

18/11/2024

TYBSc S-V

Total Marks: 75

Duration: 2 Hours 30 Minutes

N.B.: (1) All questions are compulsory.

(2) Figures to the right indicate full marks.

(3) Draw neat and labelled diagrams wherever necessary.

11

15

Q.1 Choose the correct option from the following: (Any fifteen)

1. The fluid inside the nucleus is referred to as _____.
 A. Cytosol B. Nucleoplasm C. Cytoplasm D. Matrix
2. In animal cells, vacuoles are usually _____ compared to plant cells.
 A. Larger B. Smaller C. More numerous D. Nonexistent
3. Giant chromosomes are most commonly found in the _____ cells of certain insects.
 A. Muscle B. Salivary gland C. Neurons D. Stem cells
4. Translation in prokaryotes begins when the ribosome binds to the _____ sequence.
 A. TATA B. Shine-Dalgarno C. Promoter D. Kozak
5. The energy for peptide bond formation during translation is provided by _____.
 A. ATP B. GTP C. ADP D. NADH
6. The phloem sap is hypertonic compared to the surrounding xylem due to _____.
 A. Phloem unloading B. Phloem loading C. Water movement via facilitated diffusion D. Active transport of water
7. The nutrient deficiency that leads to blossom end rot in fruits is _____.
 A. Nitrogen B. Phosphorus C. Calcium D. Potassium
8. During the girdling experiment, _____ accumulates above the girdle region in a plant.
 A. Water and minerals B. Starch and proteins C. Photosynthates D. Amino acids
9. What is the water potential (Ψ) of pure water under standard conditions?
 A. +1 MPa B. -1 MPa C. 0 MPa D. 1 kPa
10. In which scenario would osmotic potential (Ψ_s) be the most negative?
 A. Pure water B. A dilute solution of sugar C. A highly concentrated salt solution D. Distilled water at room temperature
11. The stable community of an ecosystem is termed as _____.
 A. Climax community B. Primary community C. Secondary community D. seral community

12. ✓ When succession occurs in regions where water is in plenty, as ponds, lakes, streams, swamps, bogs it is called _____.
- A. Lithosere B. Psmmosere C. Serosere D. Hydrosere
13. Climax is a stage in succession of forests just preceding the climate climax community _____.
- A. Pre-climax B. Post-climax C. sub-climax D. Disclimax
14. (14) Polyclimax theory was developed by _____.
- A. Clements B. Odum C. Tansley D. Cowel
15. ✓ Methods where plants are used to remove or detoxify the harmful pollutants from the air, water and soil is called _____.
- A. Phytoremediation B. Microremediation C. Mycoremediation D. Bioremediation
16. Which method is least likely to be used for plant regeneration in tissue culture?
- A. Callus culture B. Seed culture C. Shoot culture D. Cell suspension culture
17. Which of the following is an application of protoplast fusion in agriculture?
- A. Producing hybrid seeds B. Improving nutritional quality C. Developing pest-resistant varieties D. All of the above
18. Which of the following is NOT a stage in somatic embryogenesis?
- A. Induction B. Maturation C. Germination D. Transplantation
19. What is the optimal temperature range for orchid tissue culture?
- A. 10-15°C B. 20-25°C C. 25-30°C D. 30-35°C
20. Which type of culture is most effective for the production of Shikonin?
- A. Callus culture B. Shoot culture C. Cell suspension culture D. Seed culture

Q.2 Answer the following questions: (Any two)

15

- a. ✓ Discuss the structure of the nucleus in eukaryotic cells and describe its primary functions. 7.5
- b. What are vacuoles? explain the structure and functions of the vacuoles in plant cells. 7.5
- *c. ✓ Explain any four characteristics of Genetic code. 7.5
- d. Describe the process of initiation of translation in eukaryotes. How does the ribosome locate the start codon, and what role do initiation factors play in this process? 7.5

3 Answer the following questions: (Any two) 15

- a. Explain the pressure flow model with reference to phloem. Mention the composition of phloem sap. *phloem loading & unloading* 7.5
- b. What is meant by passive transport? Describe the various modes of passive transport of solutes in plants. 7.5
- c. Describe the role of channels, carriers and pumps in transport of solutes across membranes. 7.5
- d. Define transpiration. How does the formation of sugar and starch control the movement of guard cells? 7.5

Q.4 Answer the following questions: (Any two) 15

- a. Elaborate on the role of any three microbial populations in the degradation of pollutants. *Bioremediation* 7.5
- b. Describe the processes of hydrosere in ecological succession. Explain any two stages involved in each type of succession. 7.5
- c. Discuss the examples of primary and secondary succession and how seres lead to the climax community. 7.5
- d. With respect to phytoremediation explain the following in detail: 7.5
- a). Phytodegradation b). Phytostabilization c). Rhizofiltration

Q.5 Answer the following questions: (Any two) 15

- a. What are the specific substrate and environmental requirements for orchid cultivation? How do nutrient media influence orchid growth? 7.5
- b. What challenges are associated with the large-scale production of secondary metabolites like Shikonin using plant cell suspension cultures? How can these be addressed? 7.5
- c. What are artificial seeds, and how are they produced? 7.5
- d. Discuss chemical fusion, electrofusion, and mechanical methods in detail with reference to protoplast fusion. 7.5

TY Bsc Botany
Sem-V

28/11/2014

10:30 am

(2 Hrs 30 min)

[Total Marks : 75]

- N.B.: 1) All questions are compulsory.
2) Figures to the right indicate full marks.
3) Draw neat labeled diagrams wherever necessary.

Q. 1) Choose the correct option from the following and rewrite the sentence (ANY 15) 15

1. The bark of *Lepidodendron* was primarily composed of _____.
a. Cork
b. Secondary xylem
c. Phloem
d. Pith
2. The female fructification of *Lyginopteris* is known as _____.
a. Lagenostoma
b. Calathospermum
c. Crossotheca
d. Bennettites
3. *Pentoxylon* is a _____ fossil.
a. Gymnosperm
b. Pteridophyte
c. Bryophyte
d. Algae
4. _____ is the study of ancient plants through their fossil remains.
a. Paleobotany
b. Archaeology
c. Geology
d. Sociology
5. A major contribution of Birbal Sahni Institute of Paleobotany is the _____.
a. Discovery of the Rajmahal Hills fossil park
b. Establishment of the National Botanical Research Institute
c. Publication of the Indian Fossil Flora series
d. Development of the National Museum of Natural History
6. _____ is the term for the arrangement of ovules within the ovary.
a. Aestivation
b. Placentation
c. Phyllotaxy
d. Vernation
7. The Bentham and Hooker's classification system is _____.
a. based on evolutionary concepts
b. a natural system based on actual specimens
c. based on genetic data for classification
d. an artificial system based on a single character
8. _____ is a distinguishing feature of the Cucurbitaceae family.
a. Presence of stipules
b. Absence of stipules
c. Presence of tendrils
d. Absence of petals
9. _____ is the common species found in the Capparidaceae family.
a. *Cleome viscosa*
b. *Brassica oleracea*
c. *Solanum lycopersicum*
d. *Rosa indica*
10. _____ is a member of the family Gramineae.
a. *Solanum tuberosum*
b. *Zea mays*
c. *Rosa sinensis*
d. *Brassica juncea*
11. In _____ stem, the abnormal behaviour of cambium gives the included phloem.
a. Radish
b. *Bignonia*
c. *Dracaena*
d. *Salvadora*
12. How many types of root-stem transitions found in angiosperms?
a. 1 b. 2 c. 3 d. 4

13. The typical example of anomalous secondary growth in monocot is _____.
- a. *Bignonia*
 - b. *Salvadora*
 - c. *Achyranthes*
 - d. *Dracaena* stomata.
14. Anisocytic stomata are also called as _____.
- a. Unequal-celled type
 - b. Parallel-celled type
 - c. Cross-walled type
 - d. Irregular-celled type
15. Which type of xylem found in root?
- a. Exarch
 - b. Endarch
 - c. Mesarch
 - d. Monarch
16. A circular aperture in pollen grains is called as _____.
- a. Sulcate
 - b. Porate
 - c. Lete
 - d. Colpate
17. The wall of pollen tube is made up of _____.
- a. Cellulose and chitin
 - b. Cellulose and pectin
 - c. Pectin and lignin
 - d. Chitin and pectin
18. Pollen grains are useful as microfossils in coal and oil exploration as they are well preserved due to the presence of _____.
- a. Sporopollenin
 - b. Lignin
 - c. Callose
 - d. Chitin and pectin
19. For short term storage of pollen grains _____ is used.
- a. Ice
 - b. Chlorine gas
 - c. Charcoal powder
 - d. Organic solvents
20. The branch of Palynology that deals with the use of pollen and spore evidence in legal cases is called _____.
- a. Pollinosis
 - b. Forensic science
 - c. Anatomy
 - d. Physiology

Q. 2) Answer the following questions (ANY TWO)

15

- a) Describe the structure of *Lepidostrobis* and *Lepidocarpon* with the help of neat labelled diagrams.
- b) Describe the morphology and anatomy of *Lepidophyllum*.
- c) Describe the male reproductive organ of *Lyginopteris*.
- d) Describe the stem morphology and anatomy of *Pentoxylon*.

Q. 3) Answer the following questions (ANY TWO)

15

- a) Give the classification, floral formula, and three plants of economic importance of the family Rubiaceae.
- b) Give the morphological peculiarities and systematic position of the family Umbelliferae.
- c) Write a note on different types of aestivations.
- d) Explain in brief Bentham & Hooker's system of classification. State its merits & demerits.

Q. 4) Answer the following questions (ANY TWO)

15

- a) Explain the concept of anomalous secondary growth. Illustrate with reference to the stem of *Achyranthes*.
- b) Describe the anomalous secondary growth in the root of *Beta vulgaris*.
- c) Why does root –stem transition occur in plants? Describe any two types studied by you.
- d) Describe the any two types of stomata studied by you.

Q. 5) Answer the following questions (ANY TWO)

15

- a) Explain various exine stratifications in angiospermic pollen.
- b) What do you understand by Pollen viability? Discuss the causes of loss of viability.
- c) Give the significance of pollen storage and explain the long-term and short-term storage.
- d) Discuss the use of Palynology in Forensic science.