



INDIAN SCHOOL AL WADI AL KABIR



CLASS: XI	DEPARTMENT: SCIENCE 2024 – 2025 SUBJECT: BIOLOGY	DATE: 22.08.2024
WORKSHEET NO. 6	TOPIC: PLANT KINGDOM	NOTE: A4 FILE FORMAT
NAME OF THE STUDENT:	CLASS & SEC:	ROLL NO.

I. OBJECTIVE-TYPE QUESTIONS

- Which one of the following is false?
 - Gametophytes are multicellular, tiny, and photosynthetic thallus.
 - Pro-thallus is another name for sporophyte.
 - Gametophyte is the predominant phase in mosses.
 - Strobili, a distinctive cone-like structure, is present in Equisetum and Selaginella.
- What distinguishes liverworts from mosses in particular?
 - Mosses have vascular tissue that liverworts lack.
 - In contrast to liverworts, mosses have an intermediate stage known as protonema.
 - Mosses grow taller, whilst liverworts do not.
 - Sporophytes, specialized bodies found only in mosses, are missing in liverworts.
- Which of the following is a characteristic of Gymnosperms?
 - Reproduction by flowers
 - Presence of fruit
 - Seeds not enclosed in an ovary
 - Water required for fertilization
- Fusion of two gametes dissimilar in size, as in species of Eudorina is termed as:
 - isogamous
 - oogamous
 - anisogamous

- d) none of the above
5. Pteridophytes differ from mosses in:
- a) Independent gametophyte
 - b) Dependent gametophyte
 - c) Flagellate antherozoids
 - d) Independent and dominant sporophyte
6. Conifers can tolerate extreme environments because of:
- a) Presence of vessels
 - b) Thick cuticle
 - c) Superficial stomata
 - d) Broad hardy leaves
7. An evolutionary important character of Selaginella is:
- a) Strobili
 - b) Rhizophore
 - c) Heterosporous nature
 - d) Ligule
8. Agar is commercially obtained from:
- a) Blue-green algae
 - b) Red algae
 - c) Brown algae
 - d) Green algae

For the following questions two statements are given, one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (i), (ii), (iii) and (iv) as given below:

- i) Both A and R are true and R is the correct explanation of the assertion.
- ii) Both A and R are true but R is not the correct explanation of the assertion.
- iii) A is true but R is false.
- iv) A is false but R is true

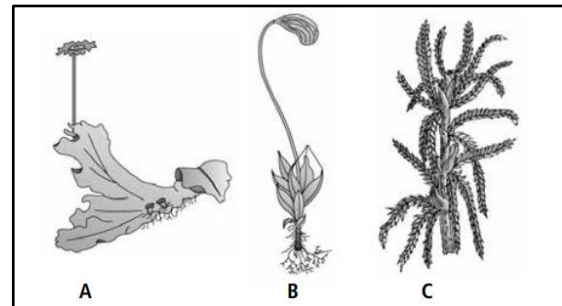
9. Assertion (A): Bryophytes are also called amphibians of the plant kingdom.
Reason (R): They require water for its existence.
10. Assertion(A): Gametophyte produces gametes by mitosis.
Reason(R): Sporophyte produces spores by meiosis.
11. Assertion(A): Selaginella and Salvinia are homosporous.
Reason(R): In Selaginella and Salvinia, similar kind of spores are produced.

II. VERY SHORT QUESTIONS (2M):

12. Why bryophytes are known as pioneers of ecological succession?
13. How gymnosperms differ from bryophytes and pteridophytes in terms of gametophytes?
14. Discuss the significance of capsules in mosses.
15. The male and female reproductive organs of several pteridophytes and gymnosperms are comparable to floral structures of angiosperms. Compare the various reproductive parts of pteridophytes and gymnosperms with reproductive structures of angiosperms.
16. In which plant will you look for mycorrhiza and coralloid roots? Also explain what these terms mean.

III. SHORT ANSWER TYPE QUESTIONS: (3M)

17. Refer to the given figures and answer the following questions.
 - (i) Identify the figures A, B and C.
 - (ii) To which group these three belong?
 - (iii) Which among these three are used in trans-shipment of living materials? Why?
18. What are the commercial uses of algae?
19. Write three differences between Chlorophyceae, Phaeophyceae and Rhodophyceae.
20. How gymnosperm can tolerate extreme environments?
21. Differentiate between *Pinus* and *Cycas*.



IV. LONG ANSWER TYPE QUESTIONS. (5M)

22. Differentiate between gymnosperm and Angiosperm.
23. What is heterospory? Briefly comment on its significance. Give two examples.
24. Describe the important characteristics of gymnosperms.
25. When and where does reduction division take place in the life cycle of a liverwort, a moss, a fern, and a gymnosperm?

V. SOURCE-BASED/ CASE STUDY-BASED QUESTIONS

26.

The earliest systems of classification used only gross superficial morphological characters such as habit, colour, number and shape of leaves, etc. They were based mainly on vegetative characters or on the androecium structure (system given by Linnaeus). Such systems were artificial; they separated the closely related species since they were based on a few characteristics. Also, the artificial systems gave equal weightage to vegetative and sexual characteristics; this is not acceptable since we know that often the vegetative characters are more easily affected by environment.

As against this, natural classification systems developed, which were based on natural affinities among the organisms and consider, not only the external features, but also internal features, like ultra-structure, anatomy, embryology and phytochemistry. Such a classification for flowering plants was given by George Bentham and Joseph Dalton Hooker.

At present phylogenetic classification systems based on evolutionary relationships between the various organisms are acceptable. This assumes that organisms belonging to the same taxa have a common ancestor. We now use information from many other sources too to help resolve difficulties in classification. These become more important when there is no supporting fossil evidence.

Numerical Taxonomy which is now easily carried out using computers is based on all observable characteristics. Number and codes are assigned to all the characters and the data are then processed. In this way each character is given equal importance and at the same time hundreds of characters can be considered. Cytotaxonomy that is based on cytological information like chromosome number, structure, behaviour and chemotaxonomy that uses the chemical constituents of the plant to resolve confusions, are also used by taxonomists these days.

- (i) Why were natural classification systems developed?
- (ii) Define numerical taxonomy.
- (iii) What is the basis of the phylogenetic classification system?
- (iv) Mention the limitation of artificial system of classification.

	(v) Megasporangium ----- Ovule																
16.	Mycorrhiza is the symbiotic association between fungus and roots of vascular plants. The mycorrhizal association is present in conifers such as Pinus, Cedrus, etc. Coralloid roots are present in Cycas. Coralloid roots are present in clusters at the base of the stem and protrude over the ground. It is greenish in colour and dichotomously branched																
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17.	(i) A – Male thallus of Marchantia B – Funaria C – Sphagnum (ii) Marchantia is a liverwort while Funaria and Sphagnum are mosses. These three belongs to division Bryophyta. (iii) Sphagnum (C) is used as packing material for trans-shipment of living materials because of its capacity to hold water.																
18.	- Algae such as <i>Gelidium</i> and <i>Gracilaria</i> are used to grow microbes. - They are used in the preparations of ice-creams and jellies. <i>Chlorella</i> is rich in proteins and is used as a food supplement by space travellers. - Many species of <i>Laminaria</i> and <i>Sargassum</i> marine algae are used as food.																
19.	<table><tr><th>Type of Algae</th><th>Major pigments</th><th>Stored food</th><th>Cell wall</th></tr><tr><td>Chlorophyceae (Green algae)</td><td>Chlorophyll a, b</td><td>Starch</td><td>Cellulose</td></tr><tr><td>Phaeophyceae (Brown algae)</td><td>Chlorophyll a, c, fucoxanthin</td><td>Mannitol, laminarin</td><td>Cellulose and algin</td></tr><tr><td>Rhodophyceae (Red algae)</td><td>Chlorophyll a, d, phycoerythrin</td><td>Floridean starch</td><td>Cellulose, pectin and poly-sulphate esters</td></tr></table>	Type of Algae	Major pigments	Stored food	Cell wall	Chlorophyceae (Green algae)	Chlorophyll a, b	Starch	Cellulose	Phaeophyceae (Brown algae)	Chlorophyll a, c, fucoxanthin	Mannitol, laminarin	Cellulose and algin	Rhodophyceae (Red algae)	Chlorophyll a, d, phycoerythrin	Floridean starch	Cellulose, pectin and poly-sulphate esters
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20.	Thick cuticle- The cuticle forms a thick protective layer in the whole plant and reduces water loss in extremely high temperatures. Sunken stomata- The surface area of <u>stomata</u> reduces which minimizes the water loss. Needle-like leaves- Their needle-like leaves have very less surface area as compared to broadleaf. Thus, minimum the surface area minimum will be the loss of water. Also, snow slips away from the needle-like leaves and protects the plant from cold.																
21.	<table><tr><th>Pinus</th><th>Cycas</th></tr><tr><td>Roots have a fungal association in the form of mycorrhiza.</td><td>They have small, specialized roots called coralloid roots that are associated with cyanobacteria.</td></tr><tr><td>The stems are branched</td><td>The stems are unbranched</td></tr><tr><td>They have needle-like leaves.</td><td>They have compound leaves.</td></tr></table>	Pinus	Cycas	Roots have a fungal association in the form of mycorrhiza.	They have small, specialized roots called coralloid roots that are associated with cyanobacteria.	The stems are branched	The stems are unbranched	They have needle-like leaves.	They have compound leaves.								
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IV.	LONG ANSWER TYPE QUESTIONS. (5M)																

22.		Gymnosperms	Angiosperms	
		Seeds are naked.	Seeds are enclosed by the ovary.	
		No flowers and fruits are produced.	Flowers and fruits are produced.	
		The endosperm is haploid.	The endosperm is triploid.	
		Vessels are absent.	Vessels are present.	
		Pollination by wind only.	Pollination by wind, insects, water etc.	
23	The two kinds of spores borne in the same plant is called as heterospory. These spores differ in size. Among them the smaller spore is called microspore and the larger spore is called megaspore. Significance of heterospory: (i) Heterospory is associated with the sexual differentiation of gametophyte a microspore develops into a male gametophyte whereas a megaspore develops into a female gametophyte. (ii) In homosporous pteridophytes spores have to germinate on soil thus face more environmental problems. In heterosporous pteridophytes, spores germinate within the sporangium and the gametophytes are retained inside for variable periods of time. Hence, germinating gametophyte has better chances of survival. This lays the foundation of complete retention of gametophytes within sporophytes in angiosperms and gymnosperms. (iii) Heterospory is the basis of development of seed habit in higher plants.			
24.	1.The term gymnosperm refers to plants with naked seeds (gymnos – naked, sperma – seeds), i.e., the seeds of these plants are not enclosed in fruits. 2. The root system consists of tap roots. The coralloid roots present in Cycas are associated with nitrogen-fixing cyanobacteria. 3. The leaves can be simple (as in Pinus) or compound (pinnate in Cycas). The leaves are needle-like, with a thick cuticle and sunken stomata. These help in preventing water loss. 4. Gymnosperms are heterosporous. They bear two kinds of spores – microspores and megaspores. 5. Flowers are absent. The microsporophylls and megasporophylls are arranged to form compact male and female cones. 6. Pollination occurs mostly through wind and pollen grains reach the pollen chamber of the ovule through the micropyle. 7. The male and female gametophytes are dependent on the sporophyte. 8. The seeds contain haploid endosperms and remain uncovered.			
25.	Liverwort – In liverworts, the main plant-body is haploid (gametophytic). It bears the male and female sex organs which produce gametes. These gametes fuse to form a zygote. The zygote develops on the gametophytic plant-body to form a sporophyte. The sporophyte is differentiated into the foot, seta, and capsule. Many haploid spores are produced as a result of the reduction division taking place inside the capsule. Moss – In mosses, the primary protonema (developed in the first stage) develops into the secondary protonema. Both these stages are haploid or gametophytic. The secondary protonema bears the sex organs which produce gametes. These gametes fuse to form a zygote. The zygote develops into a sporophyte. Many spores are formed as a result of the reduction division taking place in the capsule of this sporophyte.			

	Fern – In ferns, the main plant-body is sporophytic. Its leaves are known as sporophylls and these bear the sporangia. Reduction division takes place in these sporangia, thereby producing many spores. Gymnosperm – In gymnosperms, the main plant-body is sporophytic. They bear two types of leaves – microsporophylls and megasporophylls. Reduction division takes place in the microsporangia present on the microsporophylls (producing pollen grains) and on the megasporangia present on the megasporophylls (producing megaspores).
V	SOURCE-BASED/ CASE STUDY-BASED QUESTIONS
26.	(i) The earliest systems of classification was totally based external vegetative and sexual characteristics, such as habit, colour, number and shape of leaves, etc. and these characters are easily affected by environment. As against this, natural classification systems was developed. (ii) Natural classification systems were based on natural affinities among the organisms and consider, not only the external features, but also internal features, like ultra-structure, anatomy, embryology and phytochemistry. Such a classification for flowering plants was given by George Bentham and Joseph Dalton Hooker. (iii) Phylogenetic classification system indicates evolutionary as well as the genetic relationship among organism, it is based on the fossil record, biochemical, anatomical, morphological, embryological, physiological, genetics, Karyotype, and other studies. (iv) Artificial system of classification placed closely related species in distant groups.

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