



## SUMMER- 2023 EXAMINATION

## MODEL ANSWER - ONLY FOR THE USE OF RAC ASSESSORS

Subject Title: PHARMACOGNOSY- THEORY

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 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 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 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.
- 8) As per the policy decision of Maharashtra State Government, teaching in English/Marathi and Bilingual (English + Marathi) medium is introduced at first year of AICTE diploma Programme from academic year 2021-2022. Hence if the students write answers in Marathi or bilingual language (English +Marathi), the Examiner shall consider the same and assess the answer based on matching of concepts with model answer.

Q. No.	Sub No.	Answers	Marking Scheme
1		<b>Answer any <u>SIX</u> of the following:</b>	<b>30M</b>
1	a	<b>Why crude drugs are classified? Enlist different methods of classification of crude drugs and discuss morphological method with their merits and demerits.</b> <b>Marking Scheme:</b> <b>Reason of crude drugs classification: 1M; Method of classification list: 1M; Explanation of morphological method: 2M; Merits and Demerits: 1M.</b> <b>Answer:</b> The crude drugs are obtained from different natural sources and used in different types of disease. For adequate study of crude drugs, it is necessary to arrange all crude drugs in scientific and systematic manner. Therefore, all crude drugs are classified into different classes based on following manner. <ol style="list-style-type: none"><li>1. Alphabetical classification.</li><li>2. Morphological classification.</li><li>3. Taxonomical classification.</li><li>4. Pharmacological classification.</li><li>5. Chemical classification.</li><li>6. Chemo-taxonomical classification.</li></ol> <b>MORPHOLOGICAL CLASSIFICATION OF CRUDE DRUGS:</b> In this method, crude drugs are classified according to morphological or external characters. The morphological character varies from plant part to part. The organized drug consists of part of the plant such as root, stem, rhizome, leaf, fruits, barks, seed etc. The unorganized drug consist of gums, extract, latex etc.	<b>5M</b>



Q. No.	Sub No.	Answers	Marking Scheme																																													
		<p><b>Example of this type of classification is as follows.</b></p> <table border="1"><thead><tr><th>Sr. No.</th><th>Part of plant</th><th>Example</th></tr></thead><tbody><tr><td>1.</td><td>Root</td><td>Rauwolfia, Aconite, Ipecac</td></tr><tr><td>2.</td><td>Stem</td><td>Ephedra</td></tr><tr><td>3.</td><td>Rhizome</td><td>Ginger, Turmeric</td></tr><tr><td>4.</td><td>Bark</td><td>Cinnamon, Cinchona, Kurchi, Cassia</td></tr><tr><td>5.</td><td>Leaf</td><td>Datura, Digitalis, Vasaka, Vinca, Senna</td></tr><tr><td>6.</td><td>Flower bud</td><td>Clove</td></tr><tr><td>7.</td><td>Flower</td><td>Sunflower</td></tr><tr><td>8.</td><td>Fruit</td><td>Coriander, Fennel, Cumin, Dill</td></tr><tr><td>9.</td><td>Seed</td><td>Nux vomica, Cardamom</td></tr><tr><td>10.</td><td>Entire plant</td><td>Tulsi, Belladonna</td></tr><tr><td>11.</td><td>Dried extract</td><td>Gums, Gelatin, Acacia, Tragacanth</td></tr><tr><td>12.</td><td>Dried juice</td><td>Aloe, Kino</td></tr><tr><td>13.</td><td>Resin &amp; Resin combination</td><td>Benzoin, Myrrh</td></tr><tr><td>14.</td><td>Latex</td><td>Opium, Papaya</td></tr></tbody></table> <p><b>Merits:</b></p> <ol style="list-style-type: none"><li>1) It is more convenient for practical purpose.</li><li>2) Even if the chemical content or action of drug is not known the drug can be studied properly.</li><li>3) It gives idea about source of drugs</li><li>4) It gives idea whether it is organized or unorganized.</li></ol> <p><b>Demerits:</b></p> <ol style="list-style-type: none"><li>1) During collection, drying &amp; packing morphology of drug changes. They are difficult to study.</li><li>2) Repetition of drug or plants may occur.</li></ol>	Sr. No.	Part of plant	Example	1.	Root	Rauwolfia, Aconite, Ipecac	2.	Stem	Ephedra	3.	Rhizome	Ginger, Turmeric	4.	Bark	Cinnamon, Cinchona, Kurchi, Cassia	5.	Leaf	Datura, Digitalis, Vasaka, Vinca, Senna	6.	Flower bud	Clove	7.	Flower	Sunflower	8.	Fruit	Coriander, Fennel, Cumin, Dill	9.	Seed	Nux vomica, Cardamom	10.	Entire plant	Tulsi, Belladonna	11.	Dried extract	Gums, Gelatin, Acacia, Tragacanth	12.	Dried juice	Aloe, Kino	13.	Resin & Resin combination	Benzoin, Myrrh	14.	Latex	Opium, Papaya	
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1	b	<p><b>State the meaning of adulteration. Explain different methods of adulteration with examples Marking Scheme:</b></p> <p><b>Marking Scheme: Definition: 1M; Types of adulteration with examples: 4M</b></p> <p><b>Answer:</b></p> <p><b>Adulteration</b> is defined as debasement of an article or substituting original drugs partially or fully with other similar looking substance. The substance which are mixed is free from or inferior in chemical and therapeutic and chemical properties or addition of low grade or spoiled drugs or entirely different drugs similar to that of original drugs substituted with an intention of enhancement of profit.</p>	<p><b>5M</b></p> <p><b>1M</b></p>																																													



Q. No.	Sub No.	Answers	Marking Scheme
		<p><b>Types of Adulteration:</b> Adulteration can be broadly classified into two types:</p> <ol style="list-style-type: none"><li>1) <b>Intentional adulteration</b> is mainly encouraged by traders because these original crude drugs are highly costly. So hence they use cheaper variety to reduce the cost burden and to gain profit.</li><li>2) <b>Accidental adulteration:</b> Accidental adulteration occurs without bad intention of the manufacturers or suppliers mainly it occurs during collection of drugs because of same morphological features between two plants.</li></ol>	1M
		<p><b>A. Replacement by exhausted drugs:</b></p> <ol style="list-style-type: none"><li>1) Exhausted saffron is coloured artificially</li><li>2) Exhausted Ginger is mixed with starch</li></ol> <p><b>B. Substitution with superficially similar but inferior drugs: Examples</b></p> <ol style="list-style-type: none"><li>1) Adulteration of cloves by mother cloves.</li><li>2) Saffron with dried flower of <i>Carthamus tinctorius</i>.</li></ol> <p><b>C. Substitution by artificially manufactured substituent: Examples</b></p> <ol style="list-style-type: none"><li>1) Paraffin wax is tinged yellow &amp; substituted for yellow bee's wax.</li><li>2) Artificial invert sugar is mixed with honey.</li></ol> <p><b>D. Substitution by sub- standard commercial varieties: Examples</b></p> <ol style="list-style-type: none"><li>1) <i>Capsicum frutescens</i> (capsicum minimum), substituted by <i>Capsicum annum</i>.</li><li>2) Alexandrian senna with Arabian senna.</li></ol> <p><b>E. Presence of organic matter obtained from the same plant:</b></p> <ol style="list-style-type: none"><li>1) Clove is mixed with clove stalks.</li><li>2) Caraway &amp; Anethum fruits are mixed with other parts of inflorescence</li></ol> <p><b>F. Synthetic chemical:</b></p> <ol style="list-style-type: none"><li>1) Benzyl benzoate to balsam of Peru.</li><li>2) Citral to oil of lemon grass.</li></ol> <p><b>G. Waste from market:</b></p> <ol style="list-style-type: none"><li>1) Limestone in Asafoetida.</li><li>2) Pieces of amber coloured glass in colophony.</li></ol>	3M



Q. No.	Sub No.	Answers	Marking Scheme
1	c	<p><b>Define laxative with examples and give biological source, chemical constituents, and therapeutic uses of aloe.</b></p> <p><b>Marking Scheme: Definition:1M; Example:0.5M Biological Source:1M; Chemical constituents:1M; Therapeutic uses: 1.5M (each use – 0.5 M)</b></p> <p><b>Answer:</b></p> <p><b>Laxatives:</b></p> <p>Drugs that loosen the bowels <b>OR</b> The drugs producing, increasing and hastening intestinal evacuation. <b>OR</b> The drugs which promote defecation are called as laxatives.</p> <p>e.g. – Aloe, Senna etc</p> <p><b>Aloe</b></p> <p>1) <b>Biological source:</b> Aloe is dried juice of the of the leaves <i>Aloe barbadensis</i> (Curcao aloes), <i>Aloe perryi</i> (Socotrine aloes), hybrides of <i>Aloe ferox</i> &amp; <i>Aloe africana</i> or Aloe spicata (Cape aloes) belonging to Family <i>Liliaceae</i>. (<b>Any one biological source should be considered</b>)</p> <p>2) <b>Chemical constituents:</b></p> <ol style="list-style-type: none"><li>10-30% aloenin which is a mixture of barbaloin, 3-barbaloin and iso barbaloin,</li><li>Aloe Emodin and its antranol.</li><li>Resin containing aloesin and its esters with ferulic, p-coumaric and cinnamic acid.</li><li>Two glycosides: aloenin A and aloenin B.</li><li>Glycoproteins: alocutin A, alocutin B.</li><li>All varieties of aloe contain yellow coloured crystalline substance known as barbaloin. Resin, Aloe emodin and isobarbilion is also present in cape aloe and curacao aloe.</li></ol> <p>3) <b>Uses:</b></p> <ol style="list-style-type: none"><li>As a laxative.</li><li>As a carminative agent.</li><li>In the form of ointment, it is use for skin irritation.</li><li>In the treatment of burn due to radiation.</li><li>It is an ingredient of cosmetic preparation.</li><li>It is used to stimulate hair growth.</li><li>It is used to prevent the wrinkle due to aging.</li><li>It is an ingredient of benzoin tincture.</li></ol>	5M



Q. No.	Sub No.	Answers	Marking Scheme
1	d	<p>What are pharmaceutical aids? Give biological source and chemical constituents of</p> <p>i) Bees wax      ii) Tragacanth</p> <p><b>Marking Scheme: Definition: 1M; Biological source: 1M for each drug; Chemical constituents:1M for each drug (minimum two constituents need to mentioned for 1M)</b></p> <p><b>Answer:</b></p> <p><b>Pharmaceutical aid:</b></p> <p>Pharmaceutical Aids are the substance which are having little and no therapeutic value but are essentially use in manufacturing and compounding of pharmaceuticals.</p> <p>It may be called as pharmaceutical necessities. These compounds are obtained from various sources such as animal, vegetables, minerals and synthetic.</p> <p><b>i) Bees Wax:</b></p> <p><b>Biological Source:</b> It is purified wax obtained from honey comb of bees <i>Apis mellifica</i> and <i>Apis dorsata</i> Family: Apidae.</p> <p><b>Chemical Constituents:</b></p> <p>It mainly contains Myricin (myricyl palmitate) - 80%, free cerotic acid about 15% and small quantity of melssyl sterate, melissic acid, hydrocarbons, higher alcohols and ceroleine. Pollen and propolis are responsible for yellow color of beeswax.</p> <p><b>ii) Tragacanth:</b></p> <p><b>Biological Source:</b> It is dried gummy exudate obtained by incision on stem of <i>Astragalus gummifer</i>. Family: Leguminosae.</p> <p><b>Chemical Constituents:</b></p> <p>It is a polysaccharide contain two parts waters soluble and water insoluble. Water soluble part is known tragacanthin acid, Galacturonic acid, xylose, fructose, Galactose and neutral polysaccharide like arabinose and galactose. Water insoluble portion is called as bassorin. It also contains moisture starch. The viscosity of tragacanth is due to presence of bassorin.</p>	5M



Q. No.	Sub No.	Answers	Marking Scheme
1	e	<p><b>Enlist different traditional system of medicine and explain anyone.</b></p> <p>List of Traditional System of Medicines: 1M; Description of any one system: 4M</p> <p><b>Answer:</b></p> <p><b>Various Indigenous system of medicine are as follows-</b></p> <ol style="list-style-type: none"><li>1. Ayurveda</li><li>2. Siddha</li><li>3. Unani</li><li>4. Homoeopathy</li><li>5. Naturopathy</li><li>6. Yoga</li></ol> <p><b>1. Ayurvedic system of medicine:</b></p> <p>It is the oldest system of medicine in India. In Ayurveda there is a supposition that everything in universe is made up of 5 basic elements (Panchamahabhuta) like solid, liquid, air, space, and energy. These 5 elements exist in the body in combined form like Vata, Pitta, Kapha. These three forms are together called as “Tri-dosh”.</p> <ol style="list-style-type: none"><li>1. Vata = space + air</li><li>2. Pitta = energy + liquid</li><li>3. Kapha = solid + liquid</li></ol> <p>The seven forms of Tri dosh are called as ‘SAPTADHATU’. These saptadhatu under goes wear and tear processes and form excretory material or mala.</p> <p>When this tri dosh, saptadhatu and mala are in balanced form, the condition is healthy. But if it is in imbalanced form there are pathological disorders. In Ayurveda Charak Samhita and Sushrut Samhita are two well-known treaties. In Charak Samhita descriptions of plants used as medicine are included and in Sushrut Samhita emphasis is given on surgery.</p> <p><b>2. Siddha System of Medicine:</b></p> <ul style="list-style-type: none"><li>• The terms “Siddha” means achievement and siddhar were saintly personalities who attended proficiency in medicine through practice of bhakti and yoga.</li><li>• This is the system of pre-vedic time identified with Dravidian culture. These systems believe that all object in universe is made up of five basic elements like earth, water, sky, fire, and air.</li></ul>	5M



Q. No.	Sub No.	Answers	Marking Scheme
		<ul style="list-style-type: none"><li>• The identification of causative factors of disease is done through pulse reading, colour of the body, study of voice, urine examination, status of digestive system and examination of tongue.</li><li>• The literature of siddha system is mostly in Tamil. Few natural drugs which are used in siddha system of medicine are<ul style="list-style-type: none"><li>○ Abini (<i>Papaver somniferous</i>)</li><li>○ Ethi (<i>Nux vomica</i>)</li><li>○ Gomethi (<i>Datura</i>)</li></ul></li></ul> <p><b>3. Unani system of Medicine:</b></p> <ul style="list-style-type: none"><li>• The root of these system goes deep to the times of well-known Greek Philosopher Hippocrates.</li><li>• Aristotle made valuable contribution to the unani system of medicine. It is then carried to Persia (Iran) and then it is improved by Arabian Physician.</li><li>• Unani system of Medicine is based on two Theories:<ul style="list-style-type: none"><li>A. Hippocrates Theory of four Humours:<ul style="list-style-type: none"><li>a. Blood</li><li>b. Phylum</li><li>c. Yellow Bile</li><li>d. Black Bile.</li></ul></li><li>B. Pythagorean theory of four Proximate qualities.<ul style="list-style-type: none"><li>a. The state of Human body like hot, cold, moist and dry</li><li>b. These qualities are represented as earth, water, fire and Air</li><li>c. The Greek ideas were put by the Arabian physicians as seven working principles, included;<ul style="list-style-type: none"><li>i. Temperature</li><li>ii. Humours</li><li>iii. Organs</li><li>iv. Life</li><li>v. Spirit</li><li>vi. Energy</li><li>vii. Action</li></ul></li><li>d. These principles are responsible for body constituents and its health as well as disease condition.</li></ul></li></ul></li></ul>	



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		<p>e. In Unani system of medicine, treatment of disease is carried out by treating the cause of disease and not to its symptoms. For this purpose, the History of patient is recorded along with his pulse, urine and stool examination.</p> <p>f. The disease condition is due to imbalance in Humours and as per this treatment is given.</p> <p>g. Generally, in Unani system of medicine the Polyherbal formulation. are used as a drug. This system is also called as Arab Medicine, Islamic Medicine and oriental medicine.</p> <ul style="list-style-type: none"><li>• Example of Unani Medicines: - Madar Fufal, kabab chini sana, etc.</li></ul> <p><b>4. Homeopathic System of Medicine</b></p> <ul style="list-style-type: none"><li>• As compare to other Traditional System of medicines, Homeopathy System of medicine is a new system of medicine and which are developed by German Physician chemical Samuel Hahnemann in 18<sup>th</sup> century.</li><li>• Homeopathic medicine system works on the principle of “Similia Similibus Curentur” means that like diseases are cured like medicine. (Likes are cured by likes). Drugs produce similar symptoms as the disease (in healthy human beings).</li><li>• According to this system of medicine it is proposed that the cause of the disease itself can be used for its treatment. German Physician shown that cinchona bark can produce the symptom of malaria.</li><li>• In homeopathic system of medicine, the drug treatment is not specified but the choice of the drug is depending on symptoms and clinical condition of the patient.</li><li>• During the treatment drug extract are so diluted which believe that it increases the curative effect of the drug.</li><li>• The drugs an extracted in the form of mother tincture. which is further diluted in terms of decimal.</li></ul>	
1	f	<p><b>Define and give therapeutic application of i) Probiotic ii) Antioxidants</b></p> <p><b>Marking Scheme: 2.5M for each bit. Definition: 1M for each; Therapeutic application: 1.5M for each bit (one application – 0.5M; 1.5M for three application)</b></p> <p><b>Answer:</b></p> <p><b>1) Probiotic:</b></p> <p>These are living microorganism which when taken with or without food improve the intestinal microbial balance thus give proper functioning of large intestine. These</p>	<b>5M</b>



Q. No.	Sub No.	Answers	Marking Scheme
		<p>microorganism produces substance and condition which inhibit the growth of harmful bacteria in large intestine.</p> <p><b>Therapeutic application of probiotic.</b></p> <ol style="list-style-type: none"><li>It is useful in treatment of gastrointestinal disorders.</li><li>It is used as antitumor agents.</li><li>In the treatment of constipation.</li><li>As a toxin neutralization agent.</li></ol> <p>2) <b>Antioxidants:</b></p> <p>Antioxidants or inhibitors of oxidation are compounds which retard or prevent the oxidation in general and prolong the life of the oxidizable matter.</p> <p><b>Therapeutic applications of antioxidants:</b></p> <ol style="list-style-type: none"><li>Antioxidants are substances that may protect cells from the damage caused by unstable molecules known as free radicals.</li><li>They prevent heart and liver diseases, some cancers, arthritis, accelerated aging, eye sight deterioration and neurodegenerative diseases.</li><li>Beta- carotene and vitamins are shown to cause antioxidant effects and immune enhancement.</li><li>Vitamin E (Tocopherol) is a major radical trapper in lipid membranes and is found clinically useful in cardiac damage and carcinogenicity.</li><li>Antioxidants play vital role in life of living system.</li><li>Antioxidants are abundant in fruits and vegetables and other foods including nuts, grains and some meats, poultry, and fish.</li><li>Common antioxidants include: Green leafy vegetables, including collard green, spinach etc. beta-carotene is found sweet potatoes, pumpkins, mangoes etc.</li><li>Lycopene is a potential antioxidant found in tomatoes, watermelons, guava etc.</li><li>Some natural antioxidants like Ascorbic acid, tocopherol, Superoxide, adenosine transferrin is used therapeutically.</li><li>Vitamin E (Tocopherol) is major radical trapper in lipid membrane and clinically useful in cardiac damage.</li><li>Selenium is important dietary anticarcinogen corn oil, wheat germ oil is rich Source of vitamin.</li><li>Various plant material like Amla, lemon myrobalan Contain Antioxidant in the form of Ascorbic acid (Vitamin-C) it prevents formation of oxygen free radical.</li></ol>	



Q. No.	Sub No.	Answers	Marking Scheme
1	g	<p>Mention commercial preparation and cosmetic uses of</p> <p>1) Olive oil      ii) Sandalwood oil</p> <p>Marking Scheme: Commercial preparations of each drug:1M (0.5M for each preparation); Cosmetic uses of each drug:2M (1 use – 0.5M)</p> <p>Answer:</p> <p>i. <b>Olive Oil: (Other commercial preparations should be considered)</b></p> <p>a. <b>Commercial Preparations:</b></p> <p>i. <b>Garnier Fructis Triple Nutrition Miracle Dry Oil- (Garnier India, Mumbai)</b></p> <p>It is composed of three natural oils i. e. Olive oil, Avocado oil and Shorea oil.</p> <p><b>Role of olive oil:</b></p> <p>Olive oil moisturizes, protects, and replenishes dry hairs improving strength and elasticity. Face and body get benefits from antioxidants that help to protect against skin damage.</p> <p>ii. <b>L'oreal Hair Spa Extra-Nutritive Oil (Olive Oil) - (L'Oréal India Pvt. Ltd., Mumbai)</b></p> <p>It is enriched with the goodness of Olive Oil, Vitamin E and Natural Flower Oil.</p> <p><b>Role of olive oil:</b></p> <p>It deeply nourishes the hairs leaving them visibly smoother and extremely shiny.</p> <p>b. <b>Cosmetic Uses of Olive Oil:</b></p> <ul style="list-style-type: none"><li>• The presence of phytosterols and triterpenic compounds in olive oil confers lenitiveand revitalizing properties for dry and wrinkled skin.</li><li>• The antioxidant action of vitamin E and A prevents skin irritation from aging and maintain the soft smooth and natural elasticity of the skin.</li><li>• It also has hair strengthening properties. It has emollient, moisturizing and skin softening property, thus important components of hand lotion, lip balms, shampoo and oil for bath massage.</li></ul>	5M



Q. No.	Sub No.	Answers	Marking Scheme
		<p><b>ii. Sandalwood Oil: (Other commercial preparations should be considered)</b></p> <p><b>a. Commercial Preparations:</b></p> <p><b>i. Vicco Turmeric Skin Cream: (Vicco laboratories, Nagpur, Maharashtra)</b></p> <p>Containing of turmeric and sandalwood oil. Role of sandalwood oil in combination with turmeric: It makes skin soft, supple and young looking.</p> <p>It protects the skin from ultraviolet rays of the sun and maintains the original colour of pigments of skin. It rejuvenates and revitalizes the skin. It is useful in acne, pimples, boils, and blemishes.</p> <p><b>ii. Himalaya's Anti-Wrinkle Cream: (Himalaya drug company, Bangalore).</b></p> <p>It contains Aloe vera, Grapes, Red poppy, Lemon and Sandalwood tree extracts.</p> <p><b>Role of sandalwood oil:</b></p> <p>The essential oil of Sandalwood soothes the skin and helps to fade scars and spots.</p> <p><b>b. Cosmetic Uses of Sandalwood oil:</b></p> <ul style="list-style-type: none"><li>• It removes scars, blemishes, spots of facial skin, thus useful to get clean bright and flawless skin.</li><li>• It is common ingredient in face packs and cosmetic cream.</li><li>• Due to its potent antimicrobial property, it is useful in acne infection and as well in itchy skin.</li><li>• Along with turmeric, it is useful to glow the skin and fades the scars. It is major ingredient in popular skin care cosmetic Vicco turmeric.</li><li>• The antioxidant action of oil produces beneficial effect in skin aging and wrinkles.</li><li>• In hair care cosmetic, it is being used to control dandruff and cure itchy scalp.</li><li>• It is good hair conditioner with flavoring agent.</li><li>• It is common fixative agent for most of the perfumes and deodorants.</li></ul>	



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2		Answer any <b>TEN</b> of the following:	30 M														
2	a	<p><b>Differentiate between organized and unorganized drugs.</b></p> <p><b>Marking Scheme: ½ Mark for each Point (0.5M x 6 = 3M)</b></p> <p><b>Answer:</b></p> <table border="1"><thead><tr><th>Organized crude drug</th><th>Unorganized crude drug</th></tr></thead><tbody><tr><td>It is obtained from definite anatomic parts of the plants such as flowers, leaves, fruits etc.</td><td>It is obtained from plants or animals by means of physical process such as drying, incision, extraction such as juices, resins.</td></tr><tr><td>It is made up of definite tissue and cells.</td><td>It does not have cellular structure</td></tr><tr><td>It is solid in nature</td><td>It is solid, semi-solid and liquid in nature.</td></tr><tr><td>Microscopical characters are used for identification.</td><td>Chemical tests and physical standards are used for identification</td></tr><tr><td>Botanical and zoological terminology can be used to describe the drug</td><td>Botanical and zoological terminology is inadequate. To describe these drugs, physical characters such as solubility, optical rotation, refractive index are used.</td></tr><tr><td>Ex. Coriander, fennel, datura, etc</td><td>Ex. Aloe, bees wax, tragacanth, asafoetida etc.</td></tr></tbody></table>	Organized crude drug	Unorganized crude drug	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.	It is made up of definite tissue and cells.	It does not have cellular structure	It is solid in nature	It is solid, semi-solid and liquid in nature.	Microscopical characters are used for identification.	Chemical tests and physical standards are used for identification	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.	Ex. Coriander, fennel, datura, etc	Ex. Aloe, bees wax, tragacanth, asafoetida etc.	3M
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Microscopical characters are used for identification.	Chemical tests and physical standards are used for identification																
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.																
Ex. Coriander, fennel, datura, etc	Ex. Aloe, bees wax, tragacanth, asafoetida etc.																
2	b	<p><b>Enumerates various limitations in manufacturing of herbal formulations.</b></p> <p><b>Marking Scheme: (0.5 Mark for each Point (0.5 x 6 = 3M))</b></p> <p><b>Answer:</b></p> <ol style="list-style-type: none"><li>1. Plant authentication and geographical variation are always quality concern.</li><li>2. It has fewer side effects because it works through a polypharmacy mechanism.</li><li>3. The available toxicological, epidemiological, and other data on herbal formulations is perplexing.</li><li>4. It is difficult to follow pharmacovigilance guidelines in case of herbal formulation.</li><li>5. Unavailability of herb-drug interaction data.</li><li>6. Lack of good quality clinical trials, safety issues – Adverse reaction &amp; Drug interaction.</li><li>7. Standardization of herbal drugs.</li><li>8. Standardization, safety and efficacy measurement of herbal formulations are a big challenge.</li></ol>	3M														



## SUMMER– 2023 EXAMINATION

## MODEL ANSWER - ONLY FOR THE USE OF RAC ASSESSORS

Subject Title: PHARMACOGNOSY- THEORY

Subject Code: 20113

Q. No.	Sub No.	Answers	Marking Scheme
2	c	<p><b>Discuss the role of medicinal and aromatic plants in national economy.</b></p> <p><b>Marking Scheme: Each role -0.5M; Any six roles – 3M</b></p> <p><b>Answer:</b></p> <p><b>Role of medicinal and aromatic plants in the national economy:</b></p> <ol style="list-style-type: none"><li>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.</li><li>2. A recent study indicates that the herbal drug market continues to grow at the rate of 15% annually.</li><li>3. Several hundred genera are used in herbal remedies and in traditional or folklore medicines throughout the world.</li><li>4. The World Health Organization (WHO) estimated that 80% of the population of developing countries rely on herbal medicines for their treatment.</li><li>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.</li><li>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.</li><li>7. Many synthetic medicines are based on plant extracts, which are used to create new modern medicines.</li></ol>	3M
2	d	<p><b>Define surgical dressings. State the ideal requirements of surgical dressings.</b></p> <p><b>Marking Scheme: Definition:1M; Any four ideal requirements:2M</b></p> <p><b>Answer:</b></p> <p><b>Definition of Surgical dressings:</b></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><b>OR</b></p> <p>Surgical dressings are the materials used for covering the wounds or injuries and to be applied singly or in combination.</p> <p><b>Ideal requirements of surgical dressings: (Any four)</b></p> <ol style="list-style-type: none"><li>i. They should be sterilized before use.</li></ol>	3M



Q. No.	Sub No.	Answers	Marking Scheme
		<ul style="list-style-type: none"><li>ii. They should be stored in a dry well- ventilated place at a temp. not exceeding 25°C.</li><li>iii. They should be used with permitted antiseptics in prescribed concentration only.</li><li>iv. They should not be dyed unless mentioned in the monograph.</li><li>v. Adhesive products should not be allowed to freeze.</li><li>vi. There should not be any loose threads, fibre-ends in dressings.</li></ul>	
2	e	<p><b>State the uses of following drugs</b></p> <p><b>i) Vinca    ii) Gokhru    iii) Ipecachunha</b></p> <p><b>Marking Scheme: Uses of each drug – 1M; (One use – 0.5M; for any two uses – 1M)</b></p> <p><b>Answer:</b></p> <ul style="list-style-type: none"><li><b>i. Vinca</b><ul style="list-style-type: none"><li>a. It is used as antitumor drug.</li><li>b. It is used to treat Leukaemia, Hodgkin’s disease.</li><li>c. It is used as hypotensive and antidiabetic activity.</li></ul></li><li><b>ii. Gokhru</b><ul style="list-style-type: none"><li>a. It is used as diuretic, tonic, in treatment of calculous affection and painful micturition.</li><li>b. It is used as Aphrodisiac.</li><li>c. Gokhru is a one of important ingredient in ayurvedic preparation ‘Dashamoolarishta’ and ‘Chyavanprash’</li><li>d. Bada gokhru is used in Dysuria and Gonorrhoea.</li></ul></li><li><b>iii. Ipecachunha</b><ul style="list-style-type: none"><li>a. It is used as Antidysentrics.</li><li>b. Used in amoebic dysentery, Expectorant, Emetic, causes violent sneezing, coughing due to nasal and laryngeal irritation.</li><li>c. Ipecac with opium (Dovers powder) is used as Diaphoretic.</li></ul></li></ul>	3M
2	f	<p><b>Write the method of preparation of Avaleha and Bhasma.</b></p> <p><b>Marking Scheme: Method of Preparation of each – 1.5M</b></p> <p><b>Answer:</b></p> <p><b><u>Avalehya or Lehya</u></b></p> <p>It is a semisolid preparation of drugs prepared by addition of sugar, jaggery (gur) or sugar candy and boiled with prescribed drug juice or decoction.</p>	3M



Q. No.	Sub No.	Answers	Marking Scheme
		<p><b>Method of Preparation of Avalehya or Lehya:</b></p> <p>In the preparation of lehya ingredients present are:</p> <ul style="list-style-type: none"><li>• Kasaya (decoctions or other liquids)</li><li>• Gur / Guda / Sharkara (jaggery, sugur or sugar candy)</li><li>• Churna (powders or pulps of certain drugs)</li><li>• Ghrita (Ghee or tailam (oil))</li><li>• Madhu (honey)</li></ul> <ol style="list-style-type: none"><li>1. Gur / Guda / Sharkara (jaggery, sugar or sugar candy) is dissolved well in the decoction or liquid and strained to remove the foreign particles. This solution is then boiled over a moderate fire.</li><li>2. When the Pak (Phanita) is tantuvat (thread like) when pressed between thumb and index finger or when it sinks down in a glass of water without getting easily dissolved, it should be removed from the fire.</li><li>3. Churna (fine powders) of herbs are then added in small quantities and stirred continuously and vigorously to form a homogenous mixture.</li><li>4. Ghrita (Ghee) or Taila (oil), if mentioned is added while the preparation is somewhat hot and mixed well.</li><li>5. Madhu (honey), if mentioned is added at the last when the mixture or preparation gets cool and mixed well. e.g. Kutjavaleha, Drakshavaleha</li></ol>	
		<p><b><u>Bhasma:</u></b></p> <p>The powdered form of the substance obtained by calcination of metals, minerals or animal products by a special process in closed crucibles in pits covered with cow dung cakes (puttam) is known as Bhasma.</p>	
		<p><b>Method of Preparation of Bhasmas:</b></p> <p>It consists of 2 steps.</p> <ol style="list-style-type: none"><li>1. <b>Shodhana:</b> In Ayurveda, purification is called Shodhana. Shodhana is the process through which the external and internal impurities of metals and minerals are removed.</li><li>2. <b>Marana:</b> Marana is basically a burning process or calcination. The purified metal is placed into a mortar pestle and grounded with the juice of specified plants or Kashayas mercury (in metallic state), or a compound of mercury such as mercury perchloride (sauviram), an amalgam of sulfur and mercury (kajjali) for a specified period. Both the processes are time consuming and need special attention.</li></ol>	



Q. No.	Sub No.	Answers	Marking Scheme
2	g	<p><b>State the biological source chemical constituents and uses of Neem.</b></p> <p><b>Marking Scheme: Biological source:1M; Chemical constituents:1M; Uses:1M (for any two uses)</b></p> <p><b>Answer:</b></p> <p><b>Neem:</b></p> <ol style="list-style-type: none"><li><b>1. Biological source</b> It consists of leaves and aerial parts of <i>Azadirachta indica</i>, belonging to family Meliaceae.</li><li><b>2. Chemical Constituents</b><ol style="list-style-type: none"><li>Leaves contains – Azadirachitin, melianrol and salanin (Insect repellent)</li><li>Flowers contains – Nimbosterol, myricitin, and Kaempferol. (Insecticidal)</li><li>Fruits contains – Diacetyl azadirachtinol (Insecticidal)</li><li>Bark contains – Nimbin, Nimbinin, Nimbidin, Margolone. (Antiviral or Antibacterial)</li><li>Seeds contains – Nimbin, Nimbidin, Azodirachtin, glycerides of oleic and stearic acids.</li><li>It also contains Flavanol glycosides, quercetin, Margosine</li></ol></li><li><b>3. Uses</b><ol style="list-style-type: none"><li>The neem leaves and neem oils are used as antiseptic, isecticides, antifeedant, attractants and growth disruptor.</li><li>The anti-insect principles have been commercialized in the form of vapaside and margosides.</li><li>The drug is also attributed antifertility and antiviral properties and is being screened for efficiency in treatment of AIDS.</li></ol></li></ol>	3M
2	h	<p><b>What are the antihypertensive? Give biological source &amp; chemical constitutes of Rauwolfia</b></p> <p><b>Marking Scheme: Definition:1M; Biological source:1M; Chemical constitutes:1M</b></p> <p><b>Answer:</b></p> <p><b>Antihypertensives:</b></p> <p>The medicaments given in treatment of high blood pressure are known as antihypertensive drugs.</p> <p><b>Biological source:</b></p> <p>It consists of dried roots of the plant <i>Rauwolfia serpentina</i> belonging to family Apocynaceae</p> <p><b>Chemical constituents:</b></p> <ul style="list-style-type: none"><li>Main alkaloid – Reserpine</li><li>Other alkaloids – ajmalicine, ajmaline, rauwolfinine, rescinnamine, reserpinine, yohimbine, serpentine &amp; serpentinine.</li><li>Also contains oleo-resin, phytosterol, fatty acids, unsaturated alcohol &amp; sugars.</li></ul>	3M



Q. No.	Sub No.	Answers	Marking Scheme
2	i	<p><b>Define glycosides. Explain chemical test for cardiac glycosides.</b></p> <p><b>Marking Scheme: Definition:1M, Chemical test:2M</b></p> <p><b>Answer:</b></p> <p><b>Definition:</b></p> <p>Glycosides is an organic compound obtain from plants and animal source, which on enzymatic hydrolysis gives one or more sugar moieties along with a non-sugar moiety, which are attached by glycosidic bond. Sugar moiety is called glycone and non-sugar moiety is called aglycone or genin.</p> <p><b>Chemical Tests for Cardiac Glycosides</b></p> <p><b>Keller-Kiliani test</b></p> <ul style="list-style-type: none"><li>• To the alcoholic extract of drug equal volume of water and 0.5 ml of strong lead acetate solution was added, shake, and filtered.</li><li>• Filtrate was extracted with equal volume of chloroform. Chloroform extract was evaporated to dryness and residue was dissolved in 3 ml of glacial acetic acid followed by addition of few drops of FeCl<sub>3</sub> solution.</li><li>• The resultant solution was transferred to a test tube containing 2 ml of conc. H<sub>2</sub>SO<sub>4</sub>.</li><li>• Reddish brown layer is formed, which turns bluish green after standing due to presence of digitoxose.</li></ul>	3M
2	j	<p><b>State the role of moisture content and extractive value in evaluation of crude drug.</b></p> <p><b>Marking Scheme: Role of moisture content:1.5M; Role of Extractive Value: 1.5M</b></p> <p><b>Answer:</b></p> <p><b>1. Extractive value:</b></p> <p>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.</p> <p>It can be determined as</p> <ul style="list-style-type: none"><li>• Water soluble extractives,</li><li>• Alcohol soluble extractives</li><li>• Alcohol insoluble extractives</li><li>• Ether soluble extractives.</li></ul> <p><b>Significance of Extractive value:</b></p> <p>It is used to assess quality, purity and to detect adulteration.</p>	3M



Q. No.	Sub No.	Answers	Marking Scheme								
		<p><b>2. Moisture content-</b></p> <p>The moisture content of a drug will be responsible for decomposition of crude drugs either producing chemical change or microbial growth.</p> <p>So, the moisture content of a drug should be determined to make the solution of definite strength.</p> <p>The moisture content is determined by heating a drug at 1050 C in an oven to a constant weight.</p> <p><b>Crude Drugs with limits of Moisture content:</b></p> <table border="1"><thead><tr><th>Drugs</th><th>Moisture content (%) w/w (Not more than)</th></tr></thead><tbody><tr><td>Aloes</td><td>10.0</td></tr><tr><td>Ergot</td><td>08.0</td></tr><tr><td>Starch</td><td>15.0</td></tr></tbody></table>	Drugs	Moisture content (%) w/w (Not more than)	Aloes	10.0	Ergot	08.0	Starch	15.0	
Drugs	Moisture content (%) w/w (Not more than)										
Aloes	10.0										
Ergot	08.0										
Starch	15.0										
2	k	<p><b>Give contribution of i) Seydler ii) Galen iii) Dioscoride in pharmacognosy</b></p> <p><b>Marking Scheme: (1 mark for each)</b></p> <p><b>Answer:</b></p> <p><b>1. Seydler:</b></p> <ul style="list-style-type: none"><li>• While studying Sarsaparilla, it was, A German scientist, who coined the term Pharmacognosy in 1815 in his work entitled, ‘Analecta Pharmacognostica from combination of two greek words<ul style="list-style-type: none"><li>○ Pharmakon - a drug</li><li>○ Gignosco- to acquire the knowledge of.</li></ul></li></ul> <p><b>2. Galen:</b></p> <p>Greek Pharmacist Galen described various methods of preparation containing active constituents of crude drugs, and even at present the branch dealing with the extraction of plant and animal drugs is known as Galenical Pharmacy.</p> <p><b>3. Dioscorides:</b></p> <p>A Greek physician described several plants of medicinal importance in De Materia Medica. All the natural products, utilized by physicians were compiled together to form the Materia Medica giving their detailed information.</p>	<b>3M</b>								



## SUMMER- 2023 EXAMINATION

## MODEL ANSWER - ONLY FOR THE USE OF RAC ASSESSORS

Subject Title: PHARMACOGNOSY- THEORY

Subject Code: 20113

Q. No.	Sub No.	Answers	Marking Scheme
3		Attempt ALL questions	20 M
		<i>Important Instructions: In case, multiple answer options are observed for the same sub question of question No. 3, the option (Answer) appearing first in the answer book shall be treated as answer and assessed accordingly.</i>	
3	a	Name the drug which consist of “Quinine” as a chemical constituent Marking Scheme: Name of correct 1 Mark Answer: i) Cinchona	1
3	b	Balsams consist of _____ and _____ acids Marking Scheme: 0.5 Marks for Name of each acid Answer: Cinnamic and Benzoic	1
3	c	Mention any one oil used as a source of vitamins Marking Scheme: 1 Marks for any one example. Answer: Cod-liver oil, Halibut liver oil or Shark liver oil.	1
3	d	Gymnema is used as _____ Marking Scheme: 1 Mark for correct option Answer: iii) Antidiabetics	1
3	e	Family of colchicum seed is _____ Marking Scheme: 1 Mark for correct answer Answer: ii) Liliaceae	1
3	f	Mention the synonym of _____ Marking Scheme: 0.5 Marks for each drug (Synonym) Answer: i) Ephedra - Ma-Haung ii) Vasaka - Adhatoda or Adulsa	1
3	g	In case of Clove and Black pepper, which part of plant is used. Marking Scheme: 0.5 Marks for each drug (Part) Answer: i) Clove - dried flower buds ii)Black pepper - dried unripe fruit	1
3	h	State the volatile content of Fennel fruit Marking Scheme: 1 Mark for volatile content Answer: Volatile content of fennel fruit is from 3 to 7 %	1



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Q. No.	Sub No.	Answers	Marking Scheme
3	i	<p>Determination of stomatal index is _____ type of evaluation.</p> <p><b>Marking Scheme:</b> 1 Mark</p> <p><b>Answer:</b> Microscopic</p>	1
3	j	<p><b>Name the drug belonging to following synonym</b></p> <p><b>Marking Scheme:</b> 0.5 Marks for each drug</p> <p><b>Answer:</b></p> <p>i) <b>Puncture vine</b> – Gokharu</p> <p>ii) <b>Indian Saffron</b> - Turmeric or Curcuma</p>	1
3	k	<p><b>Give Major chemical constituents present in i) Turmeric ii) Vinca</b></p> <p><b>Marking Scheme:</b> 0.5 Marks for any one name of chemical constitute of each drug</p> <p><b>Answer:</b></p> <p><b>i. Turmeric –</b></p> <p><b>Chemical Constituents:</b></p> <p>Turmeric contains about 5% of volatile oil, resin, abundant zingiberaceous starch grains and yellow colouring substances known as curcuminoids.</p> <p>The chief component of curcuminoids is known as curcumin. Turmerone, zingiberene, borneol, caprylic acid are the other constituents of turmeric oil.</p> <p><b>ii. Vinca -</b></p> <p><b>Chemical Constituents:</b></p> <p>It consists of alkaloids and glycosides.</p> <p>Alkaloids - Indole-indoline alkaloids e.g. Vincristine, vinblastine, vindoline, vindolinine, catharanthine.</p> <p>Other alkaloids like ajmalicine, serpentine, lochnerine and tetrahydroalstonine. It also contains sesquiterpene, indole and indoline glycoside.</p>	1
3	l	<p><b>Mayer's reagent consists of _____ solution.</b></p> <p><b>Marking Scheme:</b> 1 Mark</p> <p><b>Answer:</b> <b>Potassium mercuric iodide</b> solution.</p>	1
3	m	<p><b>What you mean by Asava</b></p> <p><b>Marking Scheme:</b> 1 Mark for definition</p> <p><b>Answer:</b></p> <p>Asavas are medicinal preparations prepared by soaking the drugs in the powdered forms or in the form of their decoction, in a solution of sugar or jaggery (Gur) as may be indicated, for a specific period of time.</p>	1



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Q. No.	Sub No.	Answers	Marking Scheme
3	n	<b>Define "Gutika"</b> <b>Marking Scheme:</b> 1 Mark for definition  Answer: Medicaments in the form of tablets or pills are known as Gutika or Vati.	1
3	o	<b>Lycopodium spore method is a _____ method of evaluation of crude drug.</b> <b>Marking Scheme:</b> 1 Mark for correct option  Answer: ii) Microscopic	
3	p	<b>Extraction method used for preparation of delicate perfumes.</b> <b>Marking Scheme:</b> 1 mark for correct option  Answer: ii) Enflurage	1
3	q	<b>The pungent principle of Ginger is _____.</b> <b>Marking Scheme:</b> 1 Mark  Answer: Zingiberene	1
3	r	<b>The Greek physician _____ known as "Father of Medicine"</b> <b>Marking Scheme:</b> 1 Mark  Answer: Hippocrates	1
3	s	<b>What are herbal cosmetics</b> <b>Marking Scheme:</b> 1 Mark  Answer: Herbal Cosmetics: Herbal cosmetics are the preparations containing phytochemicals from a variety of herbs which influences the function of skin and provide nutrients to the body necessary for the healthy skin or hairs.	1
3	t	<b>Mention two drugs having family Solanaceae.</b> <b>Marking Scheme:</b> 0.5 Marks for each example (Any two)  Answer: Hyocyamus, Datura, Belladonna, Aswagandha, Potato, Tobacco	1