- 3) Anti-Inflammatory: wool extracts exhibit anti-inflammatory activity.
- 4) Antimicrobial: wool's lanolin components shows antimicrobial properties.

F1 write details about the phytochemical test used for glycosides and alkaloids.

Ans:- Glycosides:-

Glycosides are compounds that yield sugars and non-sugar compounds upon hydrolysis.

tests for Glycoside:

1) Molisch's test:-

- reagent: Molisch's reagent
- procedure: Add 2-3 drops of molisch's reagent to the extract, followed by 1-2 drops of concentrated sulfuric acid.

- observation: purple ring formation indicates presence of glycosides.

2) Bombardier's test :-

- Reagent: Bombardier's reagent
- procedure: mix extract with Bombardier's reagent and heat.
- observation: yellow precipitate formation indicates presence of glycosides.

Alkaloids :-

1) Mayer's test :-

- Reagent: Mayer's reagent (potassium mercuric iodide)
- procedure: mix extract with Mayer's reagent.
- observation: white precipitate formation indicates presence of alkaloids.

2) Wagner's test :-

- Reagent: Wagner's reagent iodine in potassium iodide
- procedure: mix extract with Wagner's reagent.
- observation: Brown or reddish-brown precipitate formation indicates presence of alkaloids.

3) Dragendorff's test :-

- Reagent: Dragendorff's reagent potassium bismuth iodide
- procedure: mix extract with Dragendorff's reagent.
- observation: orange or yellow precipitate formation indicates presence of alkaloids.

4) Hager's Test :-

- Reagent: Hager's reagent picric acid
- procedure: mix extract with Hager's reagent.
- observation: yellow precipitate formation indicates presence of alkaloids.

Q) write a short note on Ergot?

Ans: Ergot is a fungal alkaloid-producing fungus, *Claviceps purpurea*, that grows on certain grains, particularly rye.

occurrence: Ergot commonly infects rye, wheat, barley, and oats, especially in cool, moist climates.

* Chemical composition :-

Ergot contains a mixture of alkaloids, including:

- 1) Lysergic acid
- 2) Ergotamine
- 3) Ergosine
- 4) Ergocristine

pharmacological effects :-

Ergot alkaloids have:

- 1) vasoconstrictive properties
- 2) stimulate smooth muscle contraction
- 3) Inhibit serotonin and dopamine

* Medicinal uses :-

- 1) Migraines and headaches
- 2) post partum hemorrhage
- 3) Hypertension
- 4) parkinson's disease

Atotoxicity :-

- 1) Hallucinations
- 2) Convulsions
- 3) Gangrene
- 4) Death

2) Answer any question?

Write a note on

a) Differentiate between pale catechu and black catechu.

Ans:

pale catechu

→ source: Acacia catechu (Heart wood)

→ appearance - pale yellow or brownish-yellow

→ composition - catechin (20-35%), tannins (10-20%), flavonoids, glycoside

→ properties: - Astringent, anti-inflammatory, antimicrobial, antioxidant.

→ uses - Traditional medicine (Ayurveda, unani), mouthwash, skin conditions, digestive issue.

Black catechu

→ source - Acacia catechu (Bark)

→ appearance - dark brown or black

→ composition - catechin, tannins, resins, saponins

→ properties - Astringent, anti-inflammatory, antimicrobial, antidiarrheal

→ uses - Traditional medicine

- Dental problems
- skin conditions
- Digestive issues

b) Write a short note on umbelliferous fruits.

Ans: Definition: Umbelliferous fruits are a type of fruits characteristic of plants in the Apiaceae (Carrot) family.

Characteristics:

- 1) Fruit type - dry, dehiscent fruit
- 2) shape - typically elongated, cylindrical or ovoid
- 3) size - variable, usually small

- 4) structure - Composed of two or more mericarps
- 5) Attachment - mericarps attached to a central axis

* Example :-

↳ carrot, parsley, Dill, fennel, Coriander

* phytochemicals :-

- 1) Essential oils (eg - Carvone, limonene)
- 2) Flavonoids (eg - apigenin, luteolin)
- 3) phenolic acids (eg - caffeic acid, ferulic acid)
- 4) Alkaloids (eg - anisole)

* Medicinal uses :-

- 1) Digestive issues
- 2) respiratory problems
- 3) antimicrobial and antioxidant properties.

c) define stomatal number and stomatal index?

Ans:- stomatal number :-

→ stomatal number refers to the total number of stomata present on a specific surface area of a leaf, usually expressed as:

- Number of stomata per square millimeter (mm^2)
- Number of stomata per square centimeter (cm^2)

* stomatal index :-

stomatal index is a relative measure of stomatal frequency, calculated as:

stomatal index (i) = $\left(\frac{\text{number of stomata}}{\text{total number of epidermal cells}} \right) \times 100$

*1) Importance:-

- stomatal number and index are crucial in understanding.
- 1) plant gas exchange (CO_2 , O_2 , water vapor).
 - 2) transpiration and water use efficiency.
 - 3) photosynthesis and carbon assimilation
 - 4) plant adaptation to environmental stress
 - 5) plant identification and taxonomy

d) Write details on scope of pharmacognosy?

Ans.:- pharmacognosy, the study of medicinal plants and natural products, has a vast scope in various fields.

*1) Academic and Research:-

- 1) plant-based drug discovery and development
- 2) phytochemical analysis and characterization
- 3) standardization of herbal medicines.
- 4) quality control and authentication of botanicals
- 5) Ethnopharmacological studies

*2) Pharmaceutical Industry:-

- 1) development of herbal-based pharmaceuticals
- 2) production of phytopharmaceuticals.
- 3) formulation and manufacturing of natural products.
- 4) clinical trials and regulatory affairs.

*3) Health care and medicine:-

- 1) traditional medicine (Ayurveda, unani)
- 2) complementary and alternative medicine
- 3) integrative medicine
- 4) phytotherapy and herbal medicine
- 5) nutraceuticals and dietary supplements.

e) Waste the biological source and chemical constituents of Gokhru & punarnava.

Ans: - @ Gokhru :-

Biological source :- Gokhru is derived from the dried fruit of Tribulus terrestris, a perennial herb belonging to the family Zygophyllaceae.

* Chemical constituent :-

- 1) Saponins (40-50%): Tribuloside, protodioscin, and diosgenin
- 2) Flavonoids: - Kaempferol, quercetin and rutin
- 3) Alkaloids: - Harmaline, harmine and harmol
- 4) Glycosides: - steroidal glycosides

@ punarnava :-

Biological source :- punarnava is derived from the dried roots and stems of Boerhavia diffusa, a perennial herb belonging to the Nyctaginaceae family.

* Chemical constituents :-

- 1) Alkaloids (2-3%): - punarnavine, boerhavine, and ~~diffusa~~ diffusine
- 2) Flavonoids: - isorhaphontigenin
- 3) Glycosides: - punarnavoside and boerhavoside
- 4) Saponins: - triterpenoid saponins

Q) What do you mean by refractive index?

Ans: Definition:-

The refractive index (n) is a dimensionless quantity that describes the ratio of the speed of light in a vacuum (c) to the speed of light in a medium (v).

* Physical significance:-

The refractive index indicates how much a light beam bends (refracts) when passing from one medium to another. A higher refractive index indicates:

- ① slower light speed in the medium
- ② Greater bending of light

* Types of Refractive Index?

- 1) Absolute refractive index (n): - measured relative to vacuum.
- 2) Relative refractive index (n_2/n_1): - measured relative to another medium.

Q) Write short notes on phytosomes?

Ans: Ans:-

Definition:- phytosomes are herbal formulations that combine standardized plant extracts with phospholipids to enhance bioavailability, solubility and therapeutic efficacy.

Composition :-

- 1) standardized plant extract (eg flavonoids, terpenes)
- 2) phospholipids (eg- phosphatidylcholine, phosphatidylserine)

* Mechanism :-

- 1) phospholipids form a complex with plant actives, increasing solubility.
- 2) Enhanced bioavailability through improved absorption.
- 3) Targeted delivery to specific tissue or cells.

* Advantages :-

- 1) Improved bioavailability
- 2) Enhanced therapeutic efficacy
- 3) Increased solubility
- 4) Better stability
- 5) Reduced side effects

h) what are prebiotics & probiotics ?

Ans: definition prebiotics :- are non-digestible carbohydrates that serve as food for beneficial microorganisms in the gut, promoting their growth and activity.

Examples :-

- 1) Inulin
- 2) Fructooligosaccharide
- 3) Galactooligosaccharide
- 4) Arabino galactan
- 5) pectin

1) Benefits :-

- 1) Enhance beneficial bacteria growth
- 2) Improve gut barrier function
- 3) Increase short-chain fatty acid production
- 4) Support immune system
- 5) Aid in mineral absorption

2) Probiotics :-

Definition: Probiotics are live microorganisms that, when administered in adequate amounts, confer health benefits.

Example:- ① *Lactobacillus acidophilus*

② *Bifidobacterium bifidum*

③ *Bacillus coagulans*

④ *Saccharomyces boulardii*

Benefits :-

- ① Improve gut health and digestion
- ② Boost immune system function
- ③ Reduce symptoms of IBS (irritable bowel syndrome)
- ④ Aid in lactose tolerance
- ⑤ Support mental health and mood

(i) Write short notes on Carminative & G.I regulators.

Ans:- Carminatives :- Carminatives are herbal or pharmaceutical agents that expel gas from the digestive tract, relieving flatulence, bloating, and discomfort.

Example: fennel, dill, caraway, ginger, peppermint

Mechanism:-

- 1) Reduce gas formation
- 2) Increase gas expulsion
- 3) Relax intestinal smooth muscle

*] G.I Regulators :-

→ Gastrointestinal (GI) regulators are agents that normalize bowel movement, preventing diarrhea or constipation.

Example:- ① Laxatives:- senna, Aloe vera

② Anti-diarrheals:- pectin, Berberine

③ Anti-Constipation:- psyllium, Flaxseed

Mechanism:-

- 1) Regulate bowel motility
- 2) Adjust water absorption
- 3) Maintain gut flora balance

Q] write down the basic principles of siddha system of medicine;

Ans: The siddha system of medicine is one of the oldest traditional medical systems in India, it is based on the ancient teachings of siddhas and follows a holistic approach to health, focusing on balancing the body, mind, and spirit.

1) The Concept of Five Elements?

(pancha mahabhutas):

→ Siddha medicine believes that the universe and the human body are made up of five elements: - Earth (prithvi), water (jala), Fire (agni), Air (vayu), and Ether (akasha). These elements must be in balance for good health.

2) The Three Humors (vatta, pitta, kapha):

→ The body is governed by three primary doshas: vata (air and ether), pitta (fire and water), and kapha (earth and water).

3) The Concept of Thirithoshas:

→ In Siddha, a fourth aspect is added, called "Thirithoshas", which refers to the balance of three vital principles (vatham, pitham, and kapham) and the impact of the mind, emotions, and spirit.

4) The Role of Body, mind, and spirit:

→ Health is viewed as the harmonious integration of the body, mind, and soul.

→ Emotional and mental disturbances can lead to physical ailments, and spiritual well-being is crucial for ~~an~~ overall health.

Q) Write the biological source, chemical constituents and uses of senna?

Ans:- senna:-

Biological source:- senna is derived from the leaves and pods of the senna plant Cassia angustifolia

Chemical constituents:-

1) Anthraquinone glycosides

- sennoside A and B, Rhein, Aloe-emodin

2) Flavonoids:-

- kaempferol, quercetin

3) Chasmones:-

- cassiolin, Emodin

4) Volatile oils:-

- cineol, pinene

uses:-

1) Laxatives and purgative: treats constipation, bowel clearance

2) Relieves symptoms of irritable bowel syndrome

3) Anti-inflammatory and antioxidant properties

4) Treats skin condition

5) Supports liver and gallbladder health

3) Write down the biological sources of the following (within twenty words):

i) Isapaghula :

Ans: Isapaghula, also known as psyllium is derived from the seeds of the plantago ovata.

ii) Ipecac :

Ans: It is derived from the dried root or rhizome of the cephaelis ipecacuanha.

iii) Myrrh :-

Ans: Myrrh is derived from the gum or resin of trees belonging to the genus Commiphora.

iv) Ashwagandha :-

Ans: It consists of the dried roots and stem bases of withania somnifera Dunal.

v) Saffron :-

Ans: It consists of the dried roots and stem bases of ovil stigmas of the crocus sativus flower.

vi) Asafoetida :-

Ans: Asafoetida is a dried gum oleoresin that comes from the taproots of the Ferula plant.

vii) Gum acacia :-

Ans: It comes from the hardened sap of the Acacia senegal.

viii) vinca :-

→ Ans:- The biological source of vinca is the plant of Catharanthus roseus.

ix) kaolin :-

Ans:- kaolin is a naturally occurring clay mineral that is found in soil and ~~rock~~ rock deposits around the world.

x) silk

Ans:- silk is a natural protein fiber that comes from the cocoons of silkworms, which are the larvae of the silkworm moth, Bombyx mori.

xi) Artemisia :-

Ans:- The biological source of artemisinin is the sweet wormwood plant.

xii) Castor oil

Ans:- castor oil is a vegetable oil obtained by pressing the seeds of the castor oil plant Ricinus communis.

xiii) Guggul :-

Ans:- The biological source of guggul is the gum resin of the Commiphora mukul.

xiv) squill

Ans:- squill comes from the Urginea maritima

xvi) Rauwolfia

Ans: Rauwolfia is a medicinal plant that comes from the dried roots and rhizomes of the Rauwolfia serpentina.

xvii) Colchicum :-

Ans: Colchicum is a drug that comes from the autumn crocus plant.

xviii) Shatavari :-

Ans: The biological source of shatavari is the tuberosous root of the Asparagus racemosus.

xix) Papaya :-

Ans: Papain is the dried and purified latex of the green fruits and leaves of Carica papaya.

xx) Datura

Ans: Datura herb consists of the dried leaves and flowering tops of Datura metel Linn and Datura metel var.

xxi) Ajuna :-

Ans: The biological source of ajuna is the dried stem bark of the Terminalia ajuna.