

1. Stem thickening occurs due to functioning of the following structures:

- A. Lateral meristem
- B. Apical meristem
- C. Endoderm
- D. Wound meristem
- E. Intercalary meristem

2. Actinomorphic apetalous corolla include:

- A. Funnelform
- B. Tubular
- C. Cruciform
- D. Ligulate
- E. Campanulate

3. Seeds of rye, corn, and other crops have small corymb-shaped cotyledon and accumulate nutrients in the:

- A. Gemmule
- B. Embryo root
- C. Perisperm
- D. Endosperm
- E. Shell

4. Connection between plant cell protoplasts and their metabolic function is provided by thin cytoplasmic threads that pass through pores in the cell walls. Name these threads:

- A. Microtubules
- B. Microfilaments
- C. Fibrils
- D. Cytoskeleton
- E. Plasmodesma

5. During photosynthesis within plant cell chloroplasts there is short-term retained starch being produced, which rapidly hydrolyzes into glucose. This starch is called:

- A. Primary
- B. Secondary
- C. Transitory
- D. Resistant
- E. Reserve

6. During field practice a student was tasked with making a morphological collection of coenocarpous fruits. What type of fruit belongs to this group?

- A. Drupe
- B. Hesperidium
- C. Cynarodium

- D. Aggregate-accessory fruit
- E. *Fragaria*

7. During identification of fruits of *Datura* family they were determined to be a:

- A. Berry in an orange cup
- B. Urceolate capsule with a lid
- C. Juicy globular cynarodium
- D. Glossy black berry
- E. Thorned quadrivalve capsule

8. *Plantago major* inflorescence grows at the apex, its rachis is long, with sessile flowers. Name this type of inflorescence:

- A. Spike
- B. Panicle
- C. Capitulum
- D. Thyrsse
- E. Spadix

9. A plant under investigation has compound uniform monopodium inflorescence - compound umbel. What plant is it characteristic of?

- A. *Sorbus aucuparia*
- B. *Allium cepa*
- C. *Anethum graveolens*
- D. *Rosa canina*
- E. *Centaurea cyanus*

10. Within folded parenchyma of a fir needle there are cavernous structures filled with galipot and lined with live thin-walled secretory cells. Name these structures:

- A. Glandules
- B. Nectar glands
- C. Resin ducts
- D. Laticifers
- E. Etydatodes

11. A plant producing essential oil has square stem, bilabiate corolla, coenobium fruit. These features are characteristic of:

- A. *Scrophulariaceae*
- B. *Solanaceae*
- C. *Polygonaceae*
- D. *Lamiaceae*
- E. *Papaveraceae*

12. Rhizome of an *Asteraceae* family species is polycephalous, succulent, has lysi- genous cavities, accumulates inulin. Such underground organ is characteristic of:

- A. *Helianthus annuus*
- B. *Digitalis grandiflora*
- C. *Sorbus aucuparia*
- D. *Inula helenium*
- E. *Hyoscyamus niger*

13. During excursion into a conifer forest the students noticed that bilberry (*Vaccinium myrtillus*) stems are lignified only partially in their lower part, the upper part of the stem retains the form of caulis. Therefore, this plant can be classified as:

- A. Tree
- B. Liana
- C. Annual grass
- D. Perennial grass
- E. Suffrutex

14. The fruit is a thorned many-seeded capsule that opens into four flaps when ripe. It is characteristic of:

- A. *Digitalis purpurea*
- B. *Papaver somniferum*
- C. *Hyoscyamus niger*
- D. *Datura stramonium*
- E. *Linum usitatissimum*

95. Colored or white component of double perianth, which consists of petals, is a:

- A. Gynoecium
- B. Corolla
- C. Androecium
- D. Perigonium
- E. Flower cup

Species character of *Thymus serpyllum* includes: apical inflorescences (flower heads), dark punctate glands on the inferior surface of a leaf, long hairs along the edge of leaf base, and:

- A. Thorns
- B. Climbing stems
- C. Short decumbent stems
- D. Stems with prickles
- E. Creeping stems

134. You are studying a silvery downy plant of *Asteraceae* family, which is rich with essential oils and bitters. Harvested are apical sprouts with panicle of small round flower heads. This plant is:

- A. *Arctium lappa*
- B. *Calendula officinalis*
- C. *Artemisia absinthium*
- D. *Chamomilla recutita*
- E. *Bidens tripartita*

135. Name the process of cell membrane saturation with a fat-like substance - suberin:

- A. Sliming
- B. Cutinization
- C. Mineralisation
- D. Lignification
- E. Suberization

136. Bark of a thornless xylophyte of the *Rhamnaceae* family has laxative effect. Name this plant:

- A. *Hippophae rhamnoides*
- B. *Rubus idaeus*
- C. *Frangula alnus*
- D. *Aronia melanocarpa*
- E. *Crataegus sanguinea*

137. A perennial plant has white flower heads grouped in compound corymbs and bipinnatisected or tripinnatisected leaves. Name this plant:

- A. *Phaseolus vulgaris*
- B. *Taraxacum officinale*
- C. *Potentilla erecta*
- D. *Melilotus officinalis*
- E. *Achillea millefolium*

138. What inflorescences are characteristic of *Cruciferae* (*Brassicaceae*) family?

- A. Capitulum or corymb
- B. Corymb or spike
- C. Spadix or panicle
- D. Raceme or panicle
- E. Capitulum or umbel

139. Both scientific and folk medicine uses medicinal plant *Glycyrrhiza glabra L.* What part of the plant is harvested?

- A. Foliage
- B. Inflorescence
- C. Roots and rhizomes
- D. Grass
- E. Seeds

1. Microscopy of leaf epidermis of *Lamiaceae* (*Labiatae*) family plants revealed that both accessory cells are perpendicular to a stoma. Such stomata are called:

- A. Diacytic
- B. Paracytic
- C. Anisocytic
- D. Anomocytic
- E. Tetracytic

2. Stem thickening occurs due to functioning of the following structures:

- A. Lateral meristem
- B. Apical meristem
- C. Wound meristem
- D. Intercalary meristem
- E. Endoderm

11. is dark-green, lower surface is light-green with punctate glandules. Name this species:

- A. *Vaccinium vitis-idaea*
- B. *Arctostaphylos uva-ursi*
- C. *Vaccinium oxycoccus*
- D. *Vaccinium myrtillus*

Ledum palustre

12. A sample section of an axial body shows a complex consisting of phellogen and its derivatives - cork and phelloderm. This tissue is called:

- A. Periderm
- B. Colenchyma
- C. Sclerenchyma
- D. Epiblema

Epidermis

13. Racemose clusters of calcium carbonate crystals are detected among the waste products of a protoplast. These crystals are:

- A. Cystoliths
- B. Isolated crystals
- C. Raphides
- D. Styloids
- E. Druses

42. Flax seeds are used in medicine as coating agents, due to the following ability of their secondary membranes:

- A. Sliming
- B. Suberization
- C. Gummosis
- D. Lignification
- E. Mineralization

43. The end product of starch hydrolysis is:

- A. D-glucose
- B. D-fructose
- C. Saccharose
- D. Maltose
- E. D-galactose

74. Spore and pollen analysis revealed tetrahedral spores with a semicircular base and reticular surface in the pollen. It is the pollen of:

- A. *Lycopodiophyta*
- B. *Equisetiphyta*
- C. *Bryophyta*
- D. *Polypodiophyta*
- E. *Pinophyta*

75. *Quercus robur* leaves have the following type of lamina shape and division:

- A. Pinnatifolate
- B. Trilobate
- C. Pinnatipartite
- D. Palmatifolate
- E. Palmatipartite

76. Mosaic discoloration of leaves has been detected at medicinal plantations. What microorganisms are the cause of such damage?

- A. Plant-pathogenic viruses
- B. Plant-pathogenic bacteria
- C. Plant-pathogenic fungi
- D. Protozoa
- E. Rickettsia

77. Microscopic study of soy bean seeds stained with Sudan III revealed droplets of various sizes. These droplets are:

- A. Lipids
- B. Proteins
- C. Starch
- D. Inulin
- E. Glycogen

78. What type of conducting bundles is characteristic of all root zones of one-seeded plants?

- A. Radical
- B. Central phloem (Amphivasal)
- C. Central xylem (Amphicribal)
- D. Bilateral

Collateral

79. You are studying a silvery downy plant of *Asteraceae* family, which is rich with essential oils and bitters. Harvested are apical sprouts with panicle of small round flower heads. This plant is:

- A. *Artemisia absinthium*
- B. *Arctium lappa*
- C. *Bidens tripartita*
- D. *Calendula officinalis*
- E. *Chamomilla recutita*

80. Common nettle, hop, and black elderberry require soils rich in nitrogen compounds. Such plants are called:

- A. Nitrophyles
- B. Nitrophobes
- C. Calciphiles
- D. Calciphobes
- E. Halophytes

81. Weeds can be harmful for populace's wellbeing. Particularly, allergic reactions are often caused by the following plant in its period of blossoming:

- A. *Ambrosia artemisiifolia*
- B. *Equisetum arvense*
- C. *Stellaria media*
- D. *Erigeron canadensis*
- E. *Taraxacum officinale*

82. What forms from an ovule after fertilization of flowering plants?

- A. Seed
- B. Gametophyte
- C. Sporophyte
- D. Fruit
- E. Endosperm

83. Corolla of a zygomorphic bisexual flower consists of 5 petals: the largest one is called banner, two lateral - wings, and two fused together - keel. This corolla is characteristic of *Fabaceae* family and is called:

- A. Papilionaceous
- B. Lingulate
- C. Rotate
- D. Funneliform
- E. Tubular

84. A plant producing essential oil has square stem, bilabiate corolla, coenobium fruit. These features are characteristic of:

- A. *Lamiaceae*
- B. *Papaveraceae*
- C. *Polygonaceae*
- D. *Solanaceae*
- E. *Scrophulariaceae*

85. Students should identify the following to determine the sex of a flower:

- A. Stamens and pistils
- B. Flower cup and corolla
- C. Pedicel and receptacle
- D. Symmetry
- E. Color and type of indumentum

86. Both scientific and folk medicine uses medicinal plant *Glycyrrhiza glabra L.* What part of the plant is harvested?

- A. Roots and rhizomes
- B. Foliage
- C. Inflorescence
- D. Grass
- E. Seeds

87. Rhizome of an *Asteraceae* family species is polycephalous, succulent, has lysigenous cavities, accumulates inulin. Such underground organ is characteristic of:

- A. *Inula helenium*
- B. *Hyoscyamus niger*
- C. *Digitalis grandiflora*
- D. *Sorbus aucuparia*
- E. *Helianthus annuus*

88. A substance performs mechanical function; its cells are covered with uniformly thick lignified membranes. This substance is:

- A. Sclerenchyma
- B. Collenchyme
- C. Periderm
- D. Cambium
- E. Sieve tubes

2015

1. A sample section of an axial body shows a complex consisting of phellogen and its derivatives - cork and phelloderm. This tissue is called:

- A. Periderm
- B. Colenchyma
- C. Sclerenchyma
- D. Epiblema
- E. Epidermis

2. When root was being studied under microscope, root hairs were detected, which are cell growths of:

- A. Epiblema
- B. Epidermis
- C. Endoderm
- D. Exoderm
- E. Mesoderm

3. Racemose clusters of calcium carbonate crystals are detected among the waste products of a protoplast. These crystals are:

- A. Cystoliths
- B. Isolated crystals
- C. Raphides
- D. Styloids
- E. Druses

45. After application of chlorine-zinc- iodine to the thick colourless cell membranes of collenchyme

they became violet. That means the membranes are:

- A. Cellulose
- B. Lignified
- C. Cutinized
- D. Mineralized
- E. Suberinized

46. A student analyzes an axial plant organ characterized by radial symmetry, unlimited growth, positive geotropism. It provides nutrition, vegetative propagation, anchorage of plant in the soil. This organ can be identified as:

- A. Root
- B. Stem
- C. Leaf
- D. Rhizome
- E. Seed

47. The study of the main root ontogenesis shows that it has developed from:

- A. Radicle
- B. Apical meristem
- C. Pericycle
- D. Lateral meristem
- E. Intercalary meristem

48. The end product of starch hydrolysis is:

- A. D-glucose
- B. D-fructose
- C. Saccharose
- D. Maltose
- E. D-galactose

49. Spore and pollen analysis revealed tetrahedral spores in the pollen, which have semi-circular base and reticular surface. The spores can belong to:

- A. *Lycopodiophyta*
- B. *Equisetiphyta*
- C. *Bryophyta*
- D. *Polypodiophyta*
- E. *Pinophyta*

50. In the practice of harvesting herbal raw material of *Asteraceae* family the term "flowers" means both individual flowers and inflorescences. However, the notion of 'flowers' is botanically correct only for:

- A. *Centaurea cyanus*
- B. *Gnaphalium uliginosum*
- C. *Arnica montana*
- D. *Echinops ritro*
- E. *Bidens tripartita*

51. *Quercus robur* leaves have the following type of lamina shape and division:

- A. Pinnatilobate
- B. Trilobate
- C. Pinnatipartite
- D. Palmatilobate
- E. Palmatipartite

52. Microscopic study of soybean seeds stained with Sudan III revealed droplets of various sizes. They are:

- A. Lipids

- B. Proteins
- C. Starch
- D. Inulin
- E. Glycogen

101. Name the above-ground sprout modifications that develop from lateral buds, are situated in leaf angles or inflorescences, and take part in vegetative reproduction:

- A. Bulbils
- B. Above-ground tubers
- C. Cladodes
- D. Tendrils
- E. Thorns

102. What type of conducting bundles is characteristic of all root zones in one-seeded plants?

- A. Radical
- B. Amphivasal (Lepto centric)
- C. Amficribal (Hadro centric)
- D. Bilateral
- E. Collateral

103. Corolla of a zygomorphic hermaphroditic flower consists of 5 petals: the largest one is called the banner, the two lateral petals are called the wings, and the two fused petals forming the keel. Such corolla is characteristic of medicinal plants of Leguminosae family. Name the type of corolla:

- A. Papilionaceous
- B. Labiate
- C. Saucer-shaped
- D. Funneliform
- E. Tubular

104. You are studying the silvery downy plant of Asteraceae family, which is rich with essential oils and bitters. Harvested are apical sprouts with panicle of small round flower heads. This plant is:

- A. *Artemisia absinthium*
- B. *Arctium lappa*
- C. *Bidens tripartita*
- D. *Calendula officinalis*
- E. *Chamomilla recutita*

105. Common nettle, hop, black elderberry are the plants that require soils rich in nitrogen compounds, that is, such plants are called:

- A. Nitrophytes
- B. Nitrophobes
- C. Calciphiles
- D. Calciphobes
- E. Halophytes

106. Plant pathogens are represented by various microorganisms: bacteria, fungi, actinomycetales, viruses. Name the main location of plant pathogens in the natural environment:

- A. Soil
- B. Water
- C. Air
- D. Plant parts
- E. Plant vascular system

107. A cultivated plant has green berrylike fruit and underground sprout modifications - tubers. The described plant is:

- A. *Solanum tuberosum*
- B. *Convalaria majalis*

- C. *Polygonatum odoratum*
- D. *Atropa belladonna*
- E. *Solanum lycopersicum*

108. Elongated narrow prismatic crystals with sharpened points were detected during microscopic investigation of *Convallaria majalis* mesophile. These crystals are:

- A. Styloids
- B. Druses
- C. Crystalline sand
- D. Cystoliths
- E. Perigonium

109. Students should identify the following to determine the sex of a flower:

- A. Stamens and pistils
 - B. Flower cup and corolla
 - C. Pedicel and receptacle
 - D. Symmetry
- Colour and type of indumentum

110. A seed of a legume contains proteins and fatty oil. Name this legume:

- A. *Glycine hispida*
- B. *Vaccinium myrtillus*
- C. *Sinapis alba*
- D. *Astragalus dasyanthus*
- E. *Datura stramonium*

111. Rhizome of a species belonging to the Asteraceae family is polycephalous, succulent, has lysigenous cavities, accumulates inulin. Such underground organ is characteristic of:

- A. *Inula helenium*
- B. *Hyoscyamus niger*
- C. *Digitalis grandiflora*
- D. *Sorbus aucuparia*
- E. *Helianthus annuus*

112. Dry many-seeded monocarp fruit opens along its ventral suture. It can be identified as:

- A. Follicle
- B. Legume
- C. Nutlet
- D. Drupe
- E. Capsule

2014

1. If aromatic secretory-downy plant has square in cross section stem, spike inflorescence made up from whorled dichasias, bilabiate corolla and its fruit consists of four nutlets, it probably belongs to the following family:

- A. *Lamiaceae*
 - B. *Scrophulariaceae*
 - C. *Brassicaceae*
 - D. *Apiaceae*
- Solanaceae*

5. When root is studied under microscope, one leading bundle is detected in its maturation zone, where xylem and phloem areas interchange radially. It can be concluded that this bundle type is:

- A. Radial
- B. Collateral
- C. Bicollateral

- D. Amphicribal
- E. Amphivasal

6. Microscopy of monocotyledon leaf epidermis revealed that stomatal complex has four accessory cells. That means stomatal apparatus belongs to the following type:

- A. Tetracytic
- B. Diacytic
- C. Anisocytic
- D. Anomocytic
- E. Paracytic

7. *Arctostaphylos uva ursi*, *Vaccinium vitis ideae*, *Vaccinium myrtillus* life forms can be defined as:

- A. Small shrub (fruticulus)
- B. Vine
- C. Grass
- D. Shrub (frutex)
- E. Subshrub (suffrutex, semifrutex)

8. In the course of plant cells treatment with phloroglucinol with concentrated sulfuric acid their cell walls became crimson-red, which means:

- A. Lignification
- B. Suberization
- C. Mucification
- D. Cutinization
- E. Mineralization

9. When root was being studied under microscope, root hairs were detected, which are cell growths of:

- A. Epiblema
- B. Epidermis
- C. Endoderm
- D. Exoderm
- E. Mesoderm

10. Antibiotics produced by fungi belonging to *Penicillium* and *Aspergillus* genera are widely used in medicine. What class do these genera belong to?

- A. Ascomycetes
- B. Basidiomycetes
- C. Zygomycetes
- D. Deuteromycetes
- E. Chytridiomycetes

11. A student analyses plant organ with radial symmetry, unlimited growth and positive geotropism, which provides nourishment, vegetative reproduction and plant fastening in soil. This organ is:

- A. Root
- B. Stem
- C. Leaf
- D. Rhizome
- E. Seed

In root transverse section laying and formation from pericycle of the following organs can be seen in

maturation zone:

- A. Lateral roots
- B. Trichome
- C. Additional roots
- D. Root hairs
- E. Root cap

84. In spring birch and poplar buds are gathered. They essentially are:

- A. Embryonic shoots
- B. Sporophyte embryos
- C. Gametophyte embryos
- D. Reduced sporophytes
- E. Reduced gametophytes

85. When studying *white mistletoe*, - perennial medicinal semiparasite plant, - it was revealed that its embryonic root buries into higher plant stem tissue and reaches vascular tissue system. This type of roots is called:

- A. Haustorial roots
- B. Photosynthetic roots
- C. Aerating roots
- D. Contractile roots
- E. Aerial roots

86. It is known that cells of *Chlorophyta* division representatives have chromatophores of various shapes. We can observe ribbon-like chromatophores in the species of the following genus:

- A. *Spyrogyra*
- B. *Volvox*
- C. *Clorella*
- D. *Chlamidomonas*
- E. *Spirulina*

87. During practical field session students have detected plant with diversity of leaves that differ by their placement on stem, parts development, size, shape, lamina division. This phenomenon is called:

- A. Heterophyllly
- B. Phyllotaxy
- C. Metamorphosis
- D. Leaf mosaic

Venation

88. It is known that leaves of most gymnosperm species are represented by needles. Which one of the species listed below has macropodous leathery leaves with solid flabellate lamina, dichotomous venation and one or several notches along the upper margin?

- A. *Ginkgo biloba*
- B. *Cedrus libani*
- C. *Juniperus communis*
- D. *Picea abies*
- E. *Abies sibirica*

89. Leaves of *Aesculus hippocastanum* are composed of 5-7 sessile folioles that are oblong-ovate shaped with dentate-serrated margin, are attached to petiole (leaf rachis), and therefore are:

- A. Palmately compound
- B. Pinnately compound
- C. Pinnatisected
- D. Palmatisected
- E. Palmatilobed

90. During morphological analysis of lily-of-the-valley (*Convallaria majalis*) leaf it was noted that lamina has wide elliptic shape and numerous veins are parallel to leaf margin and merge only at the leaf point. What is this venation type called?

- A. Arcuate
- B. Parallel
- C. Palmate
- D. Pinnate-reticulate
- E. Dichotomous

91. Androecium of *Brassica oleracea* flower has six stamens, with four stamens of inner circle longer than two stamens of outer circle. What is this type of androecium called?

- A. Tetrodynamous
- B. Didynamous
- C. Diadelphous
- D. Monadelphous
- E. Polyadelphous

92. To make diaphoretic herbal tea the following inflorescences are used: 3-15 corymbose dichasias with light-yellow oblong wing-shaped membranous recaulescent squamella that fuses halfway with floral axis. Flowers are fragrant, yellowish. These inflorescences belong to:

- A. *Tilia cordata*
- B. *Viburnum opulus*
- C. *Robinia pseudoacacia*
- D. *Mentha piperita*
- E. *Padus avium*

93. Cherry (*Prunus cerasus*) inflorescence has short floral axis and approximately same length pedicles emerging from one point. It is characteristic of the following inflorescence organisation:

- A. Umbel
- B. Corymb
- C. Raceme
- D. Spike
- E. Head

94. Nucleoproteins contain significant amount of alkaline proteins. What proteins carry out structural function in chromatin?

- A. Protamines and histones
- B. Albumines and globulines
- C. Prolamines and glutenins
- D. Hemoglobin and myoglobin
- E. Interferones and mucin

95. Representatives of this division propagate vegetatively by special formations: isidia, soredia, lobules. Name this division.

- A. *Lichenes*

- B. *Basidiomycota*
- C. *Equisetophyta*
- D. *Lycopodiophyta*
- E. *Polypodiophyta*

96. Having been studied, conifer wood is determined to be composed of cells with pointed ends and lignified ring-porous cell wall. Therefore, this tissue of conifers is represented only by:

- A. Tracheids
- B. Vessels
- C. Sieve tubes
- D. Companion cells
- E. Bast fibers

97. When studying five herbarium specimen of medicinal plants, it was determined that one of them belongs to *Fabaceae* family. Which one is it?

- A. *Ononis arvensis*
- B. *Atropa belladonna*
- C. *Hyoscyamus niger*
- D. *Datura stramonium*
- E. *Solanum dulcamara*

98. You are studying the silvery downy plant of *Asteraceae* family, which is rich with essential oils and bitters. Harvested are apical sprouts with panicle of small round flower heads. This plant is:

- A. *Artemisia absinthium*
- B. *Arctium lappa*
- C. *Bidens tripartita*
- D. *Calendula officinalis*
- E. *Chamomilla recutita*

2013

1. A plant under examination has papilionaceous flowers. This plant belongs to the following family:

- A. *Fabaceae*
- B. *Scrophulariaceae*
- C. *Ranunculaceae*
- D. *Lamiaceae*
- E. *Asteraceae*

2. Microscopic analysis of a root revealed the following features: primary structure, endodermal cells with horseshoe-shaped areas, radial fascicle of the central cylinder, more than six xylem rays. Such root structure is typical for the following plants:

- A. Angiosperms, monocotyledons
- B. Angiosperms, dicotyledons
- C. Gymnosperms, conifers
- D. Gymnosperms, gnetaliens
- E. Pteridosperms

3. Analysis of a plant revealed essential- oil glands with several layers of cells arranged in pairs. This allows for the possibility that the plant relates to the family:

- A. *Asteraceae*
- B. *Scrophulariaceae*
- C. *Solanaceae*
- D. *Apiaceae*
- Lamiaceae

4. A sample section of an axial body shows a complex consisting of phellogen and its derivatives - cork and phellogem. This tissue is called:

- A. Periderm
- B. Collenchyma
- C. Sclerenchyma
- D. Epiblema
- E. Epidermis

5. Microscopic examination of a perennial stem revealed the secondary integumentary tissue that was formed as a result of cell division of:

- A. Phellogen
- B. Procambium
- C. Cambium
- D. Pericycle
- E. Protoderma

6. A plant under study has stipules fused together and thus forming a tight tube - ochrea, that is a diagnostic feature of the following family:

- A. *Polygonaceae*
- B. *Gramineae*
- C. *Rosaceae*
- D. *Papaveraceae*
- E. *Clusiaceae*

66. Which representative of the *Rosaceae* family has spring bloom in form of white, fragrant flowers gathered in pendulous racemes at the ends of short shoots?

- A. *Padus rasemosa (Pavia)*
- B. *Potentilla erecta*
- C. *Sorbus aucuparia*
- D. *Cerasus vulgaris*
- E. *Crataegus sanquinea*

67. A student analyzes an axial plant organ characterized by radial symmetry, unlimited growth, positive geotropism. It provides nutrition, vegetative propagation, anchorage of plant in the soil. This organ should be identified as:

- A. Root
- B. Stem
- C. Leaf
- D. Rhizome
- E. Seed

68. Cross section of a root conducting zone shows pericycle that gives rise to:

- A. Lateral roots
- B. Trichomes
- C. Adventitious roots
- D. Root fibrilla
- E. Root cap

112. Spore and pollen analysis revealed in the pollen some tetrahedral spores with a semi-circular base and a reticular surface, which may belong to:

- A. *Lycopodiophyta*
- B. *Equisetophyta*
- C. *Bryophyta*
- D. *Polypodiophyta*
- E. *Pinophyta*

113. Many species of wild rose are a source of vitamins, fatty oils and herbal material.

Specify the juicy pseudocarps that are procured as herbal raw material:

- A. Rose hips
- B. Coenobia
- C. Hesperides
- D. Aggregate-accessory fruits
- E. Cenocarp stone-fruits

114. Comparison of the underground organs of herbaceous plants revealed that in the bipartite annuals the following organ prevails:

- A. Main root system
- B. Adventitious root system
- C. Rhizome
- D. Bulb
- E. Corm

115. Representatives of *Asteraceae* family have various types of flowers EXCEPT FOR:

- A. Bilabiate
- B. Tubular
- C. Funneliform
- D. Ligulate
- E. Pseudoligulate

116. *Datura stramonium* has dry many- seeded fruits formed by syncarpous gynoecium that dehisce when the valves are broken off. Specify the fruit type:

- A. Capsule
- B. Follicle
- C. Siliqua
- D. Coenobium
- E. Hesperidium

117. Morphological analysis of poplar inflorescence showed that it is a simple monopodial inflorescence: main axis is drooping, the flowers are sessile, unisexual. Specify the type of inflorescence:

- A. Catkin
- B. Head
- C. Capitulum
- D. Cyme
- E. Panicle

118. The fruit of black locust is dry, formed of a single carpel, dehisces by the ventral and dorsal sutures on two sides, the seeds are attached along the ventral suture. Such fruit is called:

- A. Legume
- B. Siliqua
- C. Follicle
- D. Capsule
- E. Silicula

119. Microscopic study of soybean seeds stained with Sudan III revealed some droplets of various sizes. They are:

- A. Lipids
- B. Proteins
- C. Starch
- D. Inulin
- E. Glycogen

120. On the photomicrograph of a herbaceous plant stem the bicollateral vascular bundles are clearly visible. The microspecimen represents the stem of the following plant:

A. Pumpkin

B. Rye

C. Flax

D. Corn

Solomon's seal

121. What type of conducting bundles is typical for all root zones of one-seeded plants?

A. Radical

B. Central phloem

C. Central xylem

D. Bilateral

E. Collateral

122. The figwort family *Scrophulariaceae* includes a biennial plant up to 1,5 m high, with golden-yellow flowers gathered in spiked inflorescences. The flowers have five stamens. Specify this plant:

A. *Verbascum flomoides*

B. *Digitalis purpurea*

C. *Digitalis grandiflora*

D. *Digitalis lanata*

E. *Digitalis Ferruginea*

123. Astragalus dasyanthus has sessile flowers gathered into inflorescences with a short thick axis. This kind of inflorescence is called:

A. Capitulum

B. Cyme

C. Raceme

D. Head

E. Calathidium

124. In a sample studied under a microscope the multilayer palisade (columnar) parenchyma can be clearly seen. Such structure is typical for:

A. Leaf

B. Root

C. Dicotyledon stem

D. Rhizomes of ferns

E. Adventitious roots

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1. Microscopic examination of absorption zone of primary root cortex revealed that it consisted mainly of loose multilayer living parenchyma with amyloid granules. It is called:

A. Mesoderm

B. Endoderm

C. Exoderm

D. Collenchyme

E. Phellogene

14. A plant under examination has papilionaceous flower. This plant belongs in the family:

A. *Fabaceae*

B. *Scrofulariaceae*

C. *Ranunculaceae*

D. *Lamiaceae*

E. *Asteraceae*

15. Microscopic examination of a perennial stem revealed integumentary tissue of secondary origin that was formed as a result of cell division of:

- A. Phellogen
- B. Procambium
- C. Cambium
- D. Pericycle
- E. Protoderma

74. The analyzed plant has hollow ribbed stems, compound umbel inflorescence, schizocarpic fruit (cremocarp) and is rich in essential oils, which is a characteristic of:

- A. *Apiaceae*
- B. *Fabaceae*
- C. *Ericaceae*
- D. *Brassicaceae*
- E. *Asteraceae*

75. A student had to analyze an axial plant organ characterized by radial symmetry, unlimited growth, positive geotropism. It provided nutrition, vegetative propagation, anchorage of plant in the soil. This organ was identified as . . .

- A. Root
- B. Stem
- C. Leaf
- D. Rhizome
- E. Seed

76. The end product of starch hydrolysis is:

- A. D-glucose
- B. D-fructose
- C. Saccharose
- D. Maltose
- E. D-galactose

77. *Calendula officinalis* which a representative of the aster family is characterized by the following inflorescence type:

- A. Flowerhead
- B. Umbel
- C. Catkin
- D. Glome
- E. Cyme

78. Which medicinal plant of the *Asteraceae* family has only disk flowers in the flowerhead?

- A. Three-part beggarticks (*Bidens tripartita*)
- B. Dandelion (*Taraxacum officinale*)
- C. *Echinacea purpurea*
- D. Cornflower (*Centaurea cyanus*)
- E. Common yarrow (*Achillea millefolium*)

79. Spore and pollen analysis revealed in the pollen some tetrahedral spores with a semi-circular base and a reticular surface, which may belong to:

- A. *Lycopodiophyta*
- B. *Equisetiphyta*
- C. *Bryophyta*
- D. *Polypodiophyta*
- E. *Pinophyta*

80. In the practice of harvesting herbal raw material of *Asteraceae* family the term "flowers" means both individual flowers and inflorescences. However, the notion of "flowers" is botanically correct only for:

- A. *Centaurea cyanus*
- B. *Gnaphalium uliginosum*
- C. *Arnica montana*
- D. *Echinops ritro*
- E. *Bidens tripartita*

81. A perennial herbaceous plant has ascending quadrangular stem and oppositely arranged leaves. The flowers with bilabiate corolla are zygomorphic, bisexual, arranged in whorls in the leaf axils. The fruit type is coenobium. The described medicinal plant relates to the following botanic family:

- A. *Lamiaceae*
- B. *Asteraceae*
- C. *Poaceae*
- D. *Brassicaceae*
- E. *Rosaceae*

82. While determining the type and characteristics of conducting bundles of axial organs one should take into account the positional relation between phloem and xylem and . . .

- A. Cambium
- B. Procambium
- C. Collenchyme
- D. Pericycle
- E. Phellogen

83. Mycothallus of the fungus under study consists of a stipe, pileus, lamellar hymenophore. This fungus belongs in the class:

- A. Basidiomycetes
- B. Ascomycetes
- C. Zygomycetes
- D. Deuteromycetes
- E. Oomycetes

84. Morphological analysis of poplar inflorescence showed that it is a simple monopodial inflorescence: main axis is drooping, the flowers are sessile, unisexual. Specify the type of inflorescence:

- A. Catkin
- B. Head
- C. Capitulum
- D. Cyme
- E. Panicle

85. Diaphoretic herbal tea includes di- chasial cymes with light-yellow, oblong, wing-like, squamelliferous perianth. The flowers are fragrant, yellowish. These inflorescences belong to:

- A. *Tilia cordata*
- B. *Viburnum opulus*
- C. *Robinia pseudoacacia*
- D. *Mentha piperita*
- E. *Padus avium*

86. What type of conducting bundles is characteristic of all root zones of one- seeded plants?

- A. Radical
- B. Central phloem
- C. Central xylem
- D. Bilateral
- E. Collateral

87. *Astragalus dasyanthus* has sessile flowers gathered into inflorescences with a short thick axis. This inflorescence is called:

- A. Capitulum
- B. Cyme
- C. Truss
- D. Spike
- E. Head

88. A common species of the *Pinaceae* family is a tall, evergreen, shade-enduring tree. The needles are solid, prickly, quadrangular in cross-section, spirally arranged. This tree is:

- A. *Picea abies*
- B. *Larix sibirica*
- C. *Pinus sylvestris*
- D. *Juniperus communis*
- E. *Ephedra equisetina*

89. Examination of the leaf epidermis revealed cells containing cystoliths. Presence of cystoliths is typical for plants of the following family:

- A. *Urticaceae*
- B. *Brassicaceae*
- C. *Fabaceae*
- D. *Solanaceae*
- E. *Papaveraceae*