

1. How is kingdom Metaphyta (plantae) classified?

Kingdom plantae is divided into:

- a) Non-vascular plants
- b) Vascular plants

2. What does Kingdom Metaphyta include?

Kingdom Metaphyta includes

- a) Multicellular algae – red algae, brown algae, green algae
- b) Bryophytes

3. What do vascular plants include?

Vascular plants include:

- a) Pteridophytes b) Gymnosperms c) Angiosperms

4. What are non-vascular plants?

The group of plants in which xylem and phloem are absent are called non-vascular plants.

5. What are vascular plants?

The group of plants in which xylem and phloem is present are called vascular plants.

6. Mention the characteristics of multi-cellular algae.

- a) Algae are autotrophic organisms.
- b) They have green pigment chlorophyll.
- c) They are major producers in marine ecosystem.
- d) They are non-vascular plants.
- e) They have a plant body called thallus.
- f) They are eukaryotic with prominent nucleus and many plastids.
- g) The cell wall is composed of cellulose and pectin.
- h) Algae reproduce by vegetative, asexual and sexual methods. Vegetative reproduction is by fragmentation of thallus. Asexual reproduction takes place by formation of spores. Sexual reproduction is by fusion of male and female gametes.

Example: Spirogyra, Ulothrix, Batrachospermum, Polysiphonia, Sargassum and Ectocarpus.

7. What is thallus?

The flat plant body of algae is called thallus.

8. Mention the pigments present in the following algae.

a) Green algae b) Red algae c) Brown algae

- a) Green algae – green pigment chlorophyll
- b) Red algae – green pigment chlorophyll, red pigment phycoerythrin.
- c) Brown algae – green pigment chlorophyll, brown pigment xanthophyll.

9. How do Multicellular algae reproduce?

Multicellular algae reproduce by vegetative, asexual and sexual methods.

Vegetative reproduction is by fragmentation of thallus in which the thallus breaks into small fragments which grow into new plant.

Asexual reproduction takes place by formation of spores.

Sexual reproduction is by fusion of male and female gametes.

10. Mention the economic importance of multicellular algae.

- a) Some species of algae are used as cattle feed.
- b) Algin, a substance obtained from brown algae is used in preparation of ice creams and chocolates.
- c) Agar, a substance obtained from Gelidium a red algae is used as a medium for culturing bacteria in the laboratory.
- d) Red algae called Porphyra is used as a condiment.
- e) Algae growing in decaying water liberate oxygen and help in purification of water.
- f) Laminaria, a brown algae is used in the production of potassium and iodine.

11. Mention the characteristics of bryophytes.

- a) Bryophytes are autotrophic organisms.
- b) They are called amphibians of plant kingdom.
- c) They have green pigment chlorophyll.
- d) They have a plant body called thallus.
- e) They have small unicellular root like extensions called rhizoids.
- f) They include two groups – liverworts and mosses.
- g) Their life cycle includes two generations – gametophytes and sporophytes.
- h) They reproduce sexually.

Ex: Riccia, Marchantia, polytrichum, funaria.

12. Give reason: Bryophytes are referred to as amphibians of plant kingdom.

Bryophytes are plants that are found both on moist land and in water. They need water for completing the life cycle. Hence they are referred to as amphibians of plant kingdom.

13. What are rhizoids?

Rhizoids are the root like extensions present in bryophytes.

14. Name the two groups of bryophytes and give one example for each group.

Bryophytes are divided into two groups:

- a) Liverworts Ex: Riccia, Marchantia
- b) Mosses Ex: Polytrichum, funaria

15. Give reason: Liverworts are called so.

Liverworts like Riccia are called so because they resemble the shape of liver.

16. Name the two generations in the life cycle of bryophytes.

The life cycle of bryophytes include two generations Gametophyte and Sporophyte.

17. What is gametophyte?

The adult plant body of a bryophyte which produces male and female gametes is called gametophyte.

18. What are antheridia and archegonia?

Antheridia are the male gamete producing structures in bryophytes/pteridophytes

Archegonia are the female gamete producing structures in bryophytes/pteridophytes.

19. What are sporophytes?

The sporophytes are diploid spore producing structures.

20. Mention the differences between gametophyte and sporophyte.

Gametophyte	Sporophyte
1. It is gamete producing structure	1. It is spore producing structure
2. It is haploid	2. It is diploid
3. It is capable of photosynthesis & can lead independent life	3. It depends on gametophyte

21. What is meant by alternation of generations in bryophytes? Explain

The process by which gametophyte and sporophyte formed alternately during the life cycle is called alternation of generations.

The life cycle of bryophyte includes two successive generations namely a haploid gametophyte and a diploid sporophyte. The adult gametophyte produces male and female gametes. The fusion of male and female gametes produces zygote which develops into a diploid sporophyte. The spores on germination produce gametophyte.

22. What are bog mosses? Where do they grow in Karnataka?

Mosses growing in marshy places are called bog mosses. They are abundant in districts of Madikeri, Chikkamagalur, Hassan and shivamogga.

23. A plant growing on moist soil has a thalloid body, rhizoids and archegonium. To which group of Metaphyta do you include it? Give one example of the group.

The plant belongs to bryophyte

Ex: Riccia, Funaria etc.

24. Write the economic importance of bryophytes.

- Mosses are used in packing flowers.
- They are used in pots for moisture retention.
- They check erosion as they form a dense mat on the soil.
- They decompose the rocks and contribute to soil formation.

25. What are Pteridophytes?

Pteridophytes are vascular plants. They are the first terrestrial plants to develop vascular tissues.

26. What are tracheophytes?

Tracheophytes are the group of plants containing vascular tissues.

27. Give reason: Pteridophytes are included under tracheophytes.

As pteridophytes have vascular tissues, they are included under tracheophytes.

28. Mention the characteristics of pteridophytes.

- a) Pteridophytes are vascular plants.
- b) They were the first terrestrial plants to develop vascular tissues.
- c) They grow in moist soil, on damp walls, cool & shady regions. The plant body can be divided into root, stem and leaves.
- d) They are commonly called ferns.
- e) The life cycle includes two generations namely gametophyte and sporophyte.
- f) The adult plant body is called sporophyte.
- g) They reproduce by asexual and sexual methods. Asexual reproduction is by spore formation. Sexual reproduction is by fusion of male and female gametes.

Ex: Nephrolepis, Selaginella, Adiantum, Lycopodium, Marsilea.

29. What is sporophyte of pteridophytes?

Sporophyte is the adult plant body in pteridophytes.

30. How do pteridophytes reproduce asexually?

Pteridophytes reproduce asexually by producing haploid spores. The spores germinate into a haploid gametophyte.

31. What is Prothallus?

Prothallus is an independent structure developed in pteridophytes which produces male and female gametes,

32. How do pteridophytes reproduce sexually?

Prothallus an independent structure produces male and female gametes called antheridia and archegonia. The gametes fuse and forms zygote developing into a sporophyte.

33. Explain alternation of generations in pteridophytes.

The process by which gametophyte and sporophyte formed alternately during the life cycle is called alternation of generations.

The life cycle of pteridophytes includes two successive generations namely a haploid gametophyte and a diploid sporophyte.

The sporophyte produces spores which germinate into haploid gametophyte called Prothallus. Fusion of male and female gametes results in zygote which develops into a sporophyte.

34. Mention the differences between bryophyte and pteridophyte.

Bryophyte	Pteridophyte
1. It is a non-vascular plant	1. It is a vascular plant
2. The adult plant body is a haploid gametophyte.	2. The adult plant body is diploid sporophyte.

35. Why is Adiantum referred to as walking fern?

When the leaves of Adiantum touch the ground, they develop roots and form a new plant. Hence it is called walking fern.

36. Mention the economic importance of pteridophytes/ferns.

- a) Ferns are grown for their ornamental value.
- b) Leaves of pteridophytes are used in making flower bouquet.
- c) Some ferns are of medicinal importance.
- d) Some ferns like horse-tail and club mosses are involved in the formation of fossil fuels like coal and petroleum.

37. What is the significant characteristic acquired by pteridophytes in the process of evolution? Give 2 examples of pteridophytes.

The significant characteristic acquired by pteridophytes is vascular tissues (xylem and phloem). Ex: Nephrolepis, Selaginella, Adiantum, Lycopodium, Marsilea

38. What are gymnosperms?

Gymnosperms are naked seed bearing vascular plants. (Gymnos=naked, sperma=seeds)

39. Why are gymnosperms referred to as naked seeded plants?

Gymnosperms produce seeds which are exposed and not enclosed in fruits. Hence they are commonly called naked seeded plants.

40. Mention the characteristics of gymnosperms.

- a) Gymnosperms are naked seed bearing vascular plants.
- b) They grow on mountain tops at low temperature.
- c) They mostly comprise of ever green trees.
- d) The plant body is a sporophyte.
- e) They produce prominent structures called cones.
- f) They reproduce by fusion of male and female gametes resulting in formation of zygote. It becomes the seed.

Ex: Cycas, pinus, araucaria, cupressus.

41. Write a brief note on cones in gymnosperms

The sporophyte of gymnosperms produce prominent structures called cones. They produce two types of cones – male cone and female cone. Male cones contain numerous microsporophylls which produce microspores that have male gametes. Female cones contain megasporophylls which produce ovule containing female gametes.

42. What are microsporophyll and megasporophyll?

Microsporophylls are the numerous structures in the male cone of gymnosperms that produce the male gametes.

Megasporophylls are the structures in the female cone of gymnosperms that produce ovule containing female gametes.

43. Distinguish between microsporophyll and megasporophyll.

Microsporophyll	Megasporophyll
They are structures that produce the male gametes called microspores	They are structures that produce female structures called megaspores.

44. What are angiosperms?

Angiosperms are a group of plants in which the seeds are enclosed in structures called fruit. (Angion=cover, sperma=seed) They are the most evolved group of plants.

45. Mention the characteristics of angiosperms.

- a) Angiosperms are group of plants in which seeds are enclosed in structure called fruit.
- b) They are the most evolved group of plants.
- c) The adult plant body is sporophyte.
- d) Flowers are the reproductive part of the plant.
- e) Flowers may be found singly or in a cluster.
- f) They are of two types monocots and dicots.

46. What is meant by inflorescence?

A special branch containing a cluster of flowers is called inflorescence.

47. Draw a neat diagram showing the structure of a typical flower and label the parts.

48. Write the male parts of a flower.

Anther and filament are the male parts of a flower.

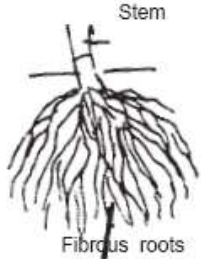
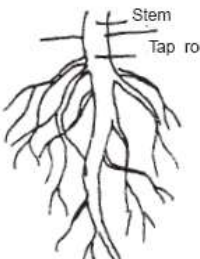
49. Write the female parts of a flower

Stigma, style and ovary are the female parts of a flower.

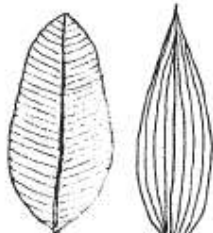
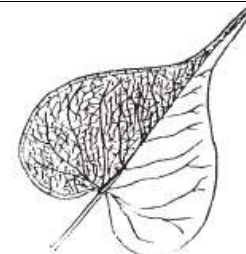
50. Distinguish between monocot and dicot seed.

Monocot seed	Dicot seed
1. Monocot seeds contain only one cotyledon.	1. Dicot seeds contain two cotyledons.
2. During germination, the cotyledons remain below the soil.	2. During germination, the cotyledons appear above the soil

51. Distinguish between root system of monocot and dicot.

Monocot root system	Dicot root system
1. They have fibrous root system	1. They have tap root system
2. The primary root is short lived	2. The primary root continues to grow throughout the life of the plant.
3. Roots develop from the base of the stem.	3. The primary root produces many secondary & tertiary branches.
	

52. Distinguish between monocot leaves and dicot leaves.

Monocot leaves	Dicot leaves
Leaves have parallel venation	Leaves have reticulate venation
	

53. Distinguish between monocot and dicot flower.

Monocot flower	Dicot flower
The floral whorls are found in multiples of three	Petals are normally in multiples of four or five

54. Distinguish between monocotyledonous and dicotyledonous plant.

Monocotyledonous plant	Dicotyledonous plant
1. Monocot seeds contain only one cotyledon.	1. Dicot seeds contain two cotyledons.
2. During germination, the cotyledons remain below the soil.	2. During germination, the cotyledons appear above the soil
3. They have fibrous root system	3. They have tap root system
4. The primary root is short lived	4. The primary root continues to grow

	throughout the life of the plant.
5. Roots develop from the base of the stem.	5. The primary root produces many secondary & tertiary branches.
6. Leaves have parallel venation	6. Leaves have reticulate venation
7. The floral whorls are found in multiples of three	7. Petals are normally in multiples of four or five
8. Vascular bundles are scattered	8. Vascular bundles are in a ring

55. Draw a neat diagram of a typical dicot plant and label the parts.

56. Classify the following into gymnosperms and angiosperms.

Wheat, pinus, bean, Cycas

Pinus, Cycas – Gymnosperms

Wheat, bean – Angiosperms

57. Write the differences between gymnosperms and angiosperms.

Gymnosperms	Angiosperms
1. They are plants in which seeds are not enclosed in fruits.	1. They are plants in which seeds are enclosed in fruits.
2. Cones are the reproductive structures	2. Flowers are the reproductive structures.

58. Give reason: It is slightly difficult to pull out a bean plant from the ground than a paddy plant.

Bean plant has taproot system with primary root and many secondary & tertiary branches which grow deep into the soil where as paddy has fibrous root in which primary root is absent.

59. Assume that a farmer cultivates jowar and toordal plants in the same plot at the same time. If there is insufficient rainfall which of the crops will dry faster? Why?

Jowar plant will dry faster because transpiration rate is more in jowar as the leaves are broader and has fibrous root system as it cannot absorb water from deeper soil.

60. How do you discriminate dicot from monocot plants as their seed start germinating?

In monocot, cotyledons remain below the soil during germination and in dicot cotyledon appear above the soil.

61. What are chordates?

Organisms characterized by the presence of a notochord are called chordates.

62. Mention the three unique characteristics of chordates.

- Presence of a solid supporting structure on the dorsal side of the body called notochord.
- Presence of dorsal, hollow, tubular nerve cord.
- Presence of openings in the pharynx called gill slits atleast in the embryonic stages.

63. What are vertebrates?

Chordates in which notochord is replaced by a vertebral column in the embryonic stage are called vertebrates.

64. How are chordates classified?

Chordates are classified into four sub phyla:

- Subphylum Hemichordata: Notochord is restricted to the anterior half of the body.
Ex: Balanoglossus.
- Subphylum Urochordata: Notochord is present only in the tail region of the larvae. It is absent in adults. Ex: Herdmania.
- Subphylum Cephalochordata: Notochord is present through the length of the body.
Ex: Amphioxus.
- Subphylum Vertebrata: Notochord is restricted only to the embryonic stage. In adults it is replaced by vertebral column.

65. What is vertebral column? State its function.

Vertebral column refers to a structure containing a series of ring like bones (vertebrae) arranged one above the other. It supports the body and provides attachment to the muscles.

66. Name the five classes under vertebrates.

- a) Class Pisces (fishes)
- b) Class Amphibia (Amphibians)
- c) Class Reptilia (Reptiles)
- d) Class Aves (Birds)
- e) Class Mammalia (Mammals)

67. Mention the characteristics of class Pisces.

- a) Members of class Pisces are commonly called fishes.
- b) They are aquatic vertebrates. They can be freshwater or marine forms.
- c) They have a streamlined body which is divided into head, trunk and tail.
- d) The body is covered by an exoskeleton composed of dermal scales.
- e) Paired and unpaired fins help in locomotion. Pair fins help in balancing.
- f) Respiratory organs are in the form of gills. Gill slits may be exposed or covered by operculum.
- g) They are cold blooded animals. Heart is two chambered with one auricle and one ventricle. It receives and pumps only de-oxygenated blood.
- h) Nervous system is well developed with a brain, a spinal cord and 10 pairs of cranial nerves.
- i) They are oviparous animals. Fertilization and development is external.
- j) They can be cartilaginous fishes or bony fishes based on the composition of endoskeleton.

Ex: Shark, Ray fish, Hippocampus, carp, Labeo etc

68. Draw a neat labelled diagram showing the external features of fish.

69. How are fishes classified based on the composition of endoskeleton? Give example.

Based on the composition of exoskeleton, fishes are classified into:

- a) Cartilaginous fishes – containing only cartilage in endoskeleton. Ex: Shark and ray fish
- b) Bony fishes – endoskeleton composed of bones Ex: Hippocampus, Carp etc.

70. A fish which has escaped from a fisherman's net has lost one of its pectoral fins. What difficulty will it face while swimming?

Pectoral fins are one of the paired fins which help in balance. So the fish would not be able to balance properly.

71. What are cold blooded / Poikilothermic animals? Give example.

Vertebrates that keep changing their body temperature according to the changes in the environment are called cold blooded or Poikilothermic animals. Ex: Fishes, amphibians, reptiles.

72. What are oviparous animals? Give example.

Animals which lay eggs are called oviparous animals. Ex: fishes, reptiles and birds.

73. What is meant by external fertilisation? Give example.

Fertilisation taking place outside the body of the organism is called external fertilisation. Ex: Fishes, frog etc.

74. Mention the economic importance of fishes.

- a) Fishes form food for humans in many countries.
- b) Oil obtained from the liver of shark and cod is rich in vitamin A and D.
- c) The dried skin of sharks is used in making polish.
- d) Fishes like Gambusia are used in biological control of mosquitoes.

75. What are amphibians?

Amphibians are the first vertebrates to appear on land.

76. Mention the characteristics of amphibians.

- a) Amphibians are the first vertebrates to appear on land.
- b) They have adaptations to live both in water and on land.
- c) The body is divided into head, trunk and tail. Tail is absent in adult stage.
- d) The skin is smooth and moist.
- e) Locomotory organs are in the form of fore and hind limbs. Fore limbs have four digits each and hind limbs have five digits each.
- f) Respiratory organs are gills in larva stage, lungs, skin in adult stage.
- g) They are cold blooded animals with a three chambered heart.
- h) Nervous system consists of brain, spinal cord and 10 pairs of cranial nerves.
- i) They are oviparous animals & fertilization is external.
- j) They exhibit metamorphosis.

Ex: Frog, Toad, Salamander, Newt, Ichthyophis (apodan)

- 77. A frog is placed for few hours in a container whose temperature is maintained at 30°C. Through which of the organs, respiration may not take place efficiently. Why?**

Respiration through skin is not efficient as it would not be moist at 30°C.

- 78. What is meant by metamorphosis?**

Metamorphosis is a series of changes that take place in some organisms from larvae stage to the adult stage.

Ex: Frog, Butterfly etc.

- 79. What are hibernation and aestivation?**

The period during which some organisms bury themselves for weeks in damp places during winter to avoid extreme temperature is called hibernation. Ex: Frog, bear etc.

The period during which some organisms bury themselves for weeks during summer is called aestivation (Summer sleep).

- 80. Mention the characteristics of class Reptilia.**

- a) Reptiles are the first true terrestrial vertebrates.
- b) Most of them are land forms and some are adapted for life in water.
- c) The body is elongated, divided into head, trunk and tail.
- d) They have an exoskeleton in the form of epidermal scales.
- e) Locomotion is by fore and hind limbs. They are pentadactyl animals.
- f) Respiration is by lungs.
- g) They are cold blooded animals. Heart is three chambered. In crocodiles ventricle is incompletely divided into two chambers.
- h) Nervous system consists of a brain, a spinal cord and 12 pairs of cranial nerves.
- i) They are oviparous animals. Fertilization is internal but development is external.

Ex: Turtles, tortoise, lizards, snakes

- 81. How are reptiles classified? OR Name the major groups of reptiles. Give example.**

Reptiles are identified into four groups:

- a) Chelonians: Turtles and tortoise.
- b) Lizards: House lizard, Chameleon, Calotes (garden lizard), Varanus (monitor lizards), Draco (flying lizard)
- c) Snakes: Viper, cobra, sea snake, Python
- d) Crocodiles and alligators.

- 82. What are pentadactyl animals?**

Animals in which have five digits each in both fore and hind limbs.

- 83. What is meant by internal fertilization?**

Fertilisation taking place inside the body of the organism is called internal fertilisation.

Ex: Tortoise, snake, crocodile etc.

- 84. Give reason: Crocodiles appear to shed tears.**

Crocodiles periodically eliminate some nitrogenous wastes in dissolved state through a pair of glands near their eyes. Hence they appear to shed tears.

85. Compare the following characteristics of amphibians and reptiles.

Characteristics	Amphibians	Reptiles
1. Skin	Soft & Moist	Hard & Dry
2. Digits in limbs	Four in fore limbs	Five in both fore & hind limbs
3. Fertilization	External	Internal

86. Raju and Rashmi observe elongated creatures in their school. Raju infers that to be a garden lizard where as Rashmi infers that to be a salamander. Help them overcome their confusion.

If the creature has a smooth and moist skin then it is an amphibian as in salamander. If the creature has dry scales then it is reptile as in garden lizard.

87. Is there any relationship between warm blooded conditions and four chambered heart?

One of the major evolutionary adaptations that allowed animals to become warm-blooded was the formation of the four-chambered heart. Four chambers mean no mixing of deoxygenated and oxygenated blood, and thus, more oxygen gets to the tissues.

88. Mention the features of class aves.

- Members of class aves are called birds.
- They are mostly aerial, capable of flying. Some are aquatic.
- They have a streamlined (boat shaped) body. The body can be divided into head, trunk and tail.
- The body is covered by feathers.
- Locomotory organs are fore and hind limbs. Fore limbs are modified into wings for flying. The hind limbs are pentadactyl.
- The respiratory organs are a pair of lungs.
- They are warm blooded animals and heart is four chambered.
- Nervous system is well developed with a brain, a spinal cord and 12 pair of cranial nerves.
- They are oviparous. Fertilization is internal and development is external.

89. Mention the functions of feather.

- Feathers provide protection.
- They maintain body temperature.
- They help in flight.
- In some birds, it helps in sexual attraction.

90. How are birds classified? Give example.

Birds are classified into two groups:

- Flying birds: Parrot, Hawk, Pigeon, Crow, Sparrow, Swan, Duck, Flamingo.
- Flightless birds: Ostrich, Kiwi, Rhea, Emu, Penguin etc.

91. What are the adaptations that enable a bird to fly? OR Make a list of the main flight adaptations in birds.

- Streamlined body
- Forelimbs modified into wings.
- Arrangement of feathers on wings to provide the lift.

- d) Presence of flight muscles.
- e) Reduced body weight.
- f) Long bones are pneumatic.
- g) Many bones in the body are fused.
- h) Absence of teeth (replaced by beak)

92. What are pneumatic bones?

Hollow, light, air filled bones of birds are called pneumatic bones.

93. In which class of vertebrates pneumatic bones are found? Mention any one of its advantage.

Pneumatic bones are found in class aves. It makes the body very light and fly without friction.

94. How are the following structures modified in a bird?

- a) Fore limbs: Fore limbs are modified into wings that help in flight.
- b) Bones: Bones are hollow, light and filled with air. This makes their body light and can fly without friction.

95. What are warm blooded or homeothermic animals?

Animals that maintain a constant body temperature, irrespective of changes in the environmental temperature are called warm blooded or homeothermic animals.

96. Mention the characteristics of class mammalia.

- a) Mammals are the most advanced group of vertebrates.
- b) They occur in a variety of habitats – terrestrial, aquatic and aerial.
- c) The body is divided into head, trunk and tail. Trunk is divided into an upper thorax and a lower abdomen separated by a diaphragm.
- d) The exoskeleton is represented by epidermal outgrowth called hairs.
- e) They are pentadactyl. Fore and hind limbs end in claws or nails.
- f) Respiratory organs are a pair of lungs.
- g) They are warm blooded and heart is four chambered. Aortic arch is on the left side.
- h) RBC are enucleate at maturity except in camels.
- i) Teeth are heterodont, embedded in sockets in jaw bones and occur in two sets during life.
- j) Nervous system is well developed with 12 pairs of cranial nerves.
- k) They are generally viviparous. Both fertilization and development takes place inside the body. A placenta is present to nourish the embryo.
- l) Mammary glands are present in females secrete milk to nourish the young ones.

Ex: Platypus, Echidna, Kangaroo, Bat, Whale, Dolphins etc

97. What is diaphragm?

Diaphragm is a muscular membrane in mammals that separate the upper thorax from the lower abdomen.

98. What are the following?

- a) Heterodont b) thecodont c) diphyodont

- a) Heterodont (from Greek, meaning 'different teeth') refers to animals which possess more than a single tooth.
- b) *Thecodont* is a type of teeth arrangement in which the teeth are embedded in the sockets of the jaws.
- c) Diphyodont refers to animals developing two successive sets of teeth, one temporary and one permanent, as in humans.

99. What are viviparous animals?

Animals which give birth to young ones are called viviparous animals. Both fertilization and development takes place inside the body of female.

100. What is the function of placenta?

The function of placenta in mammals is to nourish the embryo.

101. How are mammals classified? Give example.

Mammals are classified into three major groups:

- a) Egg laying mammals: Platypus and echidna
- b) Pouched mammals: Kangaroo, Opossum
- c) Placental mammals:
 - Flying mammals: Bats, Lemurs
 - Aquatic mammals: Whales and Dolphins
 - Carnivorous mammals: Lion, Tiger, Panther, Cat, Dog, Wolf, Fox
 - Herbivorous mammals: Elephant, Deer
 - Burrowing mammals: Rats, Rabbits, Shrews
 - Primate: Monkeys, apes and humans

102. Point out any two characteristics that support the idea that Platypus is more evolved than tortoise.

- a) Heart of Platypus is four chambered.
- b) Nervous system of Platypus has spinal nerves.

103. Mention the differences between reptiles and mammals.

Reptiles	Mammals
1. They have exoskeleton in the form of epidermal scales	1. They have exoskeleton in form of epidermal hair
2. Most of them have three chambered heart	2. They have four chambered heart
3. They are cold blooded animals	3. They are warm blooded animals
4. They are oviparous animals	4. They are viviparous animals

104. What was the need for vertebrates to evolve from oviparity to viviparity?

The two reasons for vertebrates to evolve from oviparity (Egg-laying) to viviparity (Giving live birth) are:

- a) To increase the number of successful births as in viviparity the offspring is protected by the mother whereas in oviparity eggs laid can easily be eaten by other animals. Hence viviparity is selected by natural selection and they evolved to viviparity.
- b) In oviparity the young ones developed are mostly poor as no care is given by the mother. In viviparity the young ones get full care from the mother in terms off oxygen and

nutrients so the young ones developed are healthier in viviparity. So they were selected by natural selection and were evolved to viviparity.

Characteristics	Pisces	Amphibians	Reptiles	Aves	Mammals
1. Habitat	Aquatic	Terrestrial & aquatic	Terrestrial	Terrestrial, aquatic & aerial	Terrestrial, aquatic & aerial
2. Body temperature	Cold blooded	Cold blooded	Cold blooded	Warm blooded	Warm blooded
3. Exoskeleton	Scales	Smooth & moist	Dry and Scaly	Feathers	Hairs
4. Respiratory system	Gills	Gills, lungs & skin	Lungs	Lungs	Lungs
5. Locomotory organs	Fins	Limbs	Limbs (Pentadactyl)	Fore limbs – wings Hind limbs – legs	Limbs (Pentadactyl)
6. Heart chambers	2	3	3	4	4
7. Propagation	Oviparous	Oviparous	Oviparous	Oviparous	Viviparous
8. Fertilization & Development	External	External	Internal & External	Internal & External	Internal

Fill in the blanks:

- Blue green algae are included under Kingdom Monera.
- Golden brown algae are included under Kingdom Protista.
- Marine multi-cellular algae are commonly called sea weeds (Sargassum).
- The largest of the marine multi-cellular algae are kelps which grow to about 60m in length.
- An example of kelps is Microcystus.
- The plant body of Multicellular algae is called thallus.
- Ulothrix is an example of green algae.
- The pigment present in abundance in Spirogyra/ Ulothrix is chlorophyll.
- The pigment present in abundance in Batrachospermum/Polysiphonia is Phycoerythrin.
- The red pigment present in red algae is Phycoerythrin.
- Phycoerythrin is found in abundance in red algae.
- The pigment present in abundance in Sargassum/Ectocarpus is Xanthophyll.
- The brown pigment present in brown algae is Xanthophyll.
- An example of an organism that contains Xanthophyll in excess is Ectocarpus.
- Vegetative reproduction in multicellular algae is by fragmentation of thallus.
- Bryophytes are referred to as 'Amphibians of plant kingdom'.
- The root like extensions in bryophytes is called rhizoids.
- The two groups of bryophytes are liverworts and mosses.

19. An example of liverwort is Riccia/Marchantia.
20. An example of mosses is Polytrichum/funaria.
21. A bryophyte which grows vertically to the soil surface is Polytrichum/funaria.
22. The male gamete producing structure of bryophyte is antheridia.
23. The female gamete producing structure of bryophyte is archegonia.
24. The adult plant body of bryophyte is called gametophyte.
25. Mosses growing in marshy places are called bog mosses.
26. The first terrestrial plants to develop vascular tissues are pteridophytes.
27. The group of plants which contain vascular tissues are called tracheophytes.
28. The adult plant body in pteridophytes is sporophyte.
29. The independent structure developed in pteridophytes which produces male and female gametes is Prothallus.
30. Adiantum is commonly referred to as walking fern.
31. The naked seed bearing vascular plants are gymnosperms.
32. In gymnosperms, the male gametes are produced in structures called microsporophyll.
33. In gymnosperms, the female gametes are produced in structures called megasporophyll.
34. The reproductive structures in gymnosperms are cones.
35. The group of plants in which the seeds are enclosed are called angiosperms.
36. The most evolved group of plants are angiosperms.
37. In angiosperms, the seeds are enclosed in structure called fruit.
38. The most significant feature of angiosperms is the flowers.
39. The male parts of the flower Anther and Filament.
40. The female parts of the flower are Stigma, Style and Ovary.
41. A special branch containing a cluster of flowers is called inflorescence.
42. The group of plants that bears inflorescence is Angiosperms.
43. The reproductive part of an angiosperm is flower.
44. A feature exclusive to monocots is fibrous root system.
45. Monocot plants have fibrous root system, parallel venation and floral whorls are in multiples of three.
46. Dicot plants have tap root system, reticulate venation and floral whorls are in multiples of four/five.
47. An example of a plant that has tap root system is Mustard.
48. Organisms characterized by the presence of a notochord are called chordates.
49. The solid supporting structure on the dorsal side of the body is called notochord.
50. The subphylum in which notochord is restricted to the anterior half of the body is Hemichordata.
51. The subphylum in which notochord is present only in the tail region of the larvae and absent in adults is Urochordata.
52. The subphylum in which notochord is present through the length of the body is Cephalochordata.
53. The subphylum in which notochord is restricted only to the embryonic stage is vertebrata.
54. The fins which help fishes in balancing is paired fins.
55. The respiratory organs of class Pisces are gills.
56. The heart of class Pisces is two chambered.

57. Animals which keep changing their body temperature according to the changes in the environment are called **cold blooded or Poikilothermic animals**.
58. Two chambered heart is present in class **Pisces**.
59. Fertilization and development in class Pisces is **external**.
60. Fishes receive and pump only **de-oxygenated** blood.
61. Fishes are **cold** blooded and **oviparous** animals.
62. Animals which lay eggs are called **oviparous** animals.
63. Fertilisation taking place outside the body of the organism is called **external fertilisation**.
64. A class of vertebrates in which both fertilization and development is external is **Pisces/Amphibians**.
65. **Shark** is an example of **cartilaginous** fish.
66. **Hippocampus/Carp** is an example of **bony** fish.
67. The fish used in the control of mosquitoes is **Gambusia**.
68. Rearing of fishes is called **pisciculture**.
69. The first vertebrates to appear on land are **amphibians**.
70. Skin of frog helps in **respiration**.
71. Amphibians are **Poikilothermic** and **oviparous** animals.
72. A limbless amphibian is **Ichthyophis/Apodan**.
73. Reptiles have **five** digits each in fore limbs and hind limbs.
74. In reptiles, fertilization is **internal**.
75. In some reptiles, heart is **incomplete four chambered**.
76. Among reptiles, the heart is incompletely divided into four chambers only in **crocodiles**.
77. The animal group with exoskeleton in the form of epidermal scales is **Reptiles**.
78. A class of vertebrates in which fertilization is internal and development is external is **Reptiles/Aves**.
79. The largest lizard is **Varanus**.
80. The forelimbs of class aves are modified into **wings**.
81. Air filled bones of birds are called **pneumatic** bones.
82. Aortic arch in birds is on **right side**.
83. Number of cranial nerves in birds is **12 pairs**.
84. The smallest bird is **humming bird**.
85. A bird capable of flying backwards is **humming bird**.
86. The largest bird is **Ostrich**.
87. An aquatic flightless bird is **Penguin**.
88. A migratory bird that can fly non-stop flight of more than 18,000km is **Arctic tern**.
89. The arrangement of colourful feathers in male birds to attract females is called **Plumage**.
90. The muscular membrane that divides the upper thorax and the abdominal cavities in mammals is **diaphragm**.
91. The diaphragm which separates **thorax** and **abdomen** is a **muscular membrane**.
92. A vertebrate having a diaphragm is **Bat**.
93. In mammals, aortic arch is on the **left** side.
94. Mammals are warm blooded animals, so their body temperature **remains constant**.
95. The part which nourishes the embryo is **placenta**.
96. Mammals are **warm** blooded and **viviparous** animals.

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97. An example of a flying mammal is bat.
 98. The largest mammal is whale.
 99. An egg laying mammal is Platypus/Echidna.
 100. A pouched mammal is Kangaroo/Opossum.
 101. The largest land mammal is Elephant.
