

Plant Kingdom — NEET Biology PYQ (2005-2021)

Class 11 Biology · 61 real NEET & AIPMT questions, year-tagged · answers checked by RankUp

NEET 2021

1. Gemmae are present in :

- (A) Mosses
- (B) Pteridophytes
- (C) Some Gymnosperms
- (D) Some Liverworts

NEET 2021

2. Which of the following algae produce Carrageen ?

- (A) Green algae
- (B) Brown algae
- (C) Red algae
- (D) Blue-green algae

NEET 2021

3. Which of the following plants is monoecious ?

- (A) Carica papaya
- (B) Chara
- (C) Marchantia polymorpha
- (D) Cycas circinalis

NEET 2021

4. Genera like Selaginella and Salvinia produce two kinds of spores. Such plants are known as :

- (A) Homosorus
- (B) Heterosorus
- (C) Homosporous
- (D) Heterosporous

NEET 2021

5. Which of the following algae contains mannitol as reserve food material ?

- (A) Ectocarpus
- (B) Gracilaria
- (C) Volvox
- (D) Ulothrix

NEET 2020 · Q50

6. Floridean starch has structure similar to:

- (A) Starch and cellulose
- (B) Amylopectin and glycogen
- (C) Mannitol and algin
- (D) Laminarin and cellulose

NEET 2020 · Q53

7. Which of the following pairs is of unicellular algae?

- (A) Laminaria and Sargassum
- (B) Gelidium and Gracilaria
- (C) Anabaena and Volvox
- (D) Chlorella and Spirulina

NEET 2020 · Q71

8. Strobili or cones are found in:

- (A) Salvinia
- (B) Pteris
- (C) Marchantia
- (D) Equisetum

NEET 2019 · Q153

9. Pinus seed cannot germinate and establish without fungal association. This is because :

- (A) its embryo is immature.
- (B) it has obligate association with mycorrhizae.
- (C) it has very hard seed coat.
- (D) its seeds contain inhibitors that prevent germination.

NEET 2018 · Q130

10. Which of the following statements is correct?

- (A) Horsetails are gymnosperms.
- (B) Selaginella is heterosporous, while Salvinia is homosporous.
- (C) Ovules are not enclosed by ovary wall in gymnosperms.
- (D) Stems are usually unbranched in both Cycas and Cedrus.

NEET 2018 · Q134

11. Winged pollen grains are present in

- (A) Mango
- (B) Cycas
- (C) Mustard
- (D) Pinus

NEET 2018 · Q135

12. Which one is wrongly matched?

- (A) Gemma cups – Marchantia
- (B) Biflagellate zoospores – Brown algae
- (C) Uniflagellate gametes – Polysiphonia
- (D) Unicellular organism – Chlorella

NEET 2017 · Q55

13. Select the mismatch:

- (A) Pinus - Dioecious
- (B) Cycas - Dioecious
- (C) Salvinia - Heterosporous
- (D) Equisetum - Homosporous

NEET 2017 · Q78

14. An example of colonial alga is:

- (A) Chlorella
- (B) Volvox
- (C) Ulothrix
- (D) Spirogyra

NEET 2017 (Gujarati paper) · Q75

15. Identify and select the wrong statement out of the following:

- (A) Roots of pines enter into a symbiotic relationship with higher fungi.
- (B) The coralloid roots in Cycas have nitrogen fixing cyanobacteria.
- (C) The giant redwood tree Sequoia, one of the tallest trees is an angiosperm.
- (D) In conifers the needle like leaves are well adapted to extremes of temperature, moisture conservation and onslaught of wind.

NEET 2017 (Gujarati paper) · Q84

16. Which of the following is a proteinaceous and water soluble photosynthetic pigment?

- (A) Xanthophyll
- (B) Phycocyanin
- (C) Anthocyanin
- (D) Chlorophyll

NEET 2016 Phase 2 · Q95

17. Conifers are adapted to tolerate extreme environmental conditions because of

- (A) broad hardy leaves
- (B) superficial stomata
- (C) thick cuticle
- (D) presence of vessels

NEET 2016 Phase 2 · Q96

18. Which one of the following statements is wrong?

- (A) Algae increase the level of dissolved oxygen in the immediate environment.
- (B) Algin is obtained from red algae, and carrageenan from brown algae.
- (C) Agar-agar is obtained from Gelidium and Gracilaria.
- (D) Laminaria and Sargassum are used as food.

NEET 2016 Phase 1 · Q140

19. Select the correct statement:

- (A) Gymnosperms are both homosporous and heterosporous
- (B) Salvinia, Ginkgo and Pinus all are gymnosperms
- (C) Sequoia is one of the tallest trees
- (D) The leaves of gymnosperms are not well adapted to extremes of climate

NEET 2016 Phase 1 · Q154

20. In bryophytes and pteridophytes, transport of male gametes requires:

- (A) Wind
- (B) Insects
- (C) Birds
- (D) Water

AIPMT 2015

21. In which of the following gametophyte is not independent free living?

- (A) Pinus
- (B) Funaria
- (C) Marchantia
- (D) Pteris

AIPMT 2015

22. Which one of the following statements is wrong?

- (A) Mannitol is stored food in Rhodophyceae
- (B) Algin and carrageen are products of algae
- (C) Agar-agar is obtained from Gelidium and Gracilaria
- (D) Chlorella and Spirulina are used as space food

AIPMT 2015

23. Male gametes are flagellated in:

- (A) Spirogyra
- (B) Polysiphonia
- (C) Anabaena
- (D) Ectocarpus

AIPMT 2014

24. An alga which can be employed as food for human being is:

- (A) Chlorella
- (B) Spirogyra
- (C) Polysiphonia
- (D) Ulothrix

AIPMT 2014

25. Which one of the following is wrong about Chara?

- (A) Globule and nucule present on the same plant
- (B) Upper antheridium and lower oogonium
- (C) Globule is male reproductive structure
- (D) Upper oogonium and lower round antheridium

AIPMT 2014

26. Which of the following is responsible for peat formation?

- (A) Riccia
- (B) Funaria
- (C) Sphagnum
- (D) Marchantia

AIPMT 2014

27. Which one of the following shows isogamy with non-flagellated gametes?

- (A) Ectocarpus
- (B) Ulothrix
- (C) Spirogyra
- (D) Sargassum

NEET 2013

28. Isogamous condition with non-flagellated gametes is found in

- (A) Chlamydomonas
- (B) Spirogyra
- (C) Volvox
- (D) Fucus

NEET 2013

29. Besides paddy fields, cyanobacteria are also found inside vegetative part of

- (A) Pinus
- (B) Cycas
- (C) Equisetum
- (D) Psilotum

NEET 2013

30. Read the following statements (A-E) and answer the question which follows them:

- (A) In liverworts, mosses and ferns gametophytes are free-living**
- (B) Gymnosperms and some ferns are heterosporous**
- (C) Sexual reproduction in Fucus, Volvox and Albugo is oogamous**
- (D) The sporophyte in liverworts is more elaborate than that in mosses**
- (E) Both Pinus and Marchantia are dioecious**

How many of the above statements are correct?

- (A) One
- (B) Two
- (C) Three
- (D) Four

NEET 2013

31. Monoecious plant of Chara shows occurrence of

- (A) Antheridiophore and archegoniophore on the same plant
- (B) Stamen and carpel on the same plant
- (C) Upper antheridium and lower oogonium on the same plant
- (D) Upper oogonium and lower antheridium on the same plant

AIPMT 2012 Prelims

32. Which one of the following is common to multicellular fungi, filamentous algae and protonema of mosses ?

- (A) Multiplication by fragmentation
- (B) Diplontic life cycle
- (C) Members of kingdom Plantae
- (D) Mode of Nutrition

AIPMT 2012 Prelims

33. Which one of the following is a correct statement ?

- (A) Origin of seed habit can be traced in pteridophytes
- (B) Pteridophyte gametophyte has a protonemal and leafy stage
- (C) In gymnosperms female gametophyte is free-living
- (D) Antheridiophores and archegoniophores are present in pteridophytes

AIPMT 2012 Prelims

34. Cycas and Adiantum resemble each other in having

- (A) Vessels
- (B) Seeds
- (C) Motile sperms
- (D) Cambium

AIPMT 2011 Mains

35. Consider the following four statements whether they are correct or wrong:

(A) The sporophyte in liverworts is more elaborate than that in mosses

(B) Salvinia is heterosporous

(C) The life-cycle in all seed bearing plants is diplontic

(D) In Pinus male and female cones are borne on different trees

The two wrong statements together are

- (A) Statements (B) and (C)
- (B) Statements (A) and (B)
- (C) Statements (A) and (C)
- (D) Statements (A) and (D)

AIPMT 2011 Prelims

36. Archegoniophore is present in

- (A) Funaria
- (B) Marchantia
- (C) Chara
- (D) Adiantum

AIPMT 2011 Prelims

37. Compared with the gametophytes of the bryophytes the gametophytes of vascular plants tend to be

- (A) Smaller and to have smaller sex organs
- (B) Smaller but to have larger sex organs
- (C) Larger but to have smaller sex organs
- (D) Larger and to have larger sex organs

AIPMT 2011 Prelims

38. The gametophyte is not an independent, free-living generation in

- (A) Pinus
- (B) Polytrichum
- (C) Adiantum
- (D) Marchantia

AIPMT 2011 Prelims

39. A prokaryotic autotrophic nitrogen fixing symbiont is found in

- (A) Pisum
- (B) Alnus
- (C) Cycas
- (D) Cicer

AIPMT 2010 Mains · Q35

40. Which one of the following is monoecious?

- (A) Marchantia
- (B) Cycas
- (C) Pinus
- (D) Date palm

AIPMT 2010 Prelims · Q104

41. Male and female gametophytes are independent and free-living in

- (A) Sphagnum
- (B) Mustard
- (C) Castor
- (D) Pinus

AIPMT 2009 Prelims · Q90

42. Which one of the following plants is monoecious?

- (A) Pinus
- (B) Cycas
- (C) Papaya
- (D) Marchantia

AIPMT 2009 Prelims · Q97

43. Phylogenetic system of classification is based on:

- (A) Morphological features
- (B) Chemical constituents
- (C) Floral characters
- (D) Evolutionary relationships

AIPMT 2009 Prelims · Q106

44. Which one of the following has haplontic life cycle?

- (A) Polytrichum
- (B) Ustilago
- (C) Wheat
- (D) Funaria

AIPMT 2009 Prelims · Q108

45. Which one of the following is considered important in the development of seed habit?

- (A) Heterospory
- (B) Haplontic life cycle
- (C) Free-living gametophyte
- (D) Dependent sporophyte

AIPMT 2009 Prelims · Q113

46. Mannitol is the stored food in:

- (A) Porphyra
- (B) Fucus
- (C) Gracilaria
- (D) Chara

AIPMT 2009 Prelims · Q116

47. Which one of the following is a vascular cryptogam?

- (A) Ginkgo
- (B) Marchantia
- (C) Cedrus
- (D) Equisetum

AIPMT 2008 Prelims · Q101

48. Select one of the following of important features distinguishing Gnetum from Cycas and Pinus and showing affinities with angiosperms

- (A) Embryo development and apical meristem
- (B) Absence of resin duct and leaf venation
- (C) Presence of vessel elements and absence of archegonia
- (D) Perianth and two integuments

AIPMT 2008 Prelims · Q103

49. Which one of the following is heterosporous?

- (A) Equisetum
- (B) Dryopteris
- (C) Salvinia
- (D) Adiantum

AIPMT 2008 Prelims · Q104

50. In which one of the following male and female gametophytes do not have free living independent existence?

- (A) Cedrus
- (B) Pteris
- (C) Funaria
- (D) Polytrichum

AIPMT 2007 Prelims · Q124

51. In the prothallus of a vascular cryptogam, the antherozoids and eggs mature at different times. As a result

- (A) there is high degree of sterility
- (B) one can conclude that the plant is apomictic
- (C) self-fertilization is prevented
- (D) there is no change in success rate of fertilization

AIPMT 2007 Prelims · Q135

52. If you are asked to classify the various algae into distinct groups, which of the following characters you should choose?

- (A) nature of stored food materials in the cell
- (B) structural organization of thallus
- (C) chemical composition of the cell wall
- (D) types of pigments present in the cell

AIPMT 2007 Prelims · Q154

53. Flagellated male gametes are present in all the three of which one of the following sets?

- (A) Zygnema, Saprolegnia and Hydrilla
- (B) Fucus, Marsilea and Calotropis
- (C) Riccia, Dryopteris and Cycas
- (D) Anthoceros, Funaria and Spirogyra

AIPMT 2007 Prelims · Q171

54. Spore dissemination in some liverworts is aided by

- (A) indusium
- (B) calyptra
- (C) peristome teeth
- (D) elaters

AIPMT 2007 Prelims · Q189

55. In gymnosperms, the pollen chamber represents

- (A) a cavity in the ovule in which pollen grains are stored after pollination
- (B) an opening in the megagametophyte through which the pollen tube approaches the egg
- (C) the microsporangium in which pollen grains develop
- (D) a cell in the pollen grain in which the sperms are formed

AIPMT 2006 Prelims · Q125

56. Moss peat is used as a packing material for sending flowers and live plants to distant places because :

- (A) it is easily available
- (B) it is hygroscopic
- (C) it reduces transpiration
- (D) it serves as a disinfectant

AIPMT 2006 Prelims · Q131

57. Conifers differ from grasses in the :

- (A) production of seeds from ovules
- (B) lack of xylem tracheids
- (C) absence of pollen tubes
- (D) formation of endosperm before fertilization

AIPMT 2006 Prelims · Q144

58. In a moss the sporophyte :

- (A) is partially parasitic on the gametophyte
- (B) produces gametes that give rise to the gametophyte
- (C) arises from a spore produced from the gametophyte
- (D) manufactures food for itself, as well as for the gametophyte

AIPMT 2005 Prelims · Q123

59. Match items in column-I with those in column-II.

Column-I: (a) Peritrichous flagellation; (b) Living fossil; (c) Rhizophore; (d) Smallest flowering plant; (e) Largest perennial alga

Column-II: 1. Ginkgo; 2. Macrocystes; 3. Escherichia coli; 4. Selaginella; 5. Wolffia

Select the correct answer from the following :

Codes :

- (A) (a)-2, (b)-1, (c)-3, (d)-4, (e)-5
- (B) (a)-5, (b)-3, (c)-2, (d)-5, (e)-1
- (C) (a)-1, (b)-2, (c)-5, (d)-3, (e)-2
- (D) (a)-3, (b)-1, (c)-4, (d)-5, (e)-2

AIPMT 2005 Prelims · Q130

60. Top-shaped multiciliate male gametes and the mature seed which bears only one embryo with two cotyledons, are characteristic features of :

- (A) polypetalous angiosperms
- (B) gamopetalous angiosperms
- (C) conifers
- (D) cycads

61. Ectophloic siphonostele is found in :

- (A) Adiantum and Cucurbitaceae
- (B) Osmunda and Equisetum
- (C) Marsilea and Botrychium
- (D) Dicksonia and maiden hair fern

Answer key and explanations**1. Answer: (D) Some Liverworts**

Gemmae are green, multicellular asexual buds formed in gemma cups on the thalli of some liverworts such as Marchantia. Mosses reproduce vegetatively by fragmentation and budding of the secondary protonema, not by gemmae in cups.

2. Answer: (C) Red algae

Carrageen is a hydrocolloid obtained commercially from red algae (Rhodophyceae). Brown algae yield algin instead.

3. Answer: (B) Chara

Chara is monoecious: the male globule and the female oogonium develop on the same plant. Papaya, Marchantia polymorpha and Cycas circinalis bear male and female structures on separate plants, so they are dioecious.

4. Answer: (D) Heterosporous

Selaginella and Salvinia produce two kinds of spores, small microspores and large megaspores, so they are heterosporous. Homosporous plants produce only one kind of spore.

5. Answer: (A) Ectocarpus

Brown algae store food as laminarin or mannitol, and Ectocarpus is a brown alga. Gracilaria is a red alga storing floridean starch, while Volvox and Ulothrix are green algae storing starch.

6. Answer: (B) Amylopectin and glycogen

Floridean starch, the stored food of red algae, has a structure very similar to amylopectin and glycogen. Mannitol and laminarin are stored food of brown algae, and cellulose and algin are wall materials, not reserve food.

7. Answer: (D) Chlorella and Spirulina

NCERT names Chlorella and Spirulina as unicellular, protein-rich algae used as food supplements. Laminaria, Sargassum, Gelidium and Gracilaria are large multicellular algae, and Volvox is colonial.

8. Answer: (D) Equisetum

In Equisetum (and Selaginella) the sporophylls are packed into compact strobili or cones. Salvinia bears spores in sporocarps, Pteris has sori on the leaf margin, and Marchantia is a liverwort whose sporophyte has no cones.

9. Answer: (B) it has obligate association with mycorrhizae.

Pinus has an obligate association with mycorrhizal fungi; its seeds do not germinate and establish without them. An immature embryo or hard seed coat would cause dormancy but would not explain the need for a fungus.

10. Answer: (C) Ovules are not enclosed by ovary wall in gymnosperms.

Gymnosperms have naked ovules that are not enclosed in an ovary, which is the basis of their name. Horsetails (Equisetum) are pteridophytes, both Selaginella and Salvinia are heterosporous, and Cedrus has a branched stem although Cycas is unbranched.

11. Answer: (D) Pinus

Pinus pollen grains have two air-filled wings (sacs) that help in wind dispersal. Cycas pollen is wingless, and mango and mustard are angiosperms with ordinary pollen.

12. Answer: (C) Uniflagellate gametes - Polysiphonia

Polysiphonia is a red alga, and red algae have no flagellated cells at any stage, so pairing it with uniflagellate gametes is the wrong match. Chlorella is indeed a unicellular green alga, Marchantia bears gemma cups and brown algae produce pear-shaped biflagellate zoospores, so those pairs are correct.

13. Answer: (A) Pinus - Dioecious

Pinus is monoecious, bearing both male and female cones on the same plant, so pairing it with dioecious is the mismatch. Cycas is truly dioecious, Salvinia is a heterosporous water fern and Equisetum is homosporous.

14. Answer: (B) Volvox

Volvox is a colonial green alga, a hollow sphere of many flagellated cells. Chlorella is unicellular, while Ulothrix and Spirogyra are filamentous.

15. Answer: (C) The giant redwood tree Sequoia, one of the tallest trees is an angiosperm.

Sequoia, the giant redwood and one of the tallest trees, is a gymnosperm (a conifer), not an angiosperm. Pine roots do form mycorrhizae, Cycas coralloid roots harbour nitrogen-fixing cyanobacteria, and needle-like leaves reduce water loss.

16. Answer: (B) Phycocyanin

Phycocyanin is a phycobiliprotein, a water-soluble pigment-protein complex of cyanobacteria and red algae that captures light for photosynthesis. Xanthophylls and chlorophylls are fat-soluble, and anthocyanin is a water-soluble vacuolar pigment that is not proteinaceous and not photosynthetic.

17. Answer: (C) thick cuticle

Conifer needles have a thick cuticle and sunken stomata, which cut water loss and let them survive cold and dry conditions. Their leaves are needle-like rather than broad, the stomata are sunken rather than superficial, and gymnosperms generally lack vessels in their xylem.

18. Answer: (B) Algin is obtained from red algae, and carrageenan from brown algae.

The sources are reversed in this statement: algin comes from brown algae and carrageenan from red algae. Agar from Gelidium and Gracilaria, the use of Laminaria and Sargassum as food, and the release of oxygen by photosynthetic algae are all correct.

19. Answer: (C) Sequoia is one of the tallest trees

Sequoia (giant redwood), a gymnosperm, is one of the tallest trees. Gymnosperms are all heterosporous, Salvinia is a pteridophyte, and gymnosperm needles with thick cuticle and sunken stomata are well adapted to extreme climates.

20. Answer: (D) Water

Bryophytes and pteridophytes have flagellated (motile) antherozoids that must swim through a film of water to reach the archegonium, which is why they are called amphibians of the plant kingdom (bryophytes) and are restricted to moist places.

21. Answer: (A) Pinus

In gymnosperms such as Pinus, the gametophytes are much reduced and stay within the ovule or pollen grain, depending on the sporophyte. Funaria and Marchantia (bryophytes) and Pteris (fern) have free-living gametophytes.

22. Answer: (A) Mannitol is stored food in Rhodophyceae

Mannitol (with laminarin) is the stored food of brown algae (Phaeophyceae); red algae store floridean starch, so that statement is wrong. Algin and carrageen come from algae, agar from Gelidium and Gracilaria, and Chlorella and Spirulina are used as space food.

23. Answer: (D) Ectocarpus

Ectocarpus, a brown alga, produces pear-shaped gametes with two laterally attached flagella. Spirogyra and Polysiphonia have non-motile gametes, and Anabaena is a cyanobacterium with no flagellated gametes.

24. Answer: (A) Chlorella

Chlorella is a unicellular green alga rich in proteins and is used as a food supplement, even by space travellers. Spirogyra, Polysiphonia and Ulothrix are not used as human food.

25. Answer: (B) Upper antheridium and lower oogonium

In Chara the oogonium (nucule) lies above and the round antheridium (globule) lies below at the same node, so the statement 'upper antheridium and lower oogonium' is wrong. Globule and nucule do occur on the same plant and the globule is the male structure, so those statements are correct.

26. Answer: (C) Sphagnum

The moss Sphagnum accumulates as peat, which is used as fuel and as packing material because of its water-holding capacity. Riccia and Marchantia are liverworts and Funaria is a moss that does not form peat.

27. Answer: (C) Spirogyra

Spirogyra reproduces by isogamy in which the fusing gametes are similar in size and non-flagellated (non-motile). Ulothrix and Ectocarpus have flagellated isogametes, and Sargassum is oogamous.

28. Answer: (B) Spirogyra

Spirogyra shows isogamous conjugation in which the fusing gametes are similar and non-flagellated (amoeboid). Chlamydomonas has flagellated isogametes, while Volvox and Fucus are oogamous.

29. Answer: (B) Cycas

The coralloid roots of Cycas harbour cyanobacteria such as Anabaena and Nostoc in a special zone. Pinus has fungal mycorrhiza instead, and Equisetum and Psilotum have no such cyanobacterial association.

30. Answer: (C) Three

Three statements are correct: gametophytes of liverworts, mosses and ferns are free-living; gymnosperms and some ferns (e.g. Salvinia) are heterosporous; and Fucus, Volvox and Albugo are oogamous. The sporophyte of mosses is more elaborate than that of liverworts, and Pinus is monoecious, so the other two are wrong.

31. Answer: (D) Upper oogonium and lower antheridium on the same plant

In Chara the female sex organ, the oogonium (nucule), is borne above the male antheridium (globule) at the same node of a monoecious plant. Antheridiophores and archegoniophores belong to Marchantia, and stamens and carpels to flowering plants.

32. Answer: (A) Multiplication by fragmentation

Multicellular fungi, filamentous algae and the filamentous protonema of mosses all multiply vegetatively by fragmentation. They differ in life cycle and nutrition, and fungi are not members of kingdom Plantae.

33. Answer: (A) Origin of seed habit can be traced in pteridophytes

Heterospory in some pteridophytes such as Selaginella and Salvinia, with the megaspore retained on the parent, is a precursor to the seed habit. Protonema and leafy stages belong to moss gametophytes, antheridiophores and archegoniophores occur in Marchantia (a liverwort), and the female gametophyte of gymnosperms is retained within the ovule, not free-living.

34. Answer: (C) Motile sperms

Cycas (a gymnosperm) and Adiantum (a fern) both have motile, multiflagellate male gametes. Adiantum has no seeds, neither has vessels, and the fern lacks cambium.

35. Answer: (D) Statements (A) and (D)

The sporophyte of mosses is more elaborate than that of liverworts, so the liverwort statement is wrong, and Pinus is monoecious with male and female cones on the same tree, so that statement is wrong too. Salvinia is heterosporous and all seed plants have a diplontic life cycle, so those two are correct.

36. Answer: (B) Marchantia

Marchantia, a liverwort, bears its sex organs on stalked branches: archegonia on archegoniophores and antheridia on antheridiophores. Funaria is a moss whose sex organs sit at branch tips without such stalks, Chara is an alga and Adiantum is a fern.

37. Answer: (A) Smaller and to have smaller sex organs

Moving from bryophytes to vascular plants, the gametophyte becomes progressively reduced while the sporophyte becomes dominant. The fern prothallus is small and short-lived, and in seed plants the gametophyte is just a few cells, with sex organs reduced or absent. So both the gametophyte and its sex organs become smaller.

38. Answer: (A) Pinus

In gymnosperms such as Pinus, the male and female gametophytes develop within the pollen grain and ovule and stay dependent on the sporophyte. Mosses like Polytrichum, liverworts like Marchantia and ferns like Adiantum all have free-living gametophytes.

39. Answer: (C) Cycas

The coralloid roots of Cycas harbour cyanobacteria such as Anabaena, which are prokaryotic, photoautotrophic and fix nitrogen. Pisum, Cicer and Alnus have nitrogen-fixing symbionts too (Rhizobium, Frankia), but these are not autotrophic.

40. Answer: (C) Pinus

In Pinus both male and female cones are borne on the same tree, so it is monoecious. Cycas has separate male and female plants, Marchantia has separate male and female thalli, and date palm is also dioecious.

41. Answer: (A) Sphagnum

In bryophytes such as the moss *Sphagnum*, the gametophyte is the dominant, free-living, photosynthetic generation. In gymnosperms (*Pinus*) and angiosperms (mustard, castor), the gametophytes are greatly reduced and stay inside the sporophyte's sporangia.

42. Answer: (A) Pinus

In *Pinus* both male and female cones are borne on the same tree, so it is monoecious. *Cycas*, papaya and *Marchantia* have separate male and female plants (dioecious).

43. Answer: (D) Evolutionary relationships

Phylogenetic classification groups organisms according to their evolutionary relationships, assuming members of a taxon share a common ancestor. Systems based mainly on morphology or floral characters are artificial or natural systems.

44. Answer: (B) Ustilago

In fungi like *Ustilago* the dominant phase is haploid and the only diploid stage is the zygote nucleus, which undergoes meiosis, giving a haplontic pattern. Mosses like *Funaria* and *Polytrichum* are haplo-diplontic, and wheat is diplontic.

45. Answer: (A) Heterospory

NCERT notes that heterospory, as in *Selaginella* and *Salvinia*, with the female gametophyte retained on the parent sporophyte, is a precursor to the seed habit. A free-living gametophyte is the opposite of what happens in seed plants.

46. Answer: (B) Fucus

Brown algae (Phaeophyceae) such as *Fucus* store food as laminarin or mannitol. *Porphyra* and *Gracilaria* are red algae storing floridean starch, and *Chara* is a green alga storing starch.

47. Answer: (D) Equisetum

Pteridophytes like *Equisetum* have xylem and phloem but no seeds or flowers, so they are vascular cryptogams. *Marchantia* is a bryophyte without vascular tissue, and *Ginkgo* and *Cedrus* are seed-bearing gymnosperms.

48. Answer: (C) Presence of vessel elements and absence of archegonia

Gnetum stands apart from *Cycas* and *Pinus* because its xylem contains true vessels and its female gametophyte has no archegonia, two features otherwise typical of flowering plants. Apical meristems and embryo development are common to all seed plants, so they do not separate *Gnetum* from the other gymnosperms.

49. Answer: (C) Salvinia

Salvinia, a water fern, produces two kinds of spores (microspores and megaspores), as NCERT notes for *Selaginella* and *Salvinia*. *Equisetum*, *Dryopteris* and *Adiantum* all produce a single kind of spore and are homosporous.

50. Answer: (A) Cedrus

Cedrus is a gymnosperm, in which the male gametophyte (pollen) and female gametophyte (inside the ovule) are highly reduced and remain dependent on the sporophyte. In *Pteris* the prothallus is free-living, and in the mosses *Funaria* and *Polytrichum* the gametophyte is the dominant independent plant.

51. Answer: (C) self-fertilization is prevented

When male and female gametes on the same prothallus mature at different times (dichogamy), the egg cannot be fertilised by antherozoids of the same prothallus, so self-fertilisation is prevented and cross-fertilisation is favoured. This does not cause sterility or apomixis.

52. Answer: (D) types of pigments present in the cell

Algae are divided into Chlorophyceae, Phaeophyceae and Rhodophyceae chiefly by their major pigments (chlorophyll a and b, fucoxanthin, r-phycoerythrin), which give the green, brown and red colours. Stored food and cell wall also differ, but the primary basis of grouping is pigments.

53. Answer: (C) Riccia, Dryopteris and Cycas

Riccia (bryophyte) and *Dryopteris* (pteridophyte) have flagellated antherozoids, and *Cycas* is the gymnosperm whose male gametes are motile and multiciliate. Each other set includes a plant with non-motile gametes, such as *Spirogyra*, *Zygnema*, *Hydrilla* or *Calotropis*.

54. Answer: (D) elaters

In liverworts such as *Marchantia* the capsule contains hygroscopic elaters that twist with changing humidity and scatter the spores. Peristome teeth do this job in mosses, and the indusium covers sori of ferns.

55. Answer: (A) a cavity in the ovule in which pollen grains are stored after pollination

In gymnosperms such as Cycas the pollen chamber is a cavity formed at the micropylar end of the nucellus of the ovule, where pollen grains land and rest after pollination before germinating. The structure in which pollen grains develop is the microsporangium (pollen sac), which is a different organ.

56. Answer: (B) it is hygroscopic

Peat from Sphagnum moss holds a lot of water (it is hygroscopic), so it keeps packed living plants moist during transport. Its use is not because it reduces transpiration or kills germs.

57. Answer: (D) formation of endosperm before fertilization

In gymnosperms such as conifers the endosperm is the female gametophyte, formed before fertilisation and haploid. In grasses (angiosperms) the endosperm forms after double fertilisation and is triploid.

Both groups make seeds from ovules and both have pollen tubes.

58. Answer: (A) is partially parasitic on the gametophyte

The moss sporophyte (foot, seta, capsule) stays attached to the gametophyte and gets water and some nutrients from it, though its young capsule can photosynthesise; so it is partially dependent. It produces spores, not gametes, and it grows from the zygote, not from a spore.

59. Answer: (D) (a)-3, (b)-1, (c)-4, (d)-5, (e)-2

E. coli has flagella all over its surface (peritrichous). Ginkgo is a living fossil. Selaginella has leafless rhizophores that bear roots. Wolffia is the smallest flowering plant, and the kelp Macrocystis is the largest perennial alga. That gives (a)-3, (b)-1, (c)-4, (d)-5, (e)-2.

60. Answer: (D) cycads

Cycads have large, top-shaped male gametes with many cilia, which is a primitive trait. Their seed carries one embryo with two cotyledons. Angiosperms and conifers have non-motile male gametes delivered by a pollen tube.

61. Answer: (B) Osmunda and Equisetum

An ectophloic siphonostele has a pith with phloem only outside the xylem ring; it is found in Osmunda and Equisetum. Adiantum (maidenhair fern), Marsilea and Dicksonia have amphiphloic stelar types, with phloem on both sides of the xylem.

Questions as set in the AIPMT/NEET papers conducted by CBSE and NTA. Answers checked and explanations written by the RankUp team. RankUp is not affiliated with CBSE or NTA.