

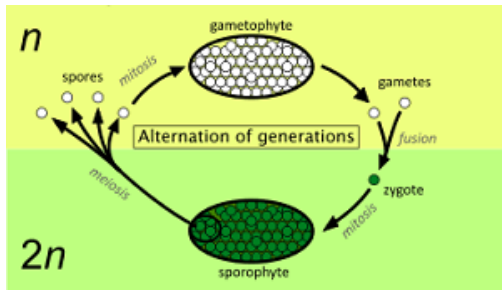
Solution

BIOLOGICAL CLASSIFICATION WS 2

Class 11 - Biology

Section A

- (b) Dikaryon**
Explanation: In fungi like ascomycetes and basidiomycetes, an intervening dikaryotic stage ($n + n$ i.e. two nuclei per cell) occurs; such a condition is called a dikaryon and the phase is called dikaryon phase of fungus.
- (d) Zoospores**
Explanation: In fungi, the asexual reproduction takes place by spores called conidia or sporangiospores or zoospores, and sexual reproduction is by oospores, ascospores and basidiospores.
- (b) Alternation of generation**
Explanation: The fluctuation between these diploid and haploid stages that occurs in plants is called the alternation of generations. The multicellular haploid plant structure is called the gametophyte, which is formed from the spore and gives rise to the haploid gametes.



- (a) Drosera**
Explanation: Drosera plant is partially heterotrophic. These plants capture insects to fulfil its protein requirement although it performs photosynthesis also.
- (b) Having cell wall and chloroplast**
Explanation: The plant cells have a eukaryotic structure with prominent chloroplasts and cell walls mainly made of cellulose.
- (a) Downy mildew**
Explanation: Downy mildew disease is caused due to fungus that forms cottony growth on the surface of the host. The leaves' surface gets reduced that alters the photosynthesis rate.
- (b) Enaima and Anaima**
Explanation: Haemoglobin in RBCs imparts red colour to it. The organisms whose blood contains haemoglobin are called enaima and those without it are called anaima.
- (d) Animalia**
Explanation: The sexual reproduction in the kingdom Animalia is by the population of males and female followed by embryological development.
- (c) A is true but R is false.**
Explanation: The product of sexual reproduction in phycomycetes is oospore. Because of the latter, the phycomycetes are also called oomycetes.
- (b) Both A and R are true but R is not the correct explanation of A.**
Explanation: The nuclei of fungi show important characteristics. They are extremely small-near the limit of resolution of the

light microscope. The nuclear membrane does not disorganise during division and the nucleus divides by constriction in the centre. The nuclei become dumbbell-shaped when the nuclear membrane is drawn out between the separating daughter nuclei. This type of non-mitotic nuclear division has been termed Karyochrosis by Moore (1964).

11. (a) Both A and R are true and R is the correct explanation of A.

Explanation: Typically the wilt diseases are associated with plants that contain vessels in their xylem, that is, the angiosperms. The most common pathogens are vascular fusaria. Many economically important plants (e.g., Potato, Tomato, Cotton, Banana, Flax, Pigeon Pea) show sudden signs of wilting due to blockage of tracheary elements by growth of fungus *Fusarium* especially *F. oxysporum*. Wilt diseases are also caused by blocking of the vessels of host plant by masses of bacteria. The common example of this category are the wilt diseases of potato, cucumber, water melon and egg plant.

12.

- (b) Both A and R are true but R is not the correct explanation of A.

Explanation: Gibberellins are plant hormones produced by the fungus *Gibberella fujikuroi* which causes a disease of rice accompanied by abnormal elongation. *Gibberella fujikuroi* is the perfect stage of the fungus *Fusarium moniliformae*. Gibberellin is used to accelerate growth of several horticultural crops. It is a natural plant growth hormone.

13.

- (d) A is false but R is true.

Explanation: Metaphyta kingdom contains all photosynthetic eukaryotic multicellular organisms and their non-photosynthetic relatives. A small group of autotrophic plants catch small animals and insects for obtaining extra nitrogen. Such plants are called insectivorous or carnivorous plants. It must be noted that the term metaphyta as applied here includes groups such as the Euglenoids which are specifically, speaking, protists.

14.

- (d) Both A and R are false

Explanation: The remains of past animals are more abundant than that of plants for two reasons:

- i. animals have several hard structural features like teeth, bones, scales, shells, feathers, wings, claws, horns, etc.
- ii. animals are more in number and show more diversity than plants.

15.

- (d) A is false but R is true.

Explanation: Animalia includes all the animals except protozoa. The kingdom has maximum number and most diverse type of organisms.

16.

- (b) Both A and R are true but R is not the correct explanation of A.

Explanation: *Monocystis* live as endoparasite in the coelomic epithelial cells and seminal vesicles of earthworm. *Eimeria mitis* is present as intracellular parasite in the anterior part of the ileum of adult birds. It causes severe disease in birds.

17.

- (b) Both A and R are true but R is not the correct explanation of A.

Explanation: Some erythrocytic merozoites enter fresh RBCs and form rounded gametocytes (gamonts). The gametocytes are of two types

- i. Smaller male gametocytes or microgamete and
- ii. Larger female gametocytes or macrogamete.

18.

- (b) Both A and R are true but R is not the correct explanation of A.

Explanation: When the mosquito bites man, sporozoites present in the salivary gland of female *Anopheles* mosquito are injected into the blood of the man. The erythrocytic schizont gives rise to merozoites. Malaria fever occurs when schizonts in red blood corpuscles burst and set free their contained merozoites and malarial pigment (haemozoin) in the blood plasma.

19.

- (d) A is false but R is true.

Explanation: Schizogony is an asexual reproduction in which schizont is formed. From the human blood, sporozoites enter the liver cells. The sporozoite grows in size to become a rounded schizont called cryptozoite. The latter divides to form

cryptomerozoites. The cryptomerozoites formed during pre-erythrocytic schizogony may enter the human RBCs to start the erythrocytic schizogony, while some of them enter new liver cells to repeat hepatic (liver) schizogony.

20. The saprotrophic Basidiomycetes can decompose plant matter because they have enzymes for metabolising both cellulose and lignin.
21. This is because pseudoparenchyma is formed by close packing, and fusion of hyphae. Individual hyphae are not distinguishable.
22. Certain insectivorous plants, like bladderwort and venus fly trap are partially heterotrophic.

Section B

23. Fill in the blanks:
- (i) 1. Sporophyte
(ii) 1. Gametophyte
24. Neurospora is used as a model organism to study plant genetics. Several characteristics of this organism make it ideal to be used for genetic studies. Some of these features are the following:
- Reproduces quickly
 - Easy to culture
 - Can survive on minimum media
25. Role of fungi in daily life are following:
- Some fungi rot food materials; like stale bread, fruits and vegetables.
 - Fermentation is possible only because of yeast.
 - Dangerous diseases of plants and animals are caused by some fungi.
 - Some fungi are used for making antibiotics.
26. Some fungi have evolved essential relationships with the roots of many living plants. These fungi grow around and into the roots. Both partners benefit so that neither would thrive without the other. This partnership is called mycorrhizal symbiosis.
27. (a) Ringworm
(b) Candidiasis
(c) Dandruff
28. Bracket or shelf fungi are lignicolous fungi which produce bracket or shelf-shaped, hard, leathery basidiocarps that are found to come out from the tree trunk or the loss of wood, e.g., Fomes tomentarius, etc.
29. Difference between algae and fungi
- Algae is autotrophic, while fungi is heterotrophic.
 - Algae cannot be a parasite, while fungi can be a parasite.
30. **Alternation of Generation.** Life cycle of plants has two distinct phases - the diploid sporophytic and the haploid gametophytic - that alternate with each other. The lengths of the haploid and diploid phases, and whether these phases are free-living or dependent on others, vary among different groups in plants. The phenomenon is called alternation of generation.

Section C

31. The fruiting bodies of Ascomycetes are called ascocarps. A fertile layer called hymenium bears asci. These fruiting bodies are different from each other in the following ways:
- Cleistothecium**- Closed ascocarp, i.e., ascocarp with no opening.
 - Perithecium**- Flask-shaped ascocarp with an apical pore called ostiole.
 - Apothecium**- Cup-shaped open ascocarp.

32.	Ascomycetes	Basidiomycetes
	It is called sac-fungi.	It is called the club fungi.
	Yeast is unicellular but Penicillium is multicellular.	Mycelium is branched and septate.
	Sexually reproduce by ascus formation with and ascospores.	A club-shaped basidium is the most important feature of it.
	Asexual spores are borne in conidiophores,	Basidiospores are formed on a basidium.
	Saprophytes, decomposers, parasitic or coprophilous(dung).	Parasites plant bodies, mushrooms are edible and cultivated. Some are poisonous e.g., Amanita.
	Common members are Yeast, Penicillium, Aspergillus,	Common members are Ustilago, Agaricus, and Puccinia.

Claviceps, and Neurospora.	
Fruiting body is ascocarp .	Fruiting body is basidiocarp .

33. Fungus cells are eukaryotic. These cells contain all the eukaryotic organelles except plastids. Some of these organelles are the nucleus, ribosomes, endoplasmic reticulum, mitochondria, Golgi bodies, etc. A fungal cell wall contains mostly chitin. Plasmalemma bears coiled membranous outgrowths called lomasomes. Nuclei are small and connected to the endoplasmic reticulum. Nuclear division involves the formation of the internal spindle. Vacuoles are small. Near the hyphal tips, the cytoplasm contains small vesicles called chitosomes. Food reserve is in the form of glycogen and oil.

34. The differences between ascocarp and basidiocarp are as follow:

Ascocarp	Basidiocarp
It is a fructification found in Ascomycetes.	It is a fructification found in Basidiomycetes.
It is simpler in construction.	It is more elaborate in construction.
Ascocarp contains numerous asci.	Basidiocarp contains several basidia.
The ascus is generally aseptate.	Basidium may be septate or aseptate.
An ascus forms eight ascocarps	A basidium produces four basidiospores
These are formed endogenously.	These are formed exogenously.

35. Mycorrhiza is a mutually beneficial or symbiotic association of fungi with roots of higher plants. Orchids grow as an epiphyte on plants, have their roots associated with fungi right from the seedling stage. Many orchids cannot survive without mycorrhizae associations. Many forest trees such as pines appear stunted if mycorrhizal associations are absent. In the presence of these associations, these plants absorb 2-3 times more nitrogen, potassium, and phosphorus compared to without them.

36. Algae have many other pigments in their chloroplast; in addition to chlorophyll. The following table shows various pigments in algae and color imparted by them:

Class	Common name	Major pigment	Colour imparted
Chlorophyceae	Green algae	Chlorophyll a, b	Green
Phaeophyceae	Brown algae	Chlorophyll a, c, Fucoxanthin (A xanthophyll pigment)	Brown
Rhodophyceae	Red algae	Chlorophyll a, d, r-phycoerythrin	Red

37. Dinoflagellates can be of different colours depending on the type of pigment present. The red dinoflagellate sometimes multiply at a very rapid rate. This is called as algal bloom. This gives a red appearance to the part of affected sea. This is also known as 'red tide'. Toxins released by them can kill other marine species.

38. (a) **Kingdom plantae**. All green plants are taken under this kingdom. Majority of members are autotrophic. Exceptions are certain parasitic plants, like venus fly trap. Plants show alternation of generation. Reproduction is vegetative asexual and sexual.

(b) **Kingdom animals**. Animals are mobile. They show holozoic nutrition, i.e. they ingest their food and break complex food substance into simpler compounds. Animals can be unicellular and multicellular. Reproduction is asexual and sexual.

(c) **Bacteria**. Bacteria are unicellular. Among bacteria there are certain species which are believed to be on earth since life began on earth. Bacteria can be beneficial and harmful to humans. Nutrition is heterotrophic and autotrophic.

(d) **Lichens**. Lichens are a very good example of symbiosis. Lichens are combination of algae and fungi. The algal part provides food and base to the fungal part, while the fungal part provides gases to the algal part. They are supposed to be very good tool to identify level of pollution in a given ecosystem.

39. **Distinguishing features of Animalia:**

- i. It includes all animals except the protozoans (protists).
- ii. These are multicellular, eukaryotes Cells lack cell walls.
- iii. Mostly holozoic mode of nutrition.
- iv. Free living and parasitic but may be mutually benefited.

Section D

40. **The sexual cycle of fungi involves the following steps :**

- i. The fusion of protoplasts between two motile or non-motile gametes is called plasmogamy.
- ii. The fusion of two nuclei is called karyogamy.
- iii. Meiosis in zygote results in haploid spores.

41. Rhizopus is a fungus that reproduces by spore formation.
No, Rhizopus - wheat rush is not a correct match.
42.
 - Mutualistic associations between fungi and plant roots are called mycorrhizae.
 - Fungi that form mycorrhizal (mycorrhizal fungi) can deliver inorganic nutrients such as phosphate.
 - In exchange, the plants supply the fungi with organic nutrients.
43. Fungi store food in the form of glycogen, along with oil bodies.
Plants, protists, mammals, and fungi all have vacuoles in their cells. Food vacuoles are sacs enclosed by a membrane and have a digestive function.
44. In basidiomycetes asexual spores are not found, vegetative reproduction occurs by fragmentation, and sexual organs are absent.
45.
 - i. Aquatic habitats
 - ii. On decaying wood
46.
 - Ascomycetes are commonly known as sac-fungi as they are produced in a sac-like structure known as ascus.
 - Dikaryon formation is the characteristic feature of ascomycetes and basidiomycetes.
47.
 - Agaricus
 - Agaricus is a fleshy saprophytic fungus with over 300 species and contains both edible and poisonous species. It is found in wet and damp climates. It grows on wood and in humus-rich soil.
48. Flagellated protozoans are either free-living or parasitic protozoans that have flagella. Sleeping sickness is caused by parasitic versions of the parasite. Trypanosoma is a good example.
49.
 - Locomotion
 - Protozoan are eukaryotic having different shapes and sizes. Some are ciliated flagellated or both may be absent.
50.
 - i. Cilia
 - ii. Flagella
 - iii. Pseudopodia
51. Ciliata has two nuclei, macronucleus, and micronucleus.
Ciliates are characterized as organisms propelled by rows of cilia and possessing two types of nuclei. They are a large macronucleus involved in vegetative functions of the organism, and a small micronucleus involved in sexuality.

Section E

52. **(d)** Trypanosoma
Explanation: Trypanosoma
53. **(c)** Locomotion
Explanation: Protozoan are eukaryotic having different shape and size. Some are ciliated flagellated or both may be absent.
54. **(d)** Pseudopodia
Explanation: Pseudopodia are the locomotory organ of Amoeba. Protozoa have cilia and flagella as their locomotory organ.
55. **(c)** Ciliata
Explanation: Ciliata
56. **(b)** Both A and R are true but R is not the correct explanation of A.
Explanation: Protista are unicellular and eukaryotic organisms. They can have different mode of nutrition like saprophytes, parasites and predators while autotrophic green algae possess chlorophyll to synthesize their own food.
57. **Some algae of commercial importance:**

Type of use	Description
Agar (derived from red algae Gelidium and Gracilaria)	Used as a culture medium in laboratory.
Algin (derived from brown algae) carrageen (derived from red algae)	Used as a gelling agent in food and in medical dressing.
Biofuels (different types of algae)	It is being used to produce biofuels. The concept is still at the experimental stage; with some prototypes of an automobile engine in working condition.
Fertilizer (different types of algae)	It has been used as fertilizer in many countries.
Food (Many species of Porphyra, Laminaria, Sargassum)	These marine algae are used as food items; especially in the East Asian Nations.

Single-cell protein (Chlorella and Spirulina)	Many algae are rich in protein and are used as food supplements.
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Some fungi of commercial importance:

Type of use	Description
Medicine	The fungus <i>Penicillium notatum</i> is used for producing antibiotics of the penicillin group. Many traditional Chinese medicines are prepared from fungi.
Diseases	Many fungi cause disease in both animals and plants.
Food processing	Yeast has been in use since ages for fermentation. Alcoholic beverages and bakery items are made because of fermentation by yeast.
Food	Some varieties of <i>Agaricus</i> are used as food in many countries.
Ripening of cheese	Some varieties of fungi are used for ripening of cheese.
Spoilage of food	<i>Rhizopus</i> (bread mould) spoils food items; like stale bread, fruits and vegetables.

58. i. **Growth promotion-** Fungus produces growth-promoting hormones. In the absence of this association, *Pinus* and *Betula* show stunted growth despite providing all types of nutrients.
- ii. **Antimicrobial substance-** Fungus protects the root from parasitic fungi and harmful bacteria by secreting antimicrobial substances.
- iii. **Nourishment-** In orchids, the fungus absorbs nourishment from outside transports it over to the germinating seed.
- iv. **Adverse environment-** Allows plants to grow in mineral deficient soil, saline soil, unfavourable pH and temperature.
- v. **Absorption of water-** Fungal association increases water availability to the root.

59. **Two classes of fungi are:**

- i. **Phycomycetes:** They occur in the water on decaying leaves and damp places. Phycomycetes have a multinucleated (coenocytic) and aseptate (without septa) mycelium. Asexual reproduction occurs by ciliated (zoospores) and non-ciliated spores called **aplanospores**. Both types of spores are formed in sporangia. The sexual reproduction takes place by the union of similar (isogamy) or dissimilar (oogamy) gametes. The examples are *Saprolegnia*, *Mucor*, and *Albugo*.
- ii. **Basidiomycetes:** They are called club **fungi** due to a club-shaped end of mycelium called **basidium**. They have septate multinucleated mycelium. The asexual spores called **basidiospores**. They are generally four in number. They are produced outside the body (exogenous), unlike ascomycetes where they are endogenous. Two compatible nuclei fuse to form a zygote, which undergoes meiosis and forms four basidiospores. The fruiting body containing basidia is a multicellular structure called **basidiocarp**. e.g. edible mushroom (*Agaricus*), Smut and Rust.

60. **Division of kingdom fungi**

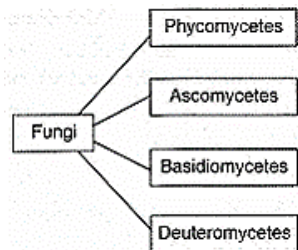
The morphology of the mycelium, mode of spore formation and fruiting bodies form the basis for the division of the kingdom into various classes.

Phycomycetes

Habit and Habitat. Members of phycomycetes are found in aquatic habitats and on decaying wood in moist and damp places or as obligate parasites on plants.

Mycelium. The mycelium is aseptate and coenocytic.

Reproduction. Asexual reproduction takes place by zoospores (motile) or by aplanospores (non-motile).



Ascomycetes

Habit and Habitat. Commonly known as sac-fungi, the ascomycetes are unicellular, e.g., yeast (*Sacharomyces*) or multicellular, e.g. *Penicillium*. They are saprophytic, decomposers, parasitic or coprophilous (growing on dung)

Mycelium. Mycelium is branched and septate.

Reproduction. The asexual spores are conidia, produced exogenously on the special mycelium called conidiophores.

Basidiomycetes

Habit and Habitat. Commonly forms of basidiomycetes are mushrooms, bracket fungi or puffballs. They grow in soil, on logs and tree stumps and in living plant bodies as parasites, e.g. rusts and smuts.

Mycelium. The mycelium is branched and septate.

Reproduction. The asexual spores are generally not found, but vegetative reproduction by fragmentation is common.

Deuteromycetes.

Habit and Habitat. Some members are saprophytes or parasites while a large number of them are decomposers of litter and help in mineral cycling. Some examples are Alternaria, Collectotrichum and Trichoderma.

Reproduction. The deuteromycetes reproduce only by asexual spores known as conidia. Their mycelium is septate and branched.

61. Peat is an accumulation of partially decayed vegetation or organic matter.

Formation of Peat: When plant material; usually in wet areas; is inhibited from decaying fully because of acidic and anaerobic conditions, it results in the formation of peat. Peat is mainly composed of wetland vegetation. Sphagnum is the main producer of peat, but many other plants may also be involved in peat formation. Most of the modern peats formed in high latitudes after the retreat of glaciers at the end of the last Ice Age. This happened about 12,000 years ago. Peat accumulation is usually slow; at a rate of 1 millimetre per year.

Peat is an important source of domestic fuel in several countries; especially in Europe and America. Peat is also used in agriculture to improve soil fertility. This is also used as water purified in septic tanks.

62. Algae reproduce asexually by a variety of spores under different environmental conditions. These spores and the conditions under which they are produced are as follows:

Type of spore	Brief description	Conditions under which it is produced
Zoospore	These are thin-walled, flagellated motile spores as they are equipped with flagella.	These are formed under favourable conditions and spread by wind.
Aplanospore	These are thin-walled, non-motile spores and lack flagella.	These are formed under unfavourable conditions.
Hypnospore	These spores have thick cell wall to tide over unfavourable conditions.	These are formed under unfavourable conditions.
Akinetes	These are formed from vegetative cells and serve as resting cells.	Formed under unfavourable conditions.
Statospores	These are similar to akinetes and are found in diatoms.	Formed under unfavourable conditions.

Section F

63. (a) Basidiomycetes

Explanation: Basidiomycetes

64. (b) I-A, II-D, III-B, IV-C

Explanation: I-A, II-D, III-B, IV-C

65. (c) Plasmogamy, Karyogamy and Meiosis

Explanation: Plasmogamy, Karyogamy and Meiosis

66. (d) I and II

Explanation: I and II

67. (b) ascomycetes and basidiomycetes

Explanation: ascomycetes and basidiomycetes

68. (a) Agaricus

Explanation: Agaricus

69. (b) All of these

Explanation: All of these

70. (d) c

Explanation: Rhizopus - wheat rush

71. **(b)** All of these

Explanation: All of these

72. **(d)** Oil and glycogen

Explanation: Oil and glycogen

73. **(d)** I and IV

Explanation: I and IV

74. **(a)** Lichens

Explanation: Lichens