

ADDITIONAL QUESTIONS ANSWERS**THE LIVING WORLD****1. How do you differentiate between growth in a living organism and non-living object?**

A: Increase in size is called growth.

- 1) In living beings, growth takes place by increase in number of cells from inside the body. Hence it is growth from inside. In animals growth is limited whereas in plants it is unlimited.
- 2) In non-living objects, growth takes place by the accretion of matter from outside.

2. Distinguish between embryology and ethology.

A:	Embryology	Ethology
	1) Embryology is the study of development of an embryo. 2) It involves fertilization, zygote formation, cleavage (early divisions of zygote) and development of organs from zygote.	1) Ethology is study of behaviour of animals. 2) It involves observation, recording, analysis of functions of animals in relation to ecological, physiological and evolutionary aspects.

3. In a given area, remains of animal that lived in the remote past are excavated for study. Which branch of science is it called?

A: Paleontology. (Specifically Paleozoology)

4. 'Zoos are tools for classification' Explain.

- A:**
- 1) Zoo is place where wild animals and birds are kept under the care of man with restricted movement.
 - 2) It helps to study external characters, feeding habits, behaviour of the animals. It helps to determine their systematic position in animal kingdom. Hence zoos are tools for classification.

5. Where and how do we preserve skeletons of animals, dry specimens etc?

- A:**
- 1) Skeletons and dry specimens are kept in museum.
 - 2) The skeletons are cleaned, bleached and articulated, whereas the specimens are stuffed (Taxidermy) before exhibition.

6. Nematode is a protostomian but not a eucoelomate. Justify the statement.

- A:**
- 1) In nematodes the blastopore becomes the mouth and hence protostomia.
 - 2) The coelom is not a true coelom because it develops from blastocoel (cavity of blastula) and not surrounded by mesoderm. It is a pseudocoel.

7. The body of sponges does not possess tissue level of organization, though it is made up of thousands of cells. Comment on it.

- A:**
- 1) The body of sponges is made up of thousands of cells.
 - 2) But there is no co-ordination between cell layers because nerve and sensory cells are absent.
 - 3) Also they are arranged as loose cell aggregates and they do not form tissues.
 - 4) So, sponges belong to cellular level of organisation, but not tissue level.
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8. What is 'tissue' level of organisation among animals? Which metazoans do exhibit this organisation?

- A:**
- 1) In animals, the cells which perform the same function are arranged into tissues.
 - 2) There is cellular co-ordination and it is due to the presence of nerve and sensory cells.
 - 3) The metazoans which exhibit tissue level of organisation is **Cnidaria**.
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9. Animals exhibiting which level of organisation lead relatively more efficient way of life when compared to those of the other levels of organisation? Why?

- A:**
- 1) Animals exhibiting 'organ level of organisation' lead relatively more efficient way of life.
 - 2) **Reason:** In this level, highly specialised sensory and nerve cells are present.
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10. Radial symmetry is an advantage to the sessile or slow moving organisms. Justify this statement.

- A:**
- 1) Animals having radial symmetry live in water and they receive stimuli from any direction.
 - 2) Accordingly, they can respond equally to any stimuli that come from all directions.
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11. If the mesentoblast cell is removed in the early embryonic development of protostomes, what would be the fate of such animals?

- A:** If Mesentoblast is removed then
- 1) Mesoderm between ectoderm and endoderm does not form.
 - 2) Mesodermal organs do not develop.
 - 3) True body cavity does not appear.
 - 4) Hence, the animal cannot survive.

ANIMAL TISSUES

12. Differentiate between merocrine and apocrine glands. Give one example to each.

A:	Merocrine glands	Apocrine Glands
	1) The secretory granules are released without the loss of any part of the cell. 2) Secretion occurs by exocytosis, and the cell remains intact. Ex: Pancreas	1) The apical part of the cell is pinched off along with the secretory product. 2) A portion of the cell cytoplasm is lost during secretion. Ex: Mammary glands

13. Differentiate between simple and compound glands. Give one example to each.

A:	Simple Glands	Compound Glands
	1) Have one straight, unbranched duct. 2) The secretory unit may be tubular or acinar (alveolar). Ex: Sweat glands	1) Have multiple branched ducts. 2) The secretory units may be tubular, acinar, alveolar, or mixed (tubulo-alveolar). 3) Ex: Salivary glands

14. Distinguish between brown fat and white fat.

A:	Brown Fat	White fat
	1) Brown fat is found in foetus and infants. 2) Brown fat is metabolically active. 3) Adipocyte has several lipid droplets.	1) White fat is found in adults. 2) White fat is metabolically inactive. 3) Adipocyte has a single large lipid droplet.

15. Distinguish between polycythemia and leukemia.

A:	Polycythemia	Leukemia
	1) It is a disorder characterized by an abnormal increase in the number of red blood cells (RBCs). 2) It primarily affects the red blood cells. 3) Symptoms include headache, dizziness, high blood pressure and increased risk of blood clots.	1) It is a type of blood cancer characterized by an abnormal increase in white blood cells (WBCs). 2) It primarily affects the white blood cells. 3) Symptoms include fatigue, frequent infections, anemia and abnormal bleeding.

16. Differentiate between a sensory neuron and a motor neuron.

A: Sensory neurons (afferent neurons) carry sensory impulses from the receptors to the CNS. Sensory neurons have a long dendron and short axon,

Motor neurons (efferent neurons) carry motor impulses from CNS to the 'effector organs' such as muscles, glands, etc. Motor neurons have short dendrites and a long axon.

ANIMAL DIVERSITY-I

17. What physical feature pertaining to the organism and its medium do you notice in a sponge body from which sponges can be/were identified as animals and not plants? What do you call the region in the sponge body in which you noticed that feature?

- A:** 1) Sponges are identified as animals due to the presence of **Osculum**.
2) It is present at the anterior free end of the sponge, which acts as **exit** for transport of water.

18. What are the different structures that makeup the internal skeleton of a sponge? What are the chemicals involved in the formation of these structures?

- A:** 1) Internal skeleton of sponges is madeup of spicules and spongin fibres.
2) Calcareous spicules are madeup of calcium carbonate.
3) Siliceous spicules are madeup of silicon dioxide.
4) Spongin fibres are madeup of protein.

19. What are the two chief morphological 'body forms' of cnidarians? What are their chief functions?

- A:** 1) The chief morphological body forms of cnidarians are (i) Medusa form (ii) Polyp form
2) Chief function of medusoid form is reproduction and polypoid form is nutrition.

20. What is the cnidarian group with quantitatively/relatively large mesoglea? What is the significance of such a well developed mesoglea pertaining to the aquatic life of that group?

- A:** 1) Cnidarian group with relatively large mesoglea is Scyphozoa. Ex: Jelly Fish
2) Such a well developed mesoglea helps in the buoyancy to afloat the organism in water.

21. What is the chief difference between the hydrozoans and the rest of the cnidarians regarding the germinal layer(s) in which its 'defensive structures or cells of defence' occur?

- A:** 1) The defence cells in cnidaria are cnidocytes or stinging cells.
2) In hydrozoans, the cnidocytes are present only in ectoderm.
3) But in the rest of the cnidarians, the cnidocytes occur both in ectoderm and endoderm

22. What is the essential difference between a 'flat worm' and a 'round worm' with reference to the perivisceral area of their bodies?

- A:** 1) In flatworms, perivisceral area is filled with parenchyma, so it is called acoelom.
2) But in nematodes, perivisceral area is present, but it is not derived from mesoderm, so it is called pseudocoelom.

23. How do you account for the origin of the perivisceral space in the body of a nematode and an annelid?

- A:** 1) The space around the visceral organs in triploblastic animals is called perivisceral space.
2) In nematodes the mesoderm is restricted to ectoderm.
3) The remaining perivisceral space is blastocoel. It is not a true coelom. It is a pseudocoel.
4) In Annelids the perivisceral space is formed by the splitting of mesoderm. It is true coelome as it is lined by peritonim.

24. What is the metamerism? What is the essential difference between the mode of formation of individual morphological body units of a tapeworm and those of an earthworm?

- A:** 1) **Metamerism:** The linear segmentation of the body into morphological units (metamers) along the antero-posterior axis of the body is called metamerism.
2) In tape worm, individual morphological body units are formed from the neck (the anterior end)
3) But in earthworms, they are originated from the posterior end.

25. How do you distinguish a 'hirudinean' from the rest of the annelids, based on the morphological features pertaining to metamerism? How does the coelom of a leech differ from the coelom of an earthworm with reference to its contents.

- A:** 1) Hirudineans have definite number of body segments, but in rest of the annelids, the number of segments is not definite.
2) Coelom in leeches is filled with botryoidal tissue which is absent in the coelom of earthworm.

26. What is the difference between the epidermis of a nematode and that of an annelid? How does a nematode differ from an annelid with reference to the musculature of the body wall?

- A:** 1) The epidermis of nematode is syncytial (multi-nucleated state) whereas the epidermis of an annelid is made up of single layer of columnar epithelial cells.
2) Circular muscles are absent in the musculature of the body wall of a nematode, whereas that of an annelid consists of both circular and longitudinal muscles in its body wall.

27. What is the uniqueness about the first two pairs of cephalic appendages of a crustacean compared to those of the other extant arthropods/?

- A:** 1) The first two pairs of cephalic appendages are antennules and antennae.
2) In other groups only antennae are present and Antennules are absent.

28. What is the sub-phylum to which 'ticks' and 'mites' belong? How do you distinguish them from the insects with reference to their walking legs?

- A:** 1) Ticks and mites belong to the subphylum chelicerata.

29. What do you call the perivisceral cavity of an arthropod? Where from is it derived during development?

- A:** 1) Perivisceral cavity of an arthropod is called haemocoel. It is not completely a true coelom.
2) Most of it is derived from blastocoel and filled with blood.

30. What is the other name for the gill of a mollusc? What is the function of osphradium?

- A:** 1) The gill of mollusc is also called Ctenidium.
2) Osphradium is a water testing organ present in bivalves and gastropods.

ANIMAL DIVERSITY-II

31. Name the structures that appeared for the first time in amphibians, in the course of evolution.

- A:** The structures that appeared for the first time in Amphibians during the course of evolution are
- 1) Tympanum (to receive sounds that come through air)
 - 2) Harderian glands (to keep the eyes moist)
 - 3) Lacrimal glands (to keep the eyes moist)
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32. Which is called 'force pump' in frog? Why is it named so?

- A:**
- 1) The bucco-pharyngeal cavity of frog acts like force pump during respiration. When the floor of the buccal cavity is raised the air passes through glottis into lung with force (inspiration)
 - 2) During expiration the floor of buccal cavity is lowered and the air goes out
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33. What are corporabigemina? Mention their chief function.

- A:**
- 1) The two optic lobes present in the mid brain of frog are called corporabigemina.
 - 2) They are centers of sense of sight.
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34. Distinguish between mesorchium and mesovarium.

- A:**
- 1) **Mesorchium:** In male frog, testes are attached to the kidney and dorsal body wall by a double fold of peritoneum called mesorchium.
 - 2) **Mesovarium:** In female frog, the ovaries are attached to the kidneys and dorsal body wall by a double fold of peritoneum called mesovarium.
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35. What are the "Golden ages" of the first jawed vertebrates and the first amniotes?

- A:**
- 1) Fishes are first jawed vertebrates.
 - 2) Devonian period is golden age of fishes.
 - 3) The first amniotes are reptiles.
 - 4) Mesozoic Era is golden age of reptiles.
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36. In which features does the skin of a reptile differ from that of a frog.

- A:**
- 1) The skin of reptile is rough, dry and scaly.
 - 2) The skin of frog is smooth, moist and without scales.
 - 3) Exoskeleton is absent in frog and present in reptiles.
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37. Describe a cat and a lizard on the basis of their chief nitrogenous wastes excreted.

- A:**
- 1) Cat is a mammal. Mammals excrete urea. Cat is ureotelic.
 - 2) Lizard is reptile. Reptiles excrete uric acid. So lizard is uricotelic.

38. What is continuous oxygenation of the blood? How is it made possible in birds?

- A:**
- 1) A bird lung receives a constant supply of fresh air during inhalation and exhalation.
 - 2) Hence continuous oxidation of blood happens.
 - 3) This is possible due to the presence of 9 air sacs in the lungs of birds.
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39. Distinguish between crop and the gizzard in birds.

- A:**
- 1) **Crop:** In Birds, the oesophagus dilates into a sac called crop. It stores the food.
 - 2) **Gizzard:** In birds, the muscular hind part of stomach is called Gizzard. It grinds the food.
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40. In which group of animals do we find three ear ossicles on each side and what are their names from the inner most to the outer most?

- A:**
- 1) The three ear ossicles are present in mammals.
 - 2) Their names from inside to outside are stapes, incus and malleus.
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41. Name the characteristic type of vertebrae found in reptiles, birds and mammals.

- A:**
- 1) The characteric vertebrae of reptiles are procoelous.
 - 2) The characteristic vertebrae of birds are heterocoelous
 - 3) The mammalian vertebrae are amphiplatyan.
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42. Name the vertebrate groups in which 'renal portal system' is absent.

- A:** Renal portal system is absent in cyclostomata and mammalia.

BIOLOGY IN HUMAN WELFARE

43. Distinguish between vector and a reservoir host.

A:	Vector	Reservoir
	1) Vector is an organism that transfers the infective stages of a parasite from one host to other. 2) Ex: Houseflies, Cockroaches.	1) Reservoir is the host that lodges the parasitic stages without getting infection. 2) Ex: Monkey for plasmodium, African antelope for Trypanosoma

44. Distinguish between mechanical vector and biological vector.

A:	Mechanical vector	Biological vector
	1) Mechanical vector is a simple carrier of infective stage of parasite. 2) Ex: Houseflies and Cockroaches for Entamoeba.	1) Biological vector is an organism in which part of life cycle of parasite takes place. 2) Ex: Female culex for wuchereria

45. What is hypertrophy? Give example.

A: Hypertrophy: Some parasites cause an abnormal increase in the volume/size of the infected host cells. This effect is called hypertrophy.

Ex: RBC of man infected by Plasmodium

46. What is hyperplasia? Give example.

A: Hyperplasia: Some parasites cause increase in the number of cells. This effect is called hyperplasia. **Ex:** Fasciola hepatica in the bile duct of sheep

47. Define the most accurate definition of the term 'health' and write any two factors that affect the health.

- A:**
- 1) **Health** is state of complete physical, mental and social well being, not merely absence of any disease or absence of physical fitness.
 - 2) The factors affect that health are
 - (i) Genetic disorders
 - (ii) infections
 - (iii) Life style

48. Distinguish between infectious and non-infectious diseases. Give two examples each.

A: 1) **Infectious diseases:** The diseases that are easily transmitted from one person to other are called infectious diseases. They are caused by pathogens.

Ex: Amoebic dysentery, Malaria, Typhoid, Common cold, Ringworm etc.

2) **Non-infectious diseases:** The diseases that are not transmitted from one person to other and not caused by pathogens.

Ex: Heart problems, Kidney problems and genetic disorders.

49. Distinguish between precystic stage and cystic stage of E.histolytica.

A:	Precystic stage	Cystic stage
	1) It is spherical, non-motile form. Not surrounded by cystic wall.	1) It is round and surrounded by delicate thin walled resistant cyst wall.
	2) It has single nucleus, which doesnot undergo any division.	2) Its nucleus undergoes successive mitotic divisions.

50. On the advice of a doctor, a patient has gone to a clinical laboratory for the examination of a sample of faeces. The lab technician, on observing the stool of the patient diagnosed that the patient was suffering from amoebiasis. Write any two characteristic features based on which the technician came to that conclusion.

A: Amoebiasis indicators in stools are (i) Tetranucleate cysts (ii) Blood corpuscles.

51. Define 'asymptomatic cyst passers' with reference to Entamoeba histolytica.

A: Asymptomatic cyst passers are people who lodge the parasite 'Entamoeba histolytica' in their intestine without exhibiting any symptoms of amoebiasis. They are just carriers.

52. What are the stages of Plasmodium vivax that infect the hepatocytes of man?

A: The stages of plasmodium that infect liver cells are (i) sporozoites (ii) Cryptozoites

53. What are Schuffner's dots? What is their significance?

A: 1) Schuffner's dots are small red coloured dots, appear in the cytoplasm of RBC when the parasite is in schizont stage of erythrocytic cycle.

2) They are supposed to be the antigens released by plasmodium. The parasite develops immunity against these antibodies.

54. What is ookinete? Based on the 'sets of chromosomes' how do you describe it?

A: 1) Long, slender, motile vermiform structure of Plasmodium formed in the lumen of crop of female Anopheles mosquito during sexual life cycle of plasmodium is called ookinete.

2) Ookinete is a diploid stage which contains two sets of chromosomes.

55. A person is suffering from chills and shivering and high temperature. These symptoms are cyclically followed by profuse sweating and return to normal body temperature. Based on these symptoms, name the disease and its causative organism.

A: The disease is malaria. The causative organism is plasmodium.

56. Describe the methods of biological control of mosquitoes.

A: **Methods of Biological control of mosquitoes:**

- (i) Spraying insecticides like DDT, BHC at mosquito breeding places.
- (ii) Introduction of larvivorous fishes like Gambusia.
- (iii) Introduction insectivorous plants like utricularia.
- (iv) Spraying of kerosene, pyrethrum oil on stagnant waters.

57. 'Elephantiasis is the terminal condition of filariasis'. Justify.

A: Elephantiasis is caused by filarial parasite. It is the last stage of the disease.

The stages are

- (i) Headache, depression and rise of temperature. (ii) Lymphangitis.
- (iii) Lymphadenitis. (iv) Blocking of lymph vessels.
- (v) Elephantiasis is the ultimate stage.

58. 'Many secondary metabolites of plants have medicinal properties. It is their misuse that creates problems'. Justify the statement with an example.

A: 1) Secondary metabolites show various medicinal properties.
2) When they are misused, they can create problems in physical or psychological functions of the person leading to mental illness like depression, insomnia etc.

59. Why are cannabinoids and anabolic steroids banned in sports and games?

A: 1) Cannabinoid and anabolic drugs are called steroid drugs.
2) They mimic the effect of testosterone and dihydro testosterone. They increase protein synthesis which develop muscular tissue enhancing the performance of sportsmen. So they are banned.

60. Mention the names of any four drugs which are used as medicines to treat patients with mental illness like depression, insomnia, etc. that are often abused.

A: Drugs used to treat mental illness are

(i) Lysergic acid diethyl amide(LSD)	(ii) Benzodiazepines(tranquilizers)
(iii) Barbiturates (sleeping pills)	(iv) Amphetamines

61. Name the viurs (group of virus) causes common cold and mention the infected organs.

A: 1) The common cold is mainly caused by **Rhinovirus** (a group of viruses called rhinoviruses).
2) It infects the nose and upper respiratory tract, especially the nasal passages and throat but not lungs.

62. How is ringworm transmitted to someone? Name the fungi causes ringworm.

A: 1) **Mode of infection:** Contamination by using towels, clothes or combs of the infected persons or even from soil.
2) It is caused by many fungi belonging to the genera **Microsporum, Trichophyton and Epidermophyton**.

ECOLOGY AND BIODIVERSITY

63. Define the term ecology and its branches.

- A:** 1) **Ecology** is defined as "the study of the relationship of organisms with their environment".
 2) **It has two main branches:**
 i) Autecology- Ecology of one species or population in relation to its environment.
 ii) Synecology- It is the study of the structure, development and distribution ecological communities.

64. What is an ecological population?

- A:** 1) **Ecological population** is the population of a group of organisms of same species living in a specific area at a specific time.
 2) **Ex:** Species of catla catla living in a pond at a given time is catla population.

65. Distinguish between ecosystem and biome.

- A:** 1) **Ecosystem** is a functional unit of biological community. It is generally small.
Ex: Aquarium, Pond etc.
 2) **Biome** is a large community of plants and animals. It occupies a vast region.
Ex: Desert, rain forest, tundra

66. What is meant by ecosphere?

- A:** 1) **Ecosphere** (or biosphere) includes all the habitable zones of earth. It is the part of earth that supports life.
 2) It extends upto several kilometers into air and several meters below the earth surface and deep into bottom of the oceans.

67. Explain the difference between the 'niche' of an organism and its 'habitat'.

A:	Niche	Habitat
	1) Niche is the functional role of the organism in the ecosystem.	1) Habitat is a place where an organism lives in the ecosystem
	2) It is just like occupation of a person.	2) It is just like address of a person.
	3) Ex: Rose bush is a producer.	3) Ex: Habitat of a fish in a pond or lake.

68. A population has more genetically similar organisms than those on biotic community. Justify the statement.

- A:** 1) Population is a group of similar organisms belonging to the same species with a similar karyotype (genetic unit). So, in a population there are **more** genetically similar organisms.
 2) A community is an association of populations of two or more species with different karyotypes in a particular area. So, in a community there are **less** genetically similar organisms.

69. How do the fish living in Antarctic waters manage to keep their body fluids from freezing?

- A:** Fish living in Antarctic water manage their body fluids from freezing
- By staying in deeper zones, where temperature is above freezing point i.e., above 4°C
 - They reduce their oxygen consumption by reducing metabolic rate.
 - They produce an antifreezing protein called antifreeze glyco-protein (AFGP). It prevents the growth of ice crystals in their body fluids which prevents their body fluids from freezing.

70. How does your body solve the problem of altitude sickness, when you ascend tall mountains?

- A:**
- At high altitudes like tall mountains, the partial pressure of oxygen is low due to the low atmospheric pressure.
 - The body compensates the low oxygen availability by increasing the RBC count and increasing the rate of breathing.

71. What is the effect of light on body pigmentation?

- A:**
- Light influences the colour of the skin. Animals living in low intensity light are pale in colour and animals living in high intensity of light are dark coloured.
 - Proteus anguinus* is pale coloured when in caves. When it is brought into sunlight, skin colour becomes dark over a period of time.

72. What are 'regulators'?

- A:** **Regulators** are the animals which maintain constant body temperature and osmotic concentration. Thus they maintain homeostasis by physiological or behavioral means. **Ex:** Birds and mammals.

73. What are 'conformers'?

- A:**
- Conformers** are the animals whose body temperature changes according to the surrounding temperature. **Ex:** Invertebrates and lower vertebrates.
 - In aquatic conformers, their osmotic concentration changes along with surround water.

74. Define commensalism. Give one example.

- A:**
- Commensalism** is a type of interaction between different species in which one is benefited and the other is neither benefited nor harmed.
 - Ex:** Barnacles growing on the back of a whale benefit, while the whale derives no noticeable benefit.

75. Differentiate between Amensalism and Predation.

A:	Amensalism	Predation
	Amensalism: It is a type of interaction between different species in which one is harmed and the other is not affected. Ex: Ibex and weevils on the plant.	- Predation is a feeding strategy, between two different species in which predator gets benefited at the cost of the prey. Ex : Lion (Predator) & Deer(Prey).

76. What is meant by interspecific competition? Give one example.

- A:** 1) **Inter specific competition** is the competition between different species for the same resource.
Ex: Flamingoes and fishes. Both of them compete for the same food that is zoo plankton.
- 2) When one species is efficient in collecting food then the other species gets eliminated.
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77. What is zone of compensation in an aquatic ecosystem?

- A:** 1) **Zone of compensation:** The imaginary line that separates the limnetic zone from profundal zone is called zone of compensation. It is the zone of effective light penetration.
- 2) In the zone of compensation, rate of photosynthesis equals to rate of respiration.
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78. Distinguish between phytoplankton and zooplankton.

- A:** 1) Floating micro organisms with chlorophyll are called phytoplankton.
Ex: Diatoms, green algae, Euglenoids and dinoflagellates.
- 2) Floating micro organisms without chlorophyll are called zooplankton.
Ex: Water fleas, rotifers and ostracoids.
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79. What is periphyton?

- A:** 1) The animals that live on or attached to aquatic plants are called **periphyton**.
- 2) **Ex:** Bryozoans, turbellarians, hydras, nymphs of insects.
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80. Write three examples for man-made ecosystems.

- A:** Man-made artificial ecosystems are
- 1) Cropland ecosystem
 - 2) Aquaculture ponds
 - 3) Aquaria
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81. Explain the process of 'leaching'.

- A:** **Leaching** is the process in which water soluble inorganic nutrients go down into the soil and get precipitated as unavailable salts.
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82. Define entropy.

- A:** 1) **Entropy** is the degraded **unavailable heat energy** for work.
- 2) According to second law of thermodynamics, 'energy loss' is inevitable in any energy changing process. Thus some amount of energy is converted into unused heat energy.
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83. What is standing crop?

- A:** 1) **Standing crop** is the mass of living material at a particular time at each trophic level.
- 2) It is measured as the number of organisms per unit area.

84. Explain the terms GPP, NPP.

- A:** 1) GPP is Gross Primary Productivity. It is rate of productivity organic matter during photosynthesis.
 2) NPP is Net Primary Productivity. It is gross primary productivity minus respiratory loss(R).
 Thus, $N.P.P = G.P.P - R$.

85. Distinguish between upright and inverted ecological pyramids.

A: Upright pyramid	Inverted pyramid
1) The ecological pyramid in which the number, biomass, energy decrease from lower to higher trophic levels is called upright pyramid . 2) Ex: Pyramid of energy.	1) The ecological pyramid in which the number, biomass, increase from lower to higher trophic levels is called inverted pyramid . 2) Ex: Pyramid of numbers in parasitic food chain.

86. Distinguish between litter and detritus.

A: Litter	Detritus
Litter is simply the scattered fallen leaves and broken twigs. It serves as the raw material for decomposition.	Detritus is humus formed of dead animals, leaves and animal excreta. It provides nutrients and energy to decomposers and detritivores.

87. Distinguish between primary and secondary productivity.

A: Primary productivity	Secondary productivity
Primary productivity is defined as the amount of biomass or organic matter produced per unit area over a period of time by plants during photosynthesis.	Secondary productivity is defined as the rate of formation of new organic matter by consumers by utilizing primary productivity of the producers.

88. What is ecological diversity? Mention the different types of ecological diversities.

- A:** 1) **Ecological diversity** is diversity at the level of Ecosystems.
Ex: Deserts, Rain forests, Mangroves.
- 2) **Types of Ecological diversities:**
- Alpha diversity - based on number of species or taxa.
 - Beta diversity - based on endemic species between two adjacent ecosystems.
 - Gamma diversity- overall diversity of various ecosystems in an ecological region with natural boundaries.

89. Invasion of an Alien species leads to extinction of native species. Justify this with two examples.

- A:**
- 1) Introduction of Nile perch in 'lake Victoria' caused the extinction of 200 species of cichlid fishes.
 - 2) Introduction of 'African catfish' reduced the number of indigenous cat fish.
The cichlid fishes and indigenous cat fishes could not stand in the competition of alien species.