3.PLANT KINGDOM



Biology Smart Booklet Theory + NCERT MCQs + NEET PYQs



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PLANT KINGDOM

What are Plants

Plant kingdom classification has changed a number of times over the years. For instance, blue-green algae were once considered to be part of the plant kingdom, but today, they are classified under Kingdom Eubacteria. Similarly, lichen was once considered a plant; however, they are composite organisms. In other words, lichens are comprised of two individual organisms a fungus and a plant. Historically, organisms that could not be classified under animals were grouped under plants.

Whittaker classified the whole living organism into five kingdoms based on the complexity of cell structure (Prokaryotic and Eukaryotic), the complexity of the body (unicellular and multicellular), and mode of nutrition (autotrophs and heterotrophs).

Classification of the Plant Kingdom

All the classification systems, starting from that of Aristotle to the 20thcentury, can be divided into three types:

- Artificial System: In this system, the classification is based on few morphological characters. Theophrastus, Pliny, and Linnaeus used an artificial system of classification.
- **Natural System:** In this system, the classification is based on all the important related characters. Both external and internal. Bentham and hooker, Adanson, Candolle used a natural system of classification.
- **Phylogenetic System:** Classification based on the evolutionary relationship of plants. The use of phylogeny for classification was done by Eichler, Blessy.

Numerical Taxonomy

Taxonomy based on statistical methods with equal importance using computers.

Cytotaxonomy

Taxonomy that is based on cytology or structure of the cell (chromosome number, shape, behaviour, etc).

Chemotaxonomy

Taxonomy based on chemical constituents of plants (nature of the protein, DNA sequence, taste, smell, etc).

Eichler Classification

The classification of Plant kingdom depending on flowering. Divided into two-

Cryptogamae (non-flowering, seedless plants) and Phanerogamae (flowering, seed-bearing plants).

Based on the Plant Body Cryptogamae is divided into Thallophyta, Bryophyta, and Pteridophyta.

- Thallophyta: The plant body is thallus-like (undifferentiated plant body).
- **Bryophyta:** Plant body with a root-like structure, stem-like structure, vascular tissues are absent).
- Pteridophyta: The plant body is differentiated into true root, stem, and leaves. Vascular

Thallophytes Again Divided Into:

- Algae (pigmented thallophytes).
- Fungi (non-pigmented thallophytes).
- Lichens: Symbiotic association between algae and fungi.

Ph<mark>an</mark>erogamae is Divided Into Two:

- Gymnosperms (naked seed plants)
- Angiosperma (covered seeded plants)

Angiosperms Are Again Divided Into Two:

- Monocots (bearing single cotyledon, fibrous root system, and parallel venation).
- Dicots (have two cotyledons, taproot system, and reticulate venation).

Algae

- Phycology: Branch of Biology that deals with the study of algae Phycos = Seaweed Logos = Study
- 2. Fritch Father of phycology.
- 3. M.O.P. lyengar is the father of Indian phycology.

Algal members are pigmented thallophyte

Habitat

Hydrophytes: Water is their habitat. In aquatic habitat:

- Freshwater (Spirogyra) and marine (Sargassum).
- Floating- Chlamydomonas, Spirogyra
- Benthophytes These plants remain attached to the bottom of their habitat. Example Chara (stoneworts)
- Xerophytes: Their habitat is desert.
- Mesophytes- They grow in medium habitats.
- Epiphytes- They grow on plant body (Cladophora)
- Epizoic- growing on the animal body (Trichophillus)

- Lithophytes- They grow on rocks.
- Halophytes-They grow in salty areas.
- Moist soil-terrestrials (Fritschiella).

Plant Body

- The vegetative plant body of algae is a haploid gametophyte.
- They may be unicellular, flagellated (Chlamydomonas), or non-flagellated (Chlorella).

Multicellular:

- Coenobium- It is a colony with a fixed number of cells and also the division of labor is fixed. E.g.: Volvox.
- Aggregation-indefinite colony. E.g., Tetraspora
- Filamentous-unbranched. E.g.: Ulothrix
- Filamentous branches. E.g.: Cladophora
- Siphonous- multinucleate. E.g.: Vaucheria
- Parenchymatous. E.g.: Ulva the,
- Branched like higher plants. E.g.: Sargassum, Chara

Nutrition:

- Autotrophs Photosynthetic (most of them)
- Parasitic forms (rare). E.g.: Cephaleuros.

Pigments:

- Chlorophyll- a, b, c, d.
- Carotenoids- carotene and xanthophyll-fucoxanthin are dominating pigments in brown algae.
- Phycobillins- phycocyanin and phycoerythrin.

Reproduction

Vegetative reproduction: Reproduction Using the Vegetative Parts.

Different Types are:

- Fission
- Fragmentation
- Budding
- Tubers
- Gemmae

Asexual Reproduction: Without the Fusion of Gametes.

Mainly by:

- Zoospores within sporangia
- Aplanospores
- Akinete
- Hypnospores

- Endospore
- Exospore
- Monospore
- Auxospore.

Palmella Stage

In this stage of asexual reproduction the spores become colonial and appear like the algae named Palmella. E.g.: Ulothrix, Chlamydomonas.

Sexual Reproduction

Homogametes: Similar gametes.

Heterogametes: Dissimilar gametes.

Isogamy: Fusion of morphologically and physiologically similar gametes. Isogamy-flagellated (Chlamydomonas) and non-flagellated (Spirogyra).

Anisogamy: Fusion of morphologically or physiologically dissimilar gametes. Morphologically dissimilar gametes' fusion occurs in Chlamydomonas. Physiologically dissimilar gametes' fusion occurs in Spirogyra.

Oogamy: It is the fusion of morphologically and physiologically dissimilar gametes that are small motile male gamete and large nonmotile female gamete. E.g.: Fucus, Volvox.

Exceptional Cases:

Unicellular antheridium and oogonium. E.g.: Oedogonium.

Special Reproductive Structures:

Conceptacles- E.g.: Sargassum

Globule (antheridium) and nucule (oogonium) E.g.: Chara

Conjugation

A special type of sexual reproduction called conjugation is found in spirogyra. The life cycle exhibits two phases-haploid and diploid and some of them exhibit alternation of generation. The diploid phase is alternated with the haploid phase.

Classification of Algae

They are classified into three:

- Chlorophyceae
- Phaeophyceae
- Rhodophyceae

Chlorophyceae: In Chlorophyceae, the plant body is unicellular as in Chlamydomonas or colonial as in Volvox or filamentous as in Spirogyra.

Different Shapes for the Chloroplast:

1. Ribbon shaped and spiral in Spirogyra



2. Girdle shaped in Ulothrix



3. Cup shaped chloroplast in Chlamydomonas.



4. Star-shaped in Zygnema.



5. Disc-shaped in Caulerpa



6. Reticulate in Oedogonium.



- Photosynthetic pigments are chlorophyll a and b.
- Food is stored in the form of starch and some are stored in the form of oil droplets.
- Pyrenoids are present, which are the storage bodies.
- The inner layer of the cell wall is made up of cellulose and the outer layer is made up of pectose.

The members reproduce:

- Vegetatively by fragmentation
- Asexually by flagellated zoospores
- Sexually by isogamy, anisogamy, and oogamy.

Common Chlorophyceae members are: Chlamydomonas, Chlorella, Volvox, Ulothrix, Ulva, Caulerpa, Chara, Acetabularia etc.

Brown Algae or Phaeophyceae

- They are marine.
- Simple branched and filamentous as in Ectocarpus, or flat ribbon-shaped in Sargassum, Laminaria, Fucus, etc.
- The giant brown algae Kelps are the largest sea plants, some are free-floating as in Sargassum and some are epiphytes on other plants like Ectocarpus.

The Plant Body has Three Parts:

- Fixing structures called a holdfast.
- The stalk-like structure called a stipe.
- The leaf-like structure is called a frond.

Rhodophyceae (Red Algae)

Red algae Rhodophyceae (red algae) include members like Porphyra, Porphyridium, Polysiphonia (multi-axial body), Batrachospermum (Frog spawn alga), Gelidium, Gracilaria, Gleopeltis, Chondrus, Corallina, Harveyella (colourless parasitic red alga). Habitat Mostly they are marine. Found in warmer oceans.

Economic Importance of Algae:

- In the food chain algae are the primary producers. The basis of the food cycles of all aquatic animals is formed by the algae.
- On earth, half of the total carbon dioxide fixation is carried out by algae through the process of photosynthesis.
- In the purification of air and water it plays a very important role.
- Some algae are edible. E.g.: Chlorella, Laminaria, Porphyra, Sargassum, Ulva, Spirulina.
- Some algae are used as fodder. E.g.: Laminaria, Sargassum, Fucus.
- It also acts as a food supplement for space travelers. E.g.: Chlorella, Spirulina.
- From red algae, algin and carrageenan are obtained which are waterholding substances or hydrocolloids.
- Agar is obtained by Gelidium and Gracilaria. It is used to grow

microorganisms.

- Used in the preparation of culture medium in tissue culture experiments.
- It has medicinal values as antibiotics are prepared from them.
- Also used as a source of minerals- Polysiphonia, Laminaria
- Has importance in biological research: Chlorella, Acetabularia.
- E.g.: Chlorella, Polysiphonia.

Common Names of Algae:

- Water silk-Spirogyra
- Sea lettuce- Ulva
- Umbrella plant-Acetabularia (Largest unicellular algae)

Bryophytes

- Simplest non-vascular land plants with undifferentiated plant bodies.
- Bryology: Study of Bryophytes.
- Hedwig: Father of bryology.
- S.R. Kashyap: Father of Indian bryology.
- The bryophytes are also called the amphibians of the plant kingdom due to their unique characteristics.
- Bryophytes grow in dense patches on moist shady places like walls, damp soil, tree trunks, etc.

Features

- Habitat: Mainly terrestrial but some are aquatic. E.g.: Riccia fluitans
- Epiphyllous E.g.: Radula
- Plant body Thallus and Prostate. E.g.: Riccia, Anthoceros, Marchantia or Erect. E.g.- Moss.
- Root-like structures called rhizoids help in fixing them in the soil.
- The body of the plant is differentiated into stem-like and leaf-like structures.
- Vascular tissues are absent.
- Vegetative reproduction occurs by fragmentation, budding, tubers, etc.
- Asexual reproduction occurs by Gemmae-asexual buds in liverworts.
- Sexual reproduction occurs. The vegetative plant body acts as the gametophyte and all the members are homosporous.
- Multicellular sex organs are present that are found in clusters.
- The club-shaped antheridium is the male reproductive organ and it produces biflagellate antherozoids which are motile too.
- The flask-shaped archegonium is the female reproductive organ and it produces the egg.
- To form the zygote the antherozoid fuses with the egg.
- The sporophyte is not free-living and it derives nutrients from the photosynthetic gametophyte.
- After meiosis, the haploid spores are formed in the sporophyte and the

spore germinates to form the gametophyte.

- Alternation of generation is present where the haploid phase alters with the diploid phase.
- Both the phases are multicellular.
- The gametophyte is the dominant photosynthetic free-living stage.
- The sporophyte is short-lived and it highly depends on the gametophyte.
- For fertilization, water is very much essential.

Classification of Bryophytes: It has three classes.

- Hapticospida (liverworts).
- Anthocerotopsida (Hornworts).
- Bryopsida. (Moss).

Hepaticopsida or Liverworts

A class of lower green plants called liverworts that belong to the division Bryophyta. The class Hepaticopsida, also called Marchantiopsida, comprises the liverworts, which are nonvascular land plants. Although there is a great diversity of external form, most of the gametophytes (gamete-producing plants) are dorsoventrally differentiated.

Bryopsida (Moss)

- They are higher bryophytes.
- The gametophyte consists of two stages-protonema and the leafy stage.
- Protonema is green filamentous, branched, creeping structures that directly develop from the spore on germination, and they also bear branched rhizoids and lateral buds.
- The leafy stage is developed as a lateral bud from the secondary protonema.
- The plant body consists of root-like, stem-like, and leaf-like structures. Eg: Funaria.
- Rhizoids are multicellular and branched also.
- The leafy stages bear the sex organs.
- Vegetative reproduction occurs by the process of fragmentation and budding in the secondary protonema.

Economic Importance:

- They are used as food by herbaceous animals.
- Sphagnum (Moss) occurs in the form of peat and is used as fuel.
- Because of its water holding capacity, the mosses are also used for the trans-shipment of living material.
- Moses also prevents soil erosion.
- They are the first colonizers on barren rocks along with lichens.
- For the growth of the higher plants or succession, they decompose rocks

for making substrate.

Pteridophytes

- They are the first terrestrial plant to bear vascular tissue such as xylem and phloem. So they are also called vascular cryptogams.
- Commonly known as a botanical snake.
- The plant body is differentiated into true root, stem, wind-needle-like, and leaf.
- The plant body is the sporophytic generation.
- The stem is rhizomatous and they regenerate when aerial parts are destroyed.
- Leaves may be small known as microphyll as in Selaginella or large known as macrophyll as in ferns.

Pteridophytes are further classified into fo<mark>ur classes:</mark>

- Psilopsida (Psilotum)
- Lycopsida (Selaginella)
- Sphenopsida (Equisetum)
- Pteropsida (Pteris).

Economic Importance:

- Some members are Medicinal: Dryopter is Helps in Soil binding & Used as Ornamental plants.
- **Edible plants:** Marcelia Used in Crop rotation- Azolla & Helps in Symbiotic nitrogen fixation.
- Play an important role in the succession of plants on bare rocks or soil.
- Sphagnum is used to keep seedlings in gardens and also in keeping cut plant parts moist during transportation and propagation.

Common Names:

- Creeping pine/ Club moss- Lycopodium
- Spike moss (Resurrection plant- Selaginella
- Water fern- Azolla (smallest pteridophyte)
- Walking fern (Maiden Hall fern)- Adiantum
- Adder's tongue fern- Ophioglossum
- Fossil pteridophyte- Cooksonia
- Leafless Pteridophyte- Psilotum
- Horsetail- Equisetum

Gymnosperm

The word "Gymnosperm" comes from the Greek words "gymnos" (naked) and "sperma" (seed), hence known as "Naked seeds." Gymnosperms are the seedproducing plants, but unlike angiosperms, they produce seeds without fruits. These plants develop on the surface of scales or leaves, or at the end of stalks forming a cone-like structure.

Gymnosperms belong to kingdom 'Plantae' and sub-kingdom 'Embryophyta'. The fossil evidence suggested that they originated during the Paleozoic era, about 390 million years ago.

Basically, gymnosperms are plants in which the ovules are not enclosed within the ovary wall, unlike the angiosperms. It remains exposed before and after fertilisation and before developing into a seed. The stem of gymnosperms can be branched or unbranched. The thick cuticle, needle-like leaves, and sunken stomata reduce the rate of water loss in these plants.

The family of gymnosperms consist of conifers, the cycads, the gnetophytes and the species of Gynkgophyta division and Ginkgo biloba.

Let us have an overview of the characteristics, examples, classification and examples of gymnosperms.

Angiosperm

A plant of a large group that comprises those that have flowers and produce seeds enclosed within a carpel, including herbaceous plants, shrubs, grasses, and most trees. Compare with gymnosperm.

Alternation of generations:

- The diploid sporophyte has a structure called a sporangium.
- The sporangium undergoes meiosis and forms haploid spores.
- The spore develops into a gametophyte which is haploid in nature.
- The gametophyte has the reproductive organs which undergo mitosis to form haploid gametes.
- The gametes fertilize to form a haploid zygote which matures into a mature sporophyte. This cycle keeps repeating.

Monocot

In this type of angiosperms, only one cotyledon is present. Also, leaves are parallelveined, and vascular bundles are scattered. The root system is adventitious. Examples: Wheat, Maize, Rice etc.

Dicot

There are two seed leaves present in dicot angiosperms. Vascular bundles are in a ring and veins are branched. Also, tap roots are present. Examples: Potato, Pea, Banyan etc.

NCERT LINE BY LINE QUESTIONS

3. Plant Kingdom

Artificial classifica	ation system is based o	on –		(Pg29, E)
A) Mainly on vege	etative character and o	on the androecium struc	cture	
B) Ultrastructure,	anatomical, embryolo	gical characters		
C) External and in	iternal features	D) Chromosom	e number.	
George Bentham a	and Joseph <mark>Dalton</mark> Ho	oker gave		(Pg30, E)
A) Artificial classi	fica <mark>tion syst</mark> em			
B) Phylogenetic cl	assification			
C) Natural classifi	cation system			
D) A and B respec	tively			
Choose incorrectly	y match option			(Pg30, E)
A) Num <mark>eric</mark> al taxo	onomy – Number and	code are a <mark>ssigned</mark> to all	l the character and	the data are then
processed				
B) Cy <mark>tota</mark> xonomy	- Based on cytologica	ll informati <mark>on</mark>		
C) Chemotaxonon	ny – Based on phytocl	hemistry		
D) <mark>Nat</mark> ural classifi	ication – Linnaeus			
Phylogenetic class	sification –			(Pg30, E)
A) Based on evolu	itionary relationship			
B) This assume the	at organism belonging	g <mark>to som</mark> e t <mark>axa haven't a</mark>	common ancestor	
C) Gave equal we	ightage to vegetative	& sexual character but r	not on evolutionary	relationship
D) A and B both r	elationship			
	liant	Paragraph – 3.1		
		Algae		
Blu <mark>e –</mark> green algae	placed in which king	dom according to R.H.	Whittaker	(Pg30, E)
A) <mark>Mon</mark> era	B) Protista	C) Fungi	D) Plantae	
Choose the correc	t statement algae:			(Pg30, E)
A) Al <mark>gae</mark> are chloi	cophyllous, autotroph	ic member of Plantae		
B) Some algae occ	ur in association with	fungi and on sloth bear	ſ	
C) The plant body	[,] of algae lack root, ste	em, leaf		
D) All of t <mark>hese</mark>				
Colonial form alga	a is –			(Pg30, E)
A) Ulothrix	B) Volvox	C) Kelp	D) Spirogyra	1
Zoospore is -				(Pg30, E)
A) Sexual spore in	ı algae	B) Asexual spor	e in algae	
C) Develop in zoo	sporangium in numb	er of four		
D) Non flagellated	1 spore			
Fusion between or	ne large static female ;	gametes and smaller mo	otile male gamete is	s termed as as seen
is				(Pg30, E)
A) Isogamous, Spi	irogyra	B) Oogamous, V	Volvox	
C) Anisogamous,	Fucus	D) Oogamous, l	Ulothrix	
<i>Eudorina</i> show –				(Pg30, E)
A) Fusion of flage	llate similar size game	ete		
	· flagellate similar size	e gamete		
B) Fusion of non -				
B) Fusion of non -C) Oogamous	C	D) Anisogamou	IS	
B) Fusion of non -C) OogamousHow many of following	owing is an example o	D) Anisogamou of isogamous <i>Ulothrix, S</i>	s Spirogyra, Volvox, fu	cus, Polysiphonia
B) Fusion of non - C) Oogamous How many of follo	owing is an example o	D) Anisogamou of isogamous <i>Ulothrix, S</i>	s Spirogyra, Volvox, fuo	cus, Polysiphonia (Pg31, M)
B) Fusion of non - C) Oogamous How many of follo A) 1	owing is an example o B) 2	D) Anisogamou of isogamous <i>Ulothrix, S</i> C) 3	b Spirogyra, Volvox, fuo D) 4	cus, Polysiphonia (Pg31, M)
B) Fusion of non -C) OogamousHow many of folleA) 1Identify organism	owing is an example o B) 2 and label A, B, C, D	D) Anisogamou of isogamous <i>Ulothrix, S</i> C) 3	bs Spirogyra, Volvox, fue D) 4	cus, Polysiphonia (Pg31, M) (Pg31, M)
	Artificial classifica A) Mainly on vege B) Ultrastructure, C) External and in George Bentham a A) Artificial classi B) Phylogenetic cl C) Natural classifi D) A and B respect Choose incorrectly A) Numerical taxo processed B) Cytotaxonomy C) Chemotaxonom D) Natural classifi Phylogenetic classi A) Based on evolu B) This assume that C) Gave equal weild D) A and B both re- Blue – green algae A) Monera Choose the correct A) Algae are chlored B) Some algae occ C) The plant body D) All of these Colonial form alga A) Ulothrix Zoospore is – A) Sexual spore ir C) Develop in zoo D) Non flagellated Fusion between or is A) Isogamous, Spr C) Anisogamous, Eudorina show –	Artificial classification system is based of A) Mainly on vegetative character and of B) Ultrastructure, anatomical, embryolo C) External and internal features George Bentham and Joseph Dalton Ho A) Artificial classification system B) Phylogenetic classification C) Natural classification system D) A and B respectively Choose incorrectly match option A) Numerical taxonomy – Number and processed B) Cytotaxonomy – Based on cytologica C) Chemotaxonomy – Based on phytoch D) Natural classification – Linnaeus Phylogenetic classification – A) Based on evolutionary relationship B) This assume that organism belonging C) Gave equal weightage to vegetative of D) A and B both relationship Blue – green algae placed in which king A) Monera Blue – green algae placed in which king A) Monera B) Protista Choose the correct statement algae: A) Algae are chlorophyllous, autotroph B) Some algae occur in association with C) The plant body of algae lack root, ste D) All of these Colonial form alga is – A) <i>Ulothrix</i> B) <i>Volvox</i> Zoospore is – A) Sexual spore in algae C) Develop in zoosporangium in numb D) Non flagellated spore Fusion between one large static female is A) Isogamous, <i>Spirogyra</i> C) Anisogamous, <i>Fucus</i> <i>Eudorina</i> show –	Artificial classification system is based on - A) Mainly on vegetative character and on the androecium strue B) Ultrastructure, anatomical, embryological characters C) External and internal features D) Chromosom George Bentham and Joseph Dalton Hooker gave A) Artificial classification system B) Phylogenetic classification system D) A and B respectively Choose incorrectly match option A) Numerical taxonomy - Number and code are assigned to al processed B) Cytotaxonomy - Based on cytological information C) Chemotaxonomy - Based on phytochemistry D) Natural classification - Linnaeus Phylogenetic classification - A) Based on evolutionary relationship B) This assume that organism belonging to some taxa haven't at C) Gave equal weightage to vegetative & sexual character but n D) A and B both relationship Blue - green algae placed in which kingdom according to R.H. A) Monera B) Protista C) Fungi Choose the correct statement algae: A) Algae are chlorophyllous, autotrophic member of Plantae B) Some algae occur in association with fungi and on sloth bear C) The plant body of algae lack root, stem, leaf D) All of these Colonial form alga is - A) <i>Ulothrix</i> B) <i>Volvox</i> C) Kelp Zoospore is - A) Sexual spore in algae B) <i>Volvox</i> C) Kelp Zoospore is - A) Sexual spore in algae B) Asexual spore C) Develop in zoosporangium in number of four D) Non flagellated spore Fusion between one large static female gametes and smaller metis A) Isogamous, <i>Spirogyra</i> B) Oogamous, T Eudoring akow -	Artificial classification system is based on - A) Mainly on vegetative character and on the androecium structure B) Ultrastructure, anatomical, embryological characters C) External and internal features D) Chromosome number. George Bentham and Joseph Dalton Hooker gave A) Artificial classification system B) Phylogenetic classification C) Natural classification system D) A and B respectively Choose incorrectly match option A) Numerical taxonomy - Number and code are assigned to all the character and processed B) Cytotaxonomy - Based on cytological information C) Chemotaxonomy - Based on phytochemistry D) Natural classification - Linnaeus Phylogenetic classification - A) Based on evolutionary relationship B) This assume that organism belonging to some taxa haven't a common ancestor C) Gave equal weightage to vegetative & sexual character but not on evolutionary D) A and B both relationship Blue - green algae placed in which kingdom according to R.H. Whittaker A) Monera B) Protista C) Fungi D) Plantae Choose the correct statement algae: A) Algae are chlorophyllous, autotrophic member of Plantae B) Some algae occur in association with fungi and on sloth bear C) The plant body of algae lack root, stem, leaf D) All of these Colonial form alga is - A) Uldrtrix B) Volvox C) Kelp D) Spirogyra Zoospore is - B) Sousal spore in algae B) Asexual spore in algae C) Develop in zoosporangium in number of four D) Non flagellated spore Fusion between one large static female gametes and smaller motile male gamete is is

		(B) (A) (C) (D)	
	A) Laminaria A = leaf B = air bladder C = stri B) Fucus A = frond B = air bladder C = stripe	pe D = holdfast $D = Hold fast$	
	C) Fucus A = air bladder B = frond, C = midr D) Laminaria A = leaf C = midrib D = petiole	10 D = holdrast	
13.	Algae are useful to man in –		(Pg32, M)
	A) Fixation of almost half of total CO_2 on ear	th	(- 8°-))
	B) Primary producer		
	C) Increase level of oxygen	D) <mark>All o</mark> f these	
14.	Hydrocolloids are produced by –		(Pg32, M)
	A) Brown algae (algin), carrageen(red algae)), Ag <mark>ar(bro</mark> wn algae)	
	B) Brown algae (algin), Red algae (carrageer	n)	
	C) Brown algae (algin, agar), Red algae (carr	rageen)	
4-	D) None of these		
15.	Choose correct statement –		(Pg32, E)
	A) Chlorella, a multicellular alga rich in prote	en af their bigh sould be due to	
	B) Chiorella & Spirulina are astronaut food be	cause of their high carbonydrate,	
	C) The product obtained by Cracilaria are us	ad to grow microhos	
	D) Laminaria Saraassum a member of Rhodor	phyceae are among 70 species of mari	ne algae used as food
	Parag	ranh – 3 1 1	ne algae used as 1000
16.	Chlorophyceae are commonly called as-		(Pg32, E)
	A) Green algae	B) Blue – green algae	
	C) Brown algae	D) Red algae	
17.	Major pigment of Chlamydomonas –	, 0	(Pg32, E)
	A) Ch <mark>lor</mark> ophyll a, b	B) Chlorophyll a, c	
	C) Chlo <mark>rop</mark> hyll a, d	D) Fucoxanthin, phycoerythrin	
18.	Choose incorrect statement about green alga-	-	(Pg32, E)
	A) The chlorophyll localised in definite chlor	roplast	
	B) Spirogyra have spiral chloroplast		
	C) Most member have one or more storage b	odies i.e. pyrenoid localised in chloro	plast
10	D) The cell wall is made of outer layer that is	s of cellulose and inner layer of pectos	e (D~22 E)
19.	A) Isogamous B) Anisogamous	C) Oogamous D) All of the	(rg52, E)
20	Chara is	C) Obganious D) An or the	(Po32 F)
20.	A) Common stonewort	B) Marine green algae	(1 502, 1)
	C) Unisexual algae	D) None of these	
21.	Flagellation in green algae is –	,	(Pg32, E)
	A) 2 – 8, equal, apical	B) 2, unequal, lateral	
	C) 2 – 8, unequal, lateral	D) Absent	
	Parag	<u>graph – 3.1.2</u>	
	Pha Pha	<u>eophyceae</u>	
22.	Phaeophyceae is commonly named as –		(Pg32, E)
a 2	A) Green alga B) Brown alga	C) Red algae D) None	
23.	Choose the correct statement from following		(Pg32, M)
	A) <i>Ectocarpus</i> is filamentous forms while kelp	ps is profusely branched from	
	D) Neips may reach a neight of average 100cr	II	
	D) Leaf - like photosynthetic organ of brown	a losu substratum by surpe	
	D Lean - The photosynthetic organ of brown	angue 15 surpe	

24.	Major pigment found in <i>Fucus</i> is/are			(Pg32, E)
	A) Chlorophyll a, c	B) Chlorophyll a, d		
	C) Chlorophyll a, b	D) Fucoxanthin and r	hycoerythrin	
25.	The color of brown algae depend upon	, 1	5 5	(Pg32, E)
	A) Amount of xanthophyll	B) Fucoxanthin prese	nt in them	
	C) Phycoerythrin and fucoxanthin ratio	D) A & B both		
26.	Choose the correct about cell of brown alg			(Pg32, E)
20.	A) Cellulosic cell wall cover outside by ali	σn		(- 80=) -)
	B) Cellulosic cell wall with pectin and poly	vsulnhate esters		
	C) They have two flagella equal sized and	l laterally inserted		
	D) A and C both	interary inserted		
27	Dictuota is member of -			(Pσ33 F)
27.	A) Same member of Ectocarpus Celidium	fucus		(1 500, 1)
	B) Same member those having Caminaria	or mannitol as stored food		
	C) Same member of Laminaria Porphyra	fucus		
	D) Same member those having phycoerytl	hrin as accessory nigment		
28	Gametes of Sargassum are-	fund as accessory president		(Pσ 33 F)
20.	A) Pyriform B) Cup - shaped	C) Ribbon - shaped	D) Discoid	(1 5 00, 1)
	Participation Di Cup - Staped	radraph = 3.1.3	D) Discola	
		hodophyceae		
29	Rhodopyceae is called red algae because of	of _		(Pg33 F)
29.	A) Prodominance of red nigment	<u>, , , , , , , , , , , , , , , , , , , </u>		(I g55, E)
	B) Abundance if d phycoarythrin			
	C A & B both	D) None of these		
20	The stored food in <i>Polysinhonia</i> is	which is yory similar to	B or	nd C in
50.	structure	_ which is very similar to _		$(P_{\sigma^{22}} E)$
	A = floridoan starch B = amylopostin C	r = alweagan		(rg55, E)
	A = floridean starch B = chitin C = alvector	ogon		
	C A = mannital B = floridaan starch C = a	mylopoctin		
	C) $A = \text{Infillential D} = \text{Infillential States} C = a$ D) None of these	intylopectifi		
31	Momber of Rhodonbycozo reproduce by			$(\mathbf{P}_{\mathbf{\sigma}}33, \mathbf{F})$
51.	A) Non-motile account approved and motile	coveral comotos		(I g55, L)
	B) motile asovual spore and motile sovual	armotos		
	C) Non $-$ motile asexual spore and non $-$ r	notile sevual gametes		
	D) motile asevual spore and non - motile	sovial gametes		
27	D) motile asexual spore and non – motile s	sexual gametes		$(\mathbf{P}_{\mathbf{\sigma}}24,\mathbf{F})$
52.	A) Isogamous	C) Octomore	D) All of the	(I g54, L)
	A) isoganious	c) obganious	D) All of the	50
	<u>F3</u>	<u>Brienbute</u>		
22	Bruenhute include	Bryopnyta		$(\mathbf{D}_{\alpha}21 \mathbf{E})$
<i>33</i> .	A) Horrowart B) Liverwort	C) Massas	D) All of the	(rg54, E)
24	A) FIORNWORL D) LIVERWORL	C) MOSSES	D) All of the	$(\mathbf{D}_{\mathbf{z}}^{2}4,\mathbf{E})$
54.	identify given plant diagram and laber its	parts.		(rg54, E)
		(A)		
		(B)		
	A) <i>Funaria</i> , A = gametophyte B = sporoph	yte		
	B) <i>Sphagnum</i> , A = gametophyte B = sporo	ohyte		
	C) Funaria, $A = $ sporophyte $B = $ gametophyte	yte		
	D) <i>Sphagnum</i> , A = sporophyte B = gameto	phyte		
	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	. <i>.</i>		

35.	Bryophytes are –	(Pg35, E)
	A) Amphibians of plant kingdom	
	B) Reptilians of plant kingdom	
	C) First vascular bundles containing plant	
	D) A & C both	
36.	The body organization of bryophytes have	(Pg35, E)
	A) Unicellular or multicellular rhizoid	
	B) Less differentiation than algae	
	C) They have true root stem and leaves	
	D) A & C both	
37.	The main plant body of bryophyte isA that produceB	(Pg35, E)
	A) $A = diploid B = gametes$ B) $A = haploid B = gametes$	
• •	C) A = haploid B = spores D) A = diploid B = spores	
38.	Choose the correct statement	
	A) Sex organs in bryophytes are unicellular and jacketed	
	B) Male sex organ is antheridium that produce flagellate (four flagella) antherozoic	ls
	C) Female sex organ is arcnegonium i.e. flask – snaped and produce single egg	
20	<i>D)</i> water is required for travelling of egg from archegonium to antheridium	$(\mathbf{D}_{\mathbf{T}}25,\mathbf{E})$
39.	A) During development of genetics	(rgoo, E)
	C) After sometime of zugote formation	1011
40	Identify the given diagram and label	$(\mathbf{P}_{\mathbf{T}}24\mathbf{E})$
1 0.		(1 gJ±,E)
	·//m ·	
	A) Sphagnum, a liverwort A = archegonia branch B = antheridial branch	
	B) Sphagnum, a moss $A = archegonia branch B = antheridial branch$	
	C) Funaria, a moss A = antheridial branch B = archegonia branch	
	D) <i>Sphagnum</i> , a liverwort A = antheridial branch B = archegonia branch	
41.	Choose the correct statement with regard to bryophyta	(Pg35, E)
	A) Sporophyte is free – living but attached to photosynthetic gametophyte derives	nourishment from it
	B) Sporophyte is not free – living but attached to photosynthetic gametophyte and	derives nourishment
	from it	
	C) Gametophyte is not free – living but attached to photosynthetic sporophyte and	derives nourishment
	from it	
	D) Gametophyte is free living but attached to photosynthetic sporophyte and deriv	res nourishment from
	it	
42.	First organism to colonize rock are –	(Pg35, E)
	A) Mosses B) Lichen C) Liverwort D) A & B bo	th
43.	For trans – shipment of living material which of following is more suitable to use	(Pg35, E)
	A) Marchantia B) Funaria C) Sphagnum D) Riccia	<u> </u>
44.	Which of the following is obtained from <i>Sphagnum</i> as coal:	(Pg35, E)
	A) Bituminous B) Peat C) Lignite D) Anthracit	te
	<u>Paragraph – 3.2.1</u>	
	Liverwort	
45.	Choose the correct statement :	(Pg35, E)
	A) The thalloid plant body of liverwort is dorsiventrally appressed closely to subst	rate
	B) The leaty members have tiny true leat in two rows on the stem like structure	

	C) The leafy membrane have tiny leaf like app D) The thalloid plant body of liverwort is isob	endage in four rows on the stem like	structure
16	Asovial reproduction in bryonbytes is not tak	a place by	$(P\sigma_{35} E)$
1 0.	A) Fragmentation	B) Common	(I goo, L)
	C) Budding in secondary protonema	D) Oogamous	
47	Gemmae are -	D) Obganious	(P σ 35 F)
ч/.	A) Green unicellular acevual bud develop in	small recentacles i e gemma cun	(I goo, L)
	B) Green multicellular asexual bud develop in	small receptacies i.e. gennia cup	
	C) Non – green unicellular asexual bud devel	on in small recentacles i.e. gemma cup	1D
	D) Green multicellular sexual bud develop in	small receptacles i.e. germa cup	'P
48.	In Marchantia	oniun receptueles nei genniu cup	(Pg35, E)
101	A) Male and Female sex organs are produced (on same thalli	(- 800) -)
	B) Male and female sex organs are produced o	n different thalli	
	C) Gametophytes is differentiated into foot set	a and capsule	
	D) Spores geminates to form free – living spor	ophyte	
	Paragr	raph – 3.2.2	
	M	osses:	
49.	The predominant stage of life cycle of a moss i	s-	(Pg36, E)
	A) Gametophytes	B) Sporophytes	
	C) Protonema stage	D) Frothallus stage	
50.	The gametophyte of moss is divided into-		(Pg <mark>36,</mark> E)
	A) Two stage, first protonema stage which dev	<mark>velops dire</mark> ctly from gamete.	
	B) Two stage, second leafy stage which develo	p fr <mark>om secondary protonem</mark> a as a lat	eral bud.
	C) Two stage, first leafy stage and second prot	onema stage	
	D) Two stage, first protenema stage which dev	elops directly from spore and second	l leafy <mark>sta</mark> ge which
	develop from spore germination as terminal b	ud.	
51.	Protonema stage is –	NCAUEIN	(Pg36, E)
	A) Creeping, green unbranched and frequently	y filamentous stage	
	B) Prostate, green, branched and frequently fills	amentous stage	
	D) Prostate non groon unbranched and frequentity I.	namentous stage	
52	Choose the correct statement about leafy stage	of mosses	(Pg36 E)
02.	A) They consist, upright, slender axes bearing	spirally arranged leaves	(1 500, 1)
	B) They are attached to soil through multicelly	lar and branched rhizoid	
	C) This stage bear sex organ	D) All of these	
53.	In sexual reproduction which of following is n	ot seen in mosses	(Pg36, E)
	A) Sex organ are produced at apex of leafy stag	ge	
	B) After fertilization zygote develop into spore	ophyte	
	C) Development of embryo	D) All of these	
54.	The sporophyte of mosses –		(Pg36, E)
	I) Is more elaborate than that is liverwort		
	II) Consisting of foot, seta and capsule		
	III) Spores present in capsule		
	IV) Spore produce after melosis		
	V) Elaborate mechanism of spore dispersal		
	A) All are correct	B) I) II) III) only	
	C) IV) V) VI) only	D) I) III) V) only	
55.	Choose incorrect matched	_ , _,, _,, , , , , , , , , , , , , , ,	(Pg36, M)
	Column – A	Column – B	
	A) Hornwort	i) Marchantia	
	B) Bryopsida	ii) Polytrichum	
	C) Liverwort	iii) Marchantia	
	D) Mosses	iv) Sphagnum	
	Parag	<u> Iraph – 3.3</u>	

		Pteridophytes		
56.	Pteridophytes includes –		(Pg36, E)	
	A) Horsetail B) Ferns	C) Polytrichum	D) A & B both	
57.	First terrestrial vascular plant is -		(Pg36, E)	
	A) Algae	B) Bryophyta (liver	wort & hornwort)	
	C) Pteridophyta	D) Bryophyta (Mos	sses)	
58.	Choose the correct statement from for	ollowing	(Pg36, E)	
	A) The plant body is differentiated in	nto true root, only true prostra	te stem as in Selaginella and true lea	af
	B) The leaves of pteridophytes are sr	nall as in Selaginella or macro	phyll in ferns.	
	C) Pteridophytes possess xylem, phl	oem		
	D) All of these			
59.	In pteridophyta –		(Pg36, E)	
	A) The main plant body is a sporoph	yte		
	B) The main plant body is a gametop	phyte		
	C) The main plant body is a gametop	ohyte on whi <mark>ch spo</mark> rophytic pl	hase is partially dependent	
	D) A & C			
60.	Choose the correct with regard to rep	production in <mark>pteridop</mark> hyte	(Pg36, E)	
	A) Spo <mark>rop</mark> hyte bear sporangia that a	re subtended <mark>by sporop</mark> hyll		
	B) Ga <mark>me</mark> tophyte bear sporangia that	are subtende <mark>d by sporophy</mark> ll		
	C) S <mark>por</mark> ophyll compact to form strob	ili as in fern		
	D) The sporangia produce spores by	mitosis in sp <mark>ore mo</mark> ther cell		
61.	Ga <mark>me</mark> tophyte of pteridophyte is -		(Pg36, E)	
	A) <mark>Sm</mark> all but multicellular, free living	g, <mark>mos</mark> tly pho <mark>tosynthetic, diffe</mark>	erentiated into root, stemand leaf	
	B) Small inconspicuous but multicell	ular dependent mostly photos	s <mark>ynthetic tha</mark> lloid body	
	C) Small but multicellular, free living	g mostly ph <mark>otosynth</mark> etic thallo	oid structure	
	D) Small inconspicuous but multicel	lular free – living mostly non	 photosynthetic thalloid body 	
62.	Water needed for fertilization in -		(Pg36, E)	
	A) Eucalyptus B) Bryophy	tes C) Pteridophyptes	D) B & C both	
63.	Sex organ bear on –		(Pg36, E)	
	A) Sporophytes	B) Gametophyte		
	C) On both gametophytes & sporoph	nyte D) None		
64.	Heterosporous pteridophytes is/are	-	(Pg36, E)	
<i>(</i> -	A) Selaginella B) Salvinia	C) Psilotum	D) A & B both	
65.	Pteridophytes with all similar kind c	of spores is in	(Pg36, E)	
	A) Terror of Kashmir	B) Psilotum		
((C) Selaginella	D) A & B both	(D -2(F)	
66.	Seed habit reported for first time is		(Pg36, E)	
	A) Blue – green algae	B) Pteridophyte		
(7	C) Angiosperm	D) bryophyta	(D ~26 E)	
67.	A) 4 classes B) 4 orders	C) 4 familias	$(\mathbf{rg}50, \mathbf{E})$	
69	A) 4 classes D) 4 olders	C) 4 families	$(\mathbf{P}_{\mathbf{r}}^{2}6, \mathbf{F})$	
00.	Autuntum is member with –	C) Luconodium	D) Solacinella	
60	A) Fieris D) Lyuiseiur Match tha following:	n C) Eycopoulum	$(\mathbf{P}_{\mathbf{\sigma}}26,\mathbf{M})$	
09.	Column I	Column II	(1 g30, 14)	
	i) Sphononsida			
1	i) Lyconsida	B) Selacinella		
1	iji) Psilopsida	C) Peilotum		
1	iv) Pteropsida	D) Fauicotum		
	A) A $-iv_B - ii C - iii D - I$	B) A $-$ iii B $-$ ii C $-$	iv. D – i	
	C A - ii, B - iii, C - i, D - iv	D) A = i B = iv C =	ii. D – iii	
70	Identify following pteridophytes -	$\mathcal{D}_{\mathcal{I}}$ $\mathcal{I}_{\mathcal{I}}$ $\mathcal{D}_{\mathcal{I}}$ $\mathcal{D}_{\mathcal{I}}$ $\mathcal{D}_{\mathcal{I}}$	(Pg37 F)	
10.	menting romowing participity as -			

(Pg37, E)



A) A = Salvinia, B = horsetail, C = fern, D = Selaginella

- B) A = Selaginella, B = Salvinia, C = fern, D = horsetail
- C) A = Equisteum, B = fern, C = Selaginella, D = horsetail
- D) A = Selaginella, B = Salvia, C = Dryopteris, D = Equisteum
- 71. Label A, B, C, D, E in following diagram:



- A) A = strobilus, B = rhizome,
 B) A = cone, C = Node, D = internode
 C) A = strobilus, B = rhizome, C = node, D = internode, E = branch
- C) A = strobilus, B = rnizon

D) None of these

Paragraph - 3.4 Gymnosperm:

72.	Gymnosperms are plar	nts in which -			(Pg38, E)
	A) Ovules are enclosed	by any ovary wall be	oth before and after ferti	lization	(- 800, 2)
	B) Ovules are not enclo	sed by any ovary wal	1 both before and after f	ertilization	
	C) Ovules are enclosed	by any ovary wall be	fore fertilization but not	after fertiliza	ation
	D) Ovules are not enclo	osed by any ovary wa	ll before fertilization but	t after fertiliza	ation
73.	Tallest tree species belo	ongs to $-$			(Pg38, E)
	A) Angiosperm	B) Gymnosperm	C) Pteridophyte	D) Algae	(- 8, -,
74.	Fungi show symbiotic	association with gym	nosperm in form of –) 8	(Pg38, E)
	A) Mycorrhiza in <i>Pinus</i>	; ;	B) Mycorrhiza in <i>cyci</i>	ıs	(- 8 , - ,
	C) Coralloid rest in <i>Pin</i>	us	D) Coralloid rest in <i>c</i>	ucas	
75.	The stem of –		,	9 -11-1	(Pg38, E)
	A) Cycas is unbranched	1	B) <i>Pinus</i> is branched		
	C) <i>Cedrus</i> is branched		D) All of these		
76.	Needle-like leaves, thic	k cuticle, sucken ston	nata are character of –		(Pg38, E)
	A) Cycas	B) Pinus	C) Gnetum	D) Ginkgo	
77.	Gymnosperms are –	,	,	, 0	(Pg38, E)
	A) Heterosporous, hap	loid microspores and	haploid megaspore		
	B) Homosporous, both	spores are haploid			
	C) Heterosporous, both	n spores(microspores	& megaspores) are diplo	oid	
	D) None of these				
78.	Choose the correct state	ement –			(Pg38, E)
	A) The male and femal	e cones borne on sam	e plant as in Cycas		
	B) The male and female	e cones borne on diffe	rent plant as in Cycas		
	C) The male and femal	e cones borne on same	e plant as in Pinus		
	D) Both A & C				
79.	Choose the correct abo	ut female cone of gyn	nosperm:		(Pg38, E)
	A) The nucleus is prote	cted by bitegmic stru	cture		
	B) The megaspore mot	ner call divides mitoti	cally to form four mega	spores	

	C) One of four megaspores, enclose female gametophyte that bear one a D) Ovula is unitegmic	d within th archegonia	e megasporangium wh	iich develop ir	nto a multicellular
80.	Statement-I : The cones bearing me Statement-II : The strobili bearing n A) Both stated statement are correct	gasporophy nicrosporar +	Il with ovules are fema ngia are called male con	ale cone ne	(Pg38, E)
	B) Both stated statement are incorrectC) Statement-I is correct while state	ect ement- II is :	incorrect		
	D) Statement-I is incorrect while sta	tement-II i	s correct		
81.	Identify given plant diagram and cl	noose corre	ct response		(Pg39, E)
	A) <i>Ginkgo</i> , a living fossil C) <i>Taxus</i>		B) Cycas, a living fossi D) Gnetum	1	
82.	What is difference between bryoph	ytic and gy	mn <mark>ospermous & ga</mark> me	tophytes	(Pg39, M)
	A) Bryophytic gametophytes is inde	ependent fr	ee-living structure whi	le gametophy	tes of gymnosperm
	is dependent			1	-
	B) Gametophyte of gymnosperm re	main withi	n the sporangia retaine	a on sporophy	/tes
83.	Choose the correct set about given t	figure:	D) None of these		(Pg39, E)
			STATES -		(-8, -,
	i) Pinnate leaves		ii) Palmate leaf		
	iii) Branched stem		iv) Branching is same	as in Cedrus	
	v) Unbranched vi) Bear male cone and female cone	on same n	lant		
	vii) Bear male cone & female cone c	on different	plant		
	viii) It is living fossil along with Gir	nkgo			
	A) i, iii, vi, viii B) i, v, vii,	viii	C) ii, v, vi	D) i, iv, vii, v	iii
84.	Anthoceros thallus and coralloid roo	t of <i>Cycas</i> a	re D) Darfa i DL (; ;		(Pg39, E)
	A) Similar in morphological structu	ire	B) Performing N ₂ -fixin	ıg	
85.	Gametophytes is parasitic over spo	rophytes is	DJDQC		(Pg39, E)
00.	A) Cycadales B) Conifer	ales	C) Monocot	D) All of thes	6e
86.	The endosperm of gymnosperm rep	oresent	,	,	(Pg39, E)
	A) Female gametophyte		B) Triploid structure		
07	C) Diploid structure	1 (1	D) A & C		
87.	Read the following statements and	cnoose the	incorrect response with	n respect to gy:	(Pg39 F)
	A) Pollen grains are carried by air c	urrents			(1 50), L)
	B) Pollen tube carries the male gam	etes to arch	legonia		
	C) Following fertilization, zygote de	evelop but	embryo stage is lacking	5	
	D) Ovule develops into seed	-			
88.	All the given structure of <i>Pinus</i> and	<i>Cycas</i> are l	naploid, except		(Pg39, E)
	A) Pollen grain B) Egg		C) Nucellus	D) Endosper	m

				,
89.	Gymnosperm is example of –			(Pg39, E)
	A) Vascular, embryophyte with ovule enclose	ed is ovary		
	B) Vascular, non-embryophyte			
	C) Non-vascular, non-embryophyte			
	D) Vascular, embryophyte			
0.	Vascular archegoniates with diplontic lifecyc	le are –		(Pg39, E)
	A) Bryophytes B) Gymnosperm	C) Pteridophytes	D) B & C	
	Para	<u>graph - 3.5</u>		
	Ang	<u>giosperm:</u>		
91.	Tallest and smallest plant species belonging t	o angiosperm is –		(Pg40, E)
	A) Sequoia and Wolffia	B) Eucalyptus and Wo	olffia	
	C) Sequoia and duck-weed	D) None of these		
2.	Dicotyledons and monocotyledons are two _	of angiosperm		(Pg40, E)
	A) Family B) Class	C) Order	D) Division	
3.	How many of following is correct about dico	tyle <mark>dons a</mark> nd monocotyl	edons respect	ively
	Seed with two cotyledons, trimerous, pentar	erous, parallel veinatior	n Seed with or	ne cotyledons,
	tetramerous, reticulate veination			(Pg40, E)
	A) 4, 3 B) 3, 4	C) 2, 5	D) 5, 2	
4.	A group of plant flower with having three me	embe <mark>rs in each wh</mark> orl is _l	placed is-	(Pg40, E)
	A) Monocot B) Dicot	C) Tetramerous	D) Both B &	C
5.	Choose the correct statement			(Pg40, M)
	A) Embryo sac develop from one functional r	nega <mark>spore(</mark> diploid) whic	<mark>ch r</mark> esult from	mitosis and
	degeneration of megaspore mother cell			
	B) Embryo sac of consist of one egg apparatu	s, three antipodal cell an	<mark>d two p</mark> olar n	uclei
	C) Polar nuclei, antipodal cells, egg are diplo	id <mark>structure</mark> of embryo sa	ac of angiospe	erm
	D <mark>) Se</mark> condary nuclei is haploid			
6.	Secondary nuclei result from fusion is			(Pg40, E)
	A) Polar nuclei and 1st male gamete			
	B) Polar nuclei and 2nd male gamete			
	C) Both nuclei of polar nuclei			
_	D) Egg apparatus and polar nuclei			
7.	Choose the correct sequence		_	(Pg40, M)
	A) Gamete formation \rightarrow pollination \rightarrow fertiliz	zation \rightarrow embryo \rightarrow new	y plant	
	B) Gamete formation \rightarrow transfer of gamete \rightarrow	\rightarrow fertilization \rightarrow pollinati	on \rightarrow embryo	
	\rightarrow new plant			
	C) Pollination \rightarrow gametogenesis \rightarrow fertilization	$on \rightarrow embryo \rightarrow new pla$	int	
0	D) None of these			
8.	Microspore of angiosperm represent-			(Pg40, E)
	A) Sporophytic phase	B) Gametophytic phase	se	
~	C) Both A & B	D) Female gamete		
9.	Pollen tube in angiosperm discharge-			(Pg40, E)
	A) One male gamete is embryo sac			
	B) Two male gamete is embryo sac			
	C) Three male gamete is embryo sac			
	D) More than one option is correct			()
00.	Syngamy is-			(Pg41, E)
	A) Fusion of egg and 1st male gamete			
	B) Fusion of egg and 2nd male gamete			
	C) Fusion of polar nuclei & 1st male gamete			
0.5	D) Both B & C			
01.	Zygote is result of-			(Pg 41, E)
	A) Syngamy	B) Double fertilization	L	
	C) Triple fusion	D) Both A & C		·
.02.	Fusion of 2nd male gamete with diploid seco	ndary nucleus result in f	ormation of-	(Pg41, E)
	A) PEN B) Embryo	C) Both A & B	D) Sporophy	vte

				,
103.	Double fertilization is-			(Pg 41, E)
	A) Fusion of two nuclei of polar nuclei			
	B) Fusion of male gamete with egg			
	C) Fusion of male gamete with secondary nuc	lei		
	D) Both B & C			
104.	PEN provide-			(Pg 41, E)
1011	A) Protection of embryo	B) Nourishment to emb	rvo	(-8,-)
	C) Anchorage to embryo	D) None of these	iyo	
105	Which of following structure degenerate after	fertilization-		(Pσ 41 F)
100.	A) Synergid B) Antipodal cell	C A & B	D) Embryo	(1511, 1)
106	Angiosperm differ with gymposperm	CITAD	D) Emoryo	(Pg /1 E)
100.	A) In presence of true root stop is loof			(1 g +1, 1)
	B) Seed englosed in fruit			
	C) Overty englaged in evula			
	C) Ovary enclosed in ovule			
107				(D 41 F)
107.	Ovule develop into and ovaries develop	o into of angiospe	rm	(Pg 41, E)
100	A) Seed, fruit B) Fruit, seed	C) Fruit, fruit	D) Seed, seed	
108.	Pistil is-			(Pg 41, E)
	A) Female sex organ of flower	B) Male sex organ of flo	ower	
	C) Non-reproductive organ of flower			
	D) Divided into two part that are anther and f	ilament.		
	Parag	<u>graph - 3.5</u>		
	Ang	iosperm:		
109.	Kelp, Polysiphonia, Ectocarpus, Fucus, Wolffia	n, Volvox		
	How many of following are show haplontic, h	aplodiplontic and diplor	n <mark>tic life cyc</mark> le	respectively
			,	(Pg42, E)
	A) 1, 3, 2 B) 3, 1, 2	C) 1, 2, 3	D) 2, 3, 1	
110.	Mitosis is observed in-			(Pg42, E)
	A) Haploid plant cell	B) Diploid plant cell		
	C) Both A & B	D) Only vegetative cell		
111.	Choose correct statement about haplontic life	cvcle-		(Pg42, E)
	i) Sporophytic generation is represented by sit	ngle cell zvønte		(-8,-)
	ii) Free-living sporonbyte	igie cell 29gote		
	iii) Sporophyte is parasite on gametophyte			
	iv) Cametonbyte arise from gametos after mit	ntical division		
	x) Example are Spirogyra and some species of	Chlamydomonas		
	vi) Gametonhyte arise from mojosis occur in s	nore-		
	A) i ji v vi \mathbf{R} i ji v vi \mathbf{R} i ji v vi	C) iii iv v		
110	$\begin{array}{c} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 $	C) III, IV, V	C) 1, 111, 1V	(Da12 E)
112.	A) Diploid dominant anoronbyte that is related	winthotic and independent	nt phase	(1 g 1 2, E)
	B) Comptonbuto in represent has four dial it and	synthetic and independe	in phase	
	C) Dominant phase is correct.			
	C) Dominant phase is gametophyte			
110	D) All of these			(D-40 E)
113.	Gymnosperms are-	O) II 1 1 1 1		(Pg42, E)
	A) Haplontic B) Diplontic	C) Haplo-diplontic	D) Diplo-hap	lontic
114.	Bryophytes and Pteridophyte exhibit-			(Pg42, E)
	A) Multicellualr sporophyte	B) Multicellular gamete	ophyte	
	C) Unicellular sporophyte	D) A & B both		
115.	Bryophytes and pteridophytes differ in their -			(Pg42, E)
	A) Stage of meiosis	B) Dominant phases		
	C) Stage of syngamy	D) Stage of gametogene	esis	
116.	In bryophytes –			(Pg42, E)
	A) Sporophyte totally or partially dependent of	on the gametophyte for it	ts anchorage	and nutrition
	B) Gametophyte totally or partially dependent	t on the sporophyte for it	s anchorage a	and nutrition
	C) A dominant, independent, photosynthetic.	thalloid haploid Sporopl	nyte alternate	e with gametophyte
	, , , , , , , , , , , , , , , , , , ,	r - r - r · r	5	

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	NEET PREVIOU	IS YEARS QL	IESTIONS	
1.	Which of the following statement is correc (a) Ovules are not enclosed by ovary wall i (b) <i>Selaginella</i> is heterosporous, while <i>Sal</i>	et? in gymnosperms. <i>vinia</i> is homosporous.		[2018]
	(c) Stems are usually unbranched in both C	Cycas and Cedrus.		
2	(d) Horsetails are gymnosperms. Winged pollen grains are present in			[2018]
	(a) Mustard (b) <i>Cycas</i>	(c) Pinus	(d) Mango	[2010]
3.	Which one is incorrectly matched?			[2018]
	(a) Uniflagellate gametes – <i>Polysiphonia</i>	(b) Biflagellate zoos	pores – Brown algae	
	(c) Unicellular organism – <i>Chlorella</i>	(d) Gemma cups – M	larchantia	
4.	Double fertilisation is exhibited by	<u> </u>	(1)	[2017]
5	(a) algae (b) fungi	(c) angiosperms	(d) gymnosperms	[2017]
э.	(a) Creas Directions	(b) Salvinia Hetero	sporolls	[2017]
	(c) Equisetum – Homosporous	(d) Pinus – Dioeciou	sporous	
6.	Life cycle of <i>Ectocarpus</i> and <i>Fucus</i> respect	tively are:		[2017]
	(a) Diplontic, Haplodiplontic	(b) Haplodiplontic, I	Diplontic	L J
	(c) Haplodiplontic, Haplontic	(d) Haplontic, Diploi	ntic	
7.	Zygotic meiosis is characteristic of			[2017]
	(a) Fucus (b) Funaria	(c) Chlamydomonas	(d) Marchantia	
8.	An example of colonial alga is			[2017]
0	(a) Volvox (b) Ulothrix	(c) Spirogyra	(d) Chlorella	[2016]
9.	(a) Gymnosperms are both homosporous at	nd heterosporous		[2010]
	(b) Salvinia, Ginkgo and Pinus all are gym	nosperms.		
	(c) Sequoia is one of the tallest trees.	noop on the second s		
	(d) The leaves of gymnosperms are not well	ll adapted to extremes o	of climate.	
10.	In bryophytes and pteridophytes, transport	of male gametes requir	res	[2016]
	(a) Wind (b) Insects	(c) Birds	(d) Water	
11.	In angiosperms, microsporogenesis and me	egasporogenesis		[2015]
	(a) form gametes without further divisions.	(b) involve meiosis. (1)		
12	(c) occur in ovule. Mala gamatanhuta in angiagnerma produce	(d) occur in anther.		[2015]
12.	(a) single sperm and vegetative cell	(b) single sperm and	two vegetative cells	[2013]
	(c) three sperms.	(d) two sperms and a	vegetative cell.	
13.	Read the following five statements (A to E)) and select the option	with all correct statem	ents. [2015]
	(A) Mosses and lichens are the first organis	sms to colonise a bare r	ock.	[]
	(B) Selaginella is a homosporous pteridoph	nyte.		
	(C) Coralloid roots in <i>Cycas</i> have VAM.			
	(D) Main plant body in bryophytes is game	etophytic, whereas in pt	eridophytes it is sporo	phytic.
	(E) In gymnosperms, male and female gam	etophytes are present v	vithin sporangia locate	ed on
	sporophyte. (1) (1) (1) (1) (1) (1) (1) (1) (1) (1)	() (D) (C) 1 (E)	(1) (A) (C) (1) (D)	
14	(a) (B), (C) and (D) (b) (A), (D) and (E) In which of the following compton byte is r	(c) (B), (C) and (E) $t_{independent}$	(a)(A), (C) and (D)	[2015]
14.	(a) Marchantia (b) Ptoris	(c) Pinus	ing: (d) Funaria	[2015]
15.	Which one is incorrect statement?	(c) 1 mus	(u) 1 unun u	[2015]
	(a) <i>Mucor</i> has biflagellate zoospores.			LJ
	(b) Haploid endosperm is typical feature of	f gymnosperms.		
		-		

	(c) Brown algae have chlorophyll <i>a</i> and <i>c</i> and(d) Archaegonia are found in bryophyta, pter	nd fucoxanthin. pridophyta and gymnos	sperms.	
16.	Which one of the following statements is in	correct?		[2015]
	(a) Agar - agar is obtained from <i>Gelidium</i> and	nd <i>Gracilaria</i> .		
	(b) Chlorella and Spirulina are used as space	e food.		
	(d) Algin and carrageenan are products of al			
17.	Male gametes are flagellated in	igae.		[2015]
17.	(a) Anabaena (b) Ectocarpus	(c) Spirogyra	(d) Polysiphonia	[2010]
18.	Which of the following is responsible for pe	eat formation?		[2014]
	(a) Marchanita (b) Riccia	(c) Funaria	(d) Sphagnum	
19.	Which one of the following is incorrect abo	out <i>Chara</i> ?		[2014]
	(a) Upper oogonium and lower round anthe	ridium.		
	(b) Globule and nucule present on the same	plant.		
	(d) Globule is male reproductive structure			
20.	An alga which can be employed as food for	human being is		[2014]
- • •	(a) <u>Ulo</u> thrix (b) Chlorella	(c) Spirogyra	(d) Polysiphonia	[=•=•]
21.	Which one of the following shows isogamy	with non-flagellated g	ametes?	[2014]
	(a) Sargassum (b) Ectocarpus	(c) Ulothrix	(d) Spirogyra	
22.	From evolutionary point of view, retention	of the female gametoph	nyte with developing y	oung embryo
	on the parent sporophyte for some time, is f	irst observed in		(NEE'I-2019)
22	(1) Liverworts (2) Mosses	(3) Pteridophytes	(4) Gymnosp	(NEET 2010)
23.	(1) Albuminous cells and sieve cells	(2) Sieve tubes only		(ILEE 1-2019)
	(3) Companion cells only	(4) Both sieve tubes a	and companion cells	
24.	Phycoerythrin is the major pigment in :		' (NEET-	2020 COVID)
	(1) Red algae (2) Blue green algae (3) Gr	een algae (4) Br	own algae	
25.	Which of the following statements is incorre	ect about gymnosperm	s? (NEET	-2020 COVID)
	(1) They are heterosporous (2) Mala and female sometan bates are free?	lievin a		
	(2) Male and remain gametophytes are free.	nving nick cuticle		
	(4) Their seeds are not covered			
26.	Male and female gametophytes do not have	an independent free liv	ving existence in	
		-	(NEET-	2020 COVID)
	(1) Pteridophytes (2) Algae (3) An	igiosperms (4) Br	yophytes	
27.	Floridean starch has structure similar to :	(2) C(1) (1) (1) (1)	(NEE	ZT-2020)
	1) Laminarin and cellulose	2) Starch and cellulos	se	
1 0	S) Amylopectin and glycogen	4) Mannitol and algir	1 (NEI	ΣΤ 202 0)
20.	1) Equisatum 2) Salvinia	2) Ptorig	(NEI 1) Marabantia	L 1-2020)
29	Which of the following pairs is of unicellula	3) I terrs	(NEI	ET-2020)
27.	1) Chlorella and Spirulina	2) Laminaria and Sar	roassum	21-2020)
	3) Gelidium and Gracilaria	4) Anabaena and Voly	Vox	
30.	Genera like <i>Selaginella</i> and <i>Salvinia</i> produc	two kinds of spores.	Such plants are known	n as
			[NEI	E T-2021]
	(1) Heterosorus (2) Homosporous	(3) Heterosporous	(4) He	omosorus
31.	Gemmae are present in		[NEE	T-2021]
20	1) Pteridophytes 2) Some Gymnospern	ms 3) Some Live	rworts 4) Mo	osses
52.	which of the following plants in monoecius	ornha 2) Crease sinci	INEE	/1-2021]
33	Which of the following algae contains man	vipila 3) Cycas circi	aterial? (NFI	Tica papaya F T-2021 1
55.	, men of the following tight contains main	1101 ub 10001 ve 1000 III		

	1) Gracilaria 2. Volvox 3) Ulothrix	4) Ectocarpus						
34.	Which of the following algae produce carra	geen?	[NEET-2021]					
	1) Brown algae2) Red algae3) Blu	e-green algae 4) Green algae						
35.	Which of the following is incorrectly ma	[NEET-2022]						
	1) Ectocarpus – Fucoxanthin	2) Ulothrix – Mannitol						
	3) Porphyra – Floridian starch	4) Volvox – Starch						
36.	Hydrocolloid carrageen is obtained from	1	[NEET-2022]					
	1) Chlorophyceae and Phaeophyceae							
	2) Phaeophyceae and Rhodophyceae							
	3) Rhodophyceae only							
	4) Phaeophyceae only							
37.	Match the plant with the kind of life cyc	le it <mark>exhibi</mark> ts:	[NEET-2022]					
	List – I	List – II						
	a) Spiro <mark>gyr</mark> a	i) Dominant diploid sporophyte v	vascular					
		plant, with highly reduced ma	le or female					
		gametophyte						
	b) Fern	ii) Dominant haploid free-living	gametophyte					
	c) <mark>Fu</mark> naria	iii) Dominant diploid sporophyte	alternating					
		with reduced gametophyte ca	lled prothallus					
	d) Cycas	iv) Dominant haploid leafy gametophyte						
		alternating with partially dep	endent					
	multicellular sporophyte.							
	Choose the correct answer from the options given below:							
	1) (a) $-(1v)$, (b) $-(1)$, (c) $-(1)$, (d) $-(11)$							
	2) (a) $-(11)$, (b) $-(111)$, (c) $-(11)$, (d) $-(1)$							
	5) (a) - (11), (b) - (1V), (c) - (1), (d) - (11)							
	4) (a) – (11), (b) – (1 v), (c)- (1), (d) – (11)							

NCERT LINE BY LINE QUESTIONS – ANSWERS

1) A	2) C	3) D	4) D	5) A	6) D	7) B	8) B	9) B	10) D
11) B	12) B	13) D	14) B	15) C	16) A	17) A	18) D	19) D	20) A
21) A	22) B	23) A	24) A	25) D	26) A	27) B	28) A	29) A	30) A
31) C	32) C	33) D	34) C	35) A	36) A	37) B	38) C	39) C	40) B
41) B	42) D	43) C	44) B	45) A	46) D	47) B	48) B	49) A	50) B
51) C	52) D	53) C	54) A	55) A	56) D	57) C	58) D	59) A	60) A
61) C	62) D	63) B	64) D	65) D	66) B	67) A	68) A	69) A	70) B
71) D	72) B	73) B	74) A	75) D	76) B	77) A	78) B	79) D	80) A
81) A	82) C	83) B	84) B	85) D	86) D	87) C	88) C	89) D	90) B
91) B	92) B	93) A	94) A	95) B	96) C	97) A	98) B	99) B	100) A
101) A	102) A	103) D	104) B	105) C	106) B	107) A	108) A	109) A	110) C
111) B	112) A	113) B	114) D	115) B	116) A	117) B	118) A	119) C	120) B
121) A	122) D	123) A	124) A	125) B					

NEET PREVIOUS YEARS QUESTIONS-ANSWERS

1 (a)	2 (c)	3 (a)	4 (c)	5 (d)	6 (b)	7 (c)	8 (a)	9 (c)	10 (d)
11 (b)	12 (d)	13 (b)	14 (c)	15 (a)	16 (c)	17 (b)	18 (d)	19 (c)	20 (b)
21 (d)	22 (3)	23 (4)	24 (1)	25 (2)	26 (3)	27 (3)	2 8 (1)	29 (1)	30 (3)
31(3)	32 (1)	33 (4)	34 (2)	35 (2)	36 (3)	37 (2)			

NEET PREVIOUS YEARS QUESTIONS-EXPLANATIONS

- **1. (a)** The gymnosperms are a group of seed-producing plants. The name is based on the unenclosed condition of their seeds (called ovules in their unfertilised state).
- 2. (c) Winged pollen grains are present in *Pinus*. Each pollen grain has two wing-like structures which enables it to float in air, as an adaptation for dispersal by the wind.
- **3. (a)** *Polysiphonia* is a genus of red algae, where asexual spores and gametes are non-motile or non-flagellated.
- **4. (c)** Double fertilisation is a unique feature exhibited only by angiosperms. It involves both syngamy and triple fusion.
- 5. (d) *Pinus* is a monoecious plant comprising of both male and female cones on same plant.
- 6. (b) *Ectocarpus* exhibits haplodiplontic life cycle while *Fucus* has diplontic life cycle.
- 7. (c) *Chlamydomonas* has haplontic life cycle hence, shows zygotic meiosis.
- 8. (a) *Volvox* is motile colonial fresh water green alga. It forms spherical colonies.
- **9. (c)** Sequoia semepervirans is one of the tallest trees.
- 10. (d) Bryophytes neither have pollen nor flowers and rely on water to carry the male gametes (sperm) to the female gametes (eggs). The antherozoids (male gametes of pteridophytes) are armed with hair-like or whip-like cilia or flagellae and are able to swim through water; they do not travel great distances and are only released when free water is available.
- 11. (b) In meiosis, the number of chromosomes are reduced by half producing haploid daughter cells. In both processes microsporogenesis and megasporogenesis, the microspore mother cell and the megaspore mother cell undergoes meiosis to produce haploid microspore and megaspore respectively.
- 12. (d) Two sperms and a vegetative cell are produced by male gametophyte in angiosperms. Male gametophyte or pollen grain contain one generative cell, which further divides mitotically to form two sperms. Whereas, a vegetative produces an elongated pollen tube to deliver the sperm in embryo sac.
- **13. (b)** *Selaginella* is a heterosporus pteridophyte containing micro & megaspores. In *Cycas*, corolloid root has the cyanobacteria *Anabaena*.
- 14. (c) *Pinus* belongs to gymnosperms in which male and female gametophytes do not have an independent Free living existance. They remain within the sporangia which are of two types — microsporangia and megasporangia.

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- 15. (a) The spores are non motile in *Mucor*.
- 16. (c) Mannitol or laminarin is the stored food in phaeophyceae (brown algae).
- **17. (b)** Male gametes are flagellated in *Ectocarpus* (phaeophyceae). They possess heterokont, lateral flagella.
- **18.** (d) *Sphagnum*, a moss, provides peat that has long been used as fuel. It has the capacity to retain water for long periods and as such used to cover the plant roots during transportation.
- **19. (c)** *Chara* is a green alga found attached to bottoms of shallow water of ponds, pools and lakes. Male sex organ is called antheridium. Female sex organ is called oogonium. Oogonium is borne at the top of the four celled filament.
- **20. (b)** *Chlorella* and *Spirullina* are unicellular algae, rich in proteins and are used as food supplements by Space travellers.
- **21. (d)** In *Spirogyra*, sexual reproduction occurs through conjugation. Gametes are non-flagellated Morphologically similar but physiologically different (isogamy with physiological anisogamy).
- 27. Floridean starch is reserve food material of red algae, it is similar to the structure of amylopectin and glycogen
- 28. Equisetum is pteridophyte in which sporophylls are organised in from of strobili or cones
- 29. Chlorella and Spirulina are algae used as single cell proteins
- **30.** Plants like Selaginella and Salvinia produce two kinds of spore i.e., microspores and macrospores. They are known as heterosporous. Most of the pteridophytes produce single type of spores and are called homosporous Sorus are brownish or yellowish cluster of spore producing structures located on the lower surface of fern leaves.
- 31. Some Liverworts
- 32. Chara
- 33. Ectocarpus is pheophyceae member which stores Mannitol
- 34. Carrageen is present in the cell walls of red algae
- 35. Ulothrix is green alga and stored food is starch
- 36. Rhodophyceae
- 37. Spirogyra is a green algae, haplontic life cycle.

Fern is a pteridophyte – Life cycle shows dominant diploid sporophyte, alternating with reduced free living gametophytic stage. So its Haplo-diplontic life cycle

Funaria – belongs to Bryophyta. Its a moss plant. Exhibits haplodiplontic lifecycle. The free living haploid gametophyte bears the sporophytic plant body.

Cycas – Gymnosperms.

Gymnosperms exhibit dominant diploid saprophytic plant body, with highly reduced male/female gametophyte.