

BT101 - ECOLOGY, BIODIVERSITY & EVOLUTION-I

ALL OBJECTIVES & SUBJECTIVES FROM PAST FILES FOR FINAL TERM

: ANAYA | : ARHAM (+923351328979) | : AIZA WRITES



OBJECTIVES

1. Components of ecology are ____ **6**
2. Rate at new organic matter formed in all herbivores____ **Secondary Productivity.**
3. Types of ecological pyramids are____ **3**
4. Lotic system example is.....**Springs**
5. Leaching is present in which zone of soil..... **A-Horizon**
6. Marine water ecosystem is a great source of____ **Biodiversity**
7. Lichens and mosses are the example of? **Primary Succession.**
8. Human eye can detect electromagnetic radiations of wavelength range **380-760nm.**
9. Fjords Mostly found in?..... **Norway**.
10. Organisms that feed on large chunks of dead and decaying organic matters are known as____ **Scavengers.**
11. External mechanical force of terrestrial plants is **Wind**
12. The external factors which control the ecosystem are ----- of internal factors **Independent**
13. Fungi is ____ decomposer **Primary**
14. The orientation toward a factor is called ____ **Taxis**
15. When a population reach a ____ there are more individual trying to use the same quantity of resource____ **High Density**
16. Complexity of ecosystem make it more _____ **Stable**
17. Camouflage use of any combination of _____ **Coloration**
18. Near the surface of earth ozone concentration about ppm____ **0.04-0.15**
19. The total average height of troposphere is _____ **13km**
20. Adult human body contain ____ of water_____ **60%**
21. What is the example of chemotrophs? _____ **Microbes**
22. Food of giraffe per day may be____ **75 Pounds**
23. HAB stands for ____ **Harmful Algal Bloom**
24. Which process is involved in soil formation ____ **Weathering?**
25. Population diversity of lager organisms _____ **Low**
26. Process of emigration cause.... **Decrease in Population**
27. The term ecology was derived by.... **Ernst Hackle In 1866**
28. Plants capture % of solar energy....**1%**
29. The top most mineral horizon, often referred to as top soil.... **A-Horizon**
30. zones of lentic water bodies....**4**
31. Fat which gives energy to animal's brain and hearts..... **Brown Fat**



32. Depending upon cell structure organisms are of ____ types ____ **2**
33. The rate that new organic matter by means of individual growth and reproduction in all herbivores ____ **Gross Productivity**.
34. Variety of tools to track size of population in one tool ____ **Survivorship Curve**
35. 541 million years ago O₂ made stable of atmosphere ____ **15%**
36. Region with identical climate have fauna and flora according to Buffon's law ____ **Different**
37. Natural selection variation from a population by favouring one allele over other at a gene locus ____ **Odd**
38. First vertebrates possess amitotic eggs ____ **Reptile**
39. Toxoplasmosis caused by toxoplasma virulent in immune suppressed individually ____ **AIDS**
40. Rate at new organic matter formed in all herbivores ____ **Secondary Productivity**
41. Example of winter sleep ____ **Bear**
42. Speciation occurs in single population ____ **Sympatric**
43. ____ % volume of water belongs to sea water: **97%**
44. Species of red kangaroo..... **Native Specie**
45. Rocky part of earth is called **Crust**
46. Occupation of species is called.... **Niche**
47. Carnivorous fishes possess..... **Long Stomach and Short Intestine.**
48. A deep fast flowing freshwater body... **River**
49. The process in which soil is formed.... **Soil Formation**
50. Normal body temperature of birds is, **105°F.**
51. Optimum temperature of human body is..... **37°C**
52. Oligotrophic lakes have ____ **Low Nutrients**
53. Lake having excessive amounts of dissolved nutrient ____ **Hypertrophic Lake**
54. Trophic means ____ **Food**
55. Abyssal zone temperature is ____ **3-4°C.**
56. Diversity which reflects the biological complexity of ecosystem ____ **Functional Diversity**
57. Best example of scavengers is..... **Vultures**
58. Human population at present it is about **7.4 Billion.**
59. Blind Indus dolphin is an example of.... **Endemic Species**
60. Deliberately or accidentally introduced into an ecosystem..... **Non-Native Species.**
61. Hibernating animals possess..... **Low Metabolic Rate**
62. Pisaster is an example of..... **Keystone Specie**
63. Species are introduced in the environment in ____ ways: **2**
64. Evolutionary changes weather over long period of rapid are result or change in makeup ____ **Genetic**



65. ----- are characteristics that increase the potential of an organism or species to successfully reproduce in a specified environment. _____ **Adaptation**
66. Extinct hippopotamus like animals now called _____ **Taxodone**
67. This process of evaporation through plant leave is called ----- **Transpiration**
68. Oxygen atom form _____ **Ozone**
69. Cladogram depict the sequence in the of derived characters----- **Origin**
70. They engulf food by _____ using pseudopodia _____ **Phagocytosis**
71. The total average height of the troposphere is _____ **13 Km**
72. Form of precipitations that is ----- acidic. It has elevated levels of hydrogen ions low ph._____ **Unusually**
73. Genomic DNA sequence of an Archaean and ----- were first compared in 1996 _____ **Bacterium**
74. Animal changes its color rapidly _____ **Chameleon**
75. Above thermosphere is _____ **Exosphere**
76. Symbiosis relationship between _____ **Different Species**
77. Bird voice box _____ **Syrinx**
78. Extinct hippopotamus like _____ **Taxodone**
79. Sense organs widely dispersed in _____ **Annelida**
80. Camouflage use of any combination of materials coloration or _____ **Illumination**
81. ----- Rapidly changes its color. _____ **Chameleon**
82. Near the surface ozone concentrations about _____ **0.04-0.15ppm**
83. Animal use----- energy to make organic molecules _____ **Chemical Energy**
84. Ionosphere produced in ----- **Thermosphere**
85. Lysosome were discovered by the Belgian cytologist de duve in -----by **1950s**
86. The net-----of direct and indirect relationship is called tropic cascades _____ **Effect**
87. There can be outflow or inflow _____ in a gene pool. _____ **Genes**
88. The second major layer of Earth's atmosphere is _____ **Stratosphere**
89. Two or more species living in same habitat reciprocally_ each other evolution **Affect**
90. Consumers of plants are _____ and physiologically adapted to eating plant material _____ **Anatomically**
91. Y axis is a logarithmic plot of numbers of survivors X axis is a linear plot _____ **Age**
92. Conditions in the reproductive _of a female may not support the sperm of male. **Tract**
93. Major mechanism through which genetic material is generated during molecular evolution. _____ **New**
94. He joined ----- of medicine Scotland in 1825 but he was not interested in being physician. _____ **School**
95. Ventral gland cells called _____ **Ronette**
96. Domain eukaryote evolved _____ billion years ago _____ **2.7**
97. -----was first isolated and named in 1817 _____ **Chloroplast**



98. What is the example of chemoautotroph _____ **Microbes? Mussels**
99. The rate that new organic matter is made by means of individual growth and reproduction in all the herbivores _____ **Secondary Productivity**
100. Variety of tools to track the size of population is one tool _____ **Survivorship Curve**
101. Regions with identical climate have ----- floras and faunas (buffoons' law) _____ **Different**
102. Natural selection ----- variations from a population by favoring one allele over other at a gene locus.
_____ **Removes**
103. First vertebrates to possess amniotic eggs in _____ **Reptiles**
104. Toxoplasmosis caused by toxoplasma virulent in immune suppressed individual as in _____ **Aids**
105. Plant use light energy into photosynthesis. They convert light energy int _____ **Chemical Bond Energy**
106. Gross primary production (GPP) is the amount of ----- energy as biomass that primary producers create in a given length of time. _____ **Chemical Energy**
107. The ----- of solar energy (1%) is consumed in photosynthesis. _____ **Small Fraction**
108. --- Competition occurs between two species to use the same resources _____ **Interspecific**
109. One species gain benefits while those of the other species are neither benefited nor harmed. _____
Commensalism
110. One species gain benefit other species is harmed _____ **Parasitism**
111. _____ is located above the thermosphere. _____ **Exosphere**
112. _____ is responsible for sustaining life on earth. _____ **Atmosphere**
113. Disruption of ecosystem interaction is an important cause of _____ **Habitat Loss**
114. ----- is removal of forest or stand of trees from land which is then converted to a non-forest use.
_____ **Deforestation**
115. Land pollution --- affects the respiratory system of human beings. _____ **Indirectly**
116. _____ are strongly affected by light pollution. _____ **Reptiles**
117. _____ is process of increasing concentration of toxic substance. **Biomagnifications**
118. First evolutionary scheme was proposed by Jean Baptiste Lamarck in _____ **1809**
119. Genes of all traits are present in population in form _____ **Allele**
120. This speciation occurs within a single population. _____ **(Sympatric Speciation)**
121. Evolutionary changes are occurring _____ over millions of years. _____ **Gradually**
122. Termites is the example of _____ **Xylophages**
123. Formation of new forms from an ancestral species, usually in response to the opening of new habitats is called _____ **Adaptive Radiations.**
124. Skeleton of Echinodermata consists of a series of calcium carbonate plates called _____ **Ossicles**
125. Activated sludge-sewage mixture is called mixed _____ **Liquor**
126. The organism occupies is the total of all the ways it uses the resources of its environment. _____ **Niche**



127. Form of precipitation that is unusually acidic _____ Acid Rain
128. All of the frogs in a particular pond or all of the sea urchins in a particular tidepool make up a _____ Deme
129. The final community is the community _____ Climax
130. Storm water runoff is the number --- cause of stream impairment in urban areas _1
131. Decreases in genetic diversity make populations ...likely to withstand environmental stress _____ Less
132. Different populations of species are geographically isolated _____ Same
133. Fitness is quantified assuccess _____ Reproductive
134. Covering of is called a plumage _____ Feathers
135. Osmoregulation is a Physiological adaptation to conserve _____ Water Fluid
136. Most reptiles excrete _____ Uric Acid
137.allow molecules to freely diffuse from one side of the membrane to the other. _____ Porins
138. Any preserved remains, impression, or trace of any once-living thing from a past geological age. _____ Fossil
139. Hydrocarbons consists carbons is _____ Ch₄
140. Ozone is made up of _____ O₃
141. Camillo Golgi country is _____ Italian
142. Interspecific Between members of _____ Different Species
143. Environment's maximal load is called _____ Carrying Capacity
144. The first community to become established in an area is called the ...community _____ Pioneer
145. Nitrogen Fixation require _____ Soybeans, Legumes
146. Natural selection prefers population size _____ Large
147. Cascade Effect Removal ofin environment _____ Apex Predator
148. Intermediate Filaments Intermediate in size _____ 8-12 Nm
149. RER has _____ Ribosomes Attached
150. Two or more species living in same habitat, reciprocally ...each other's evolution _____ Affect
151. solar nebula (disc of dirt and gases) _____ First Atmosphere
152. In some cases, selection ...one phenotype at one time and another phenotype at another time. _____ Favors
153. *Nosema bombicus* parasitizes ...Causing the disease pebrine or pepper disease _____ Silkworms
154. Traits that promote successful reproduction are said to be _____ Adaptive
155. Rasping structure called radula Consist of Chitinous belts _____ Curved Teeth
156. Gene interactions fitness of alleles _____ Affect
157. Conditions in the reproductive of a female may not support the sperm of male _____ Tract



158. Evolutionary changes are occurring gradually over of years _____ Millions
159. There are type of Mastigophore _____ 2
160. subphylum Sarcodina are the _____ Amoebae
161. Own circular..... mostly attached to inner membrane _____ DNA
162. The an organism occupies is the total of all the ways it uses the resources of its environment.
_____ Niche
163. Distinct biological communities Formed in response to specific external factors in that environment _____ Biomes
164. of an organism is position it occupies in a food chain. _____ Trophic Level
165. Winter Sleep Occurs in large animals to ... reserves _____ Energy
166. Each successional stage is called a _____ Seral Stage
167. Atmosphere can be divided into layers _____ Five
168. Amount of CO₂ made by breakdown of compounds almost match the amount of CO₂ used _____ Organic
169. All living organism 16% nitrogen by weight atmosphere is nitrogen by volume _____ 78 %
170. Species are species that occur outside of their natural ranges because of human activity _____ Exotic
171. Hydrocarbons Diverse group of organic compounds that contain only and carbon
_____ Hydrogen
172. Sound that is unwanted or disrupts one's quality of life is called _____ Noise
173. Rise in mean temperature of 0.6-1.0°C in arid coastal areas, arid mountains and hyper arid plains.
Observed in _____ Pakistan
174. Industrial may contain acids, alkalis, salts, poisons, oils and in some cases harmful bacteria.
_____ Effluents
175. Pere David's deer was a native species of _____ China
176. Changes only in the germ cells/.... are transferred to next generation _____ DNA
177. Theory of uniformitarianism planted two ideas in Darwin's mind the earth could be much older
than _____ 6,000 Years.
178. Maladaptive traits become frequent in a population and eventually are eliminated. _____ Less
179. A species is a of different molecules and structures that have evolved at different rates _____
Mosaic
180. Genetic material is organized as DNA molecules, along with a variety _____ to form Chromosomes are
_____ Proteins
181. Christian deDuve (1967) Isolated from cells by centrifugation _____ Liver
182. Cytoskeleton provides support and shape to _____ Cell
183. Amoeba engulf food by---- using pseudopodia. _____ Phagocytosis



184. Aeciospore consists exclusively of ... extracellular _____ **Obligatory**

185. The cnidocyte has a modified called a cnidocil _____ **Cilium**

186. The organ of excretion in Platyhelminthes is---- cell _____ **Flame**

187. Mosses are the example of plant _____ **Nonvascular**

188. In Hemichordate Larvae feed on _____ **Plankton**

SUBJECTIVES

1. Difference Between Monocot and Dicot?

Monocots and dicots are two major groups of angiosperms (flowering plants). The main differences include the number of cotyledons (seed leaves), leaf venation, vascular bundle arrangement, and floral parts.

Cotyledons:

Monocots have one cotyledon in their seeds. Dicots have two cotyledons.

Leaf Venation:

Monocots typically have parallel venation in their leaves. Dicots generally have reticulated (net-like) venation.

2. Logistic Growth Rate

- It occurs when resources are limited
- Population doesn't grow beyond the carrying capacity of ecosystem
- It produces s shaped curve
- A stationary or stable phase is achieved
- It has four phase, lag, log, declaration and steady.
- Examples, yeast

3. R Selected And K Selected

Traits of r-selected species

- ❖ High rate of reproduction
- ❖ Small body size
- ❖ Early maturity onset
- ❖ Short generation time
- ❖ Ability to disperse offspring widely



Examples:

bacteria, grasses, cephalopods, rodents

Traits of k-selected species

- ❖ Large body size
- ❖ Long life expectancy
- ❖ Production of fewer offspring
- ❖ Often require extensive parental care until they mature

Examples:

humans, whales, parrots, eagle

4. Ecological Niche

Each organism in a community confronts the challenge of survival in a different way. Occupies a Specific functional role and place called its niche. The niche an organism occupies is the total of all the ways it uses the resources of its environment.

5. What Is Crypsis Explain Reference with Skin Colouration and Counter Shading?

Crypsis

- ❖ Resemblance to surroundings
- ❖ Colours and patterns resemble a particular natural background
- ❖ Change their colour if environment changes
- ❖ Example: Egyptian nightjar, Parrot

Changeable skin coloration

- ❖ Actively change their skin patterns and colours
- ❖ Change can be rapid or seasonal
- ❖ Chameleon rapidly changes its colour.
- ❖ Arctic fox changes from brown or grey in the summer to white in the winter
- ❖ Use special chromatophore cells, fur moulting to resemble their current background.

Countershading

- ❖ Shadow makes upper side darker and underside lighter
- ❖ Countershading graded colour to counteract the effect of self-shadowing
- ❖ Creating an illusion of flatness
- ❖ Makes animal darker below and lighter above

Example:

gazelles, grasshoppers, sharks, dolphins



6. Mimicry And Camouflage

Camouflage

- ❖ Use of any combination of materials, coloration, or illumination
- ❖ Concealment from predators
- ❖ Also known as cryptic colouration

Mimicry

The resemblance of one species to another for protective or aggressive purposes

- ❖ Different from camouflage
- ❖ They imitate instead of hiding by camouflage strategies

7. Evolution of Third Atmosphere

- ❖ Constant rearrangement of continental plates
- ❖ Inflow and outflow of CO₂ from large continental carbonate stores
- ❖ O₂ synthesized in photosynthesis was being used in reducing materials
- ❖ Gradually, it was shifted to oxidizing atmosphere instead of reducing
- ❖ 541 million years ago, O₂ made stable 15% of atmosphere.

8. Invasive Species

Colonization, a natural process by which a species expands its geographic range, occurs in many ways.

Examples:

- ❖ Seed dispersal by birds
- ❖ Lowering of sea levels join two isolated land masses
- ❖ Flooding

Migratory animals carrying other animals as symbiotic or parasitic partners Human activities are the major reason of invasion of species. Exotic Species are species that occur Outside of their natural ranges because of human activity. An exotic species becomes invasive when It becomes established in its new environment and out competes native species.

9. Treatment Of Waste Water

Septic Tanks

- ❖ Bacteria in sewage degrade organic Matter
- ❖ Tank buried in ground to treat Sewage from an individual home
- ❖ Wastewater flows into tank
- ❖ Solid material (“sludge”) settles to Bottom of tank



- ❖ Clean water flows out of tank into Ground through subsurface drains Lagoons (Stabilization Ponds)
- ❖ 3-5' deep
- ❖ Sunlight, algae, oxygen interact to clean waste water

Secondary Treatment

- ❖ Secondary Treatment with Activated Sludge
- ❖ Effluent leaves sedimentation tank and is pumped to an aeration tank
- ❖ Effluent is mixed with air and sludge loaded with bacteria ("activated sludge")
- ❖ Sludge contacts with raw sewage, and bacteria in the sludge then decompose the raw Sewage, lowering ODW and BOD
- ❖ Activated sludge-sewage mixture is called mixed liquor
- ❖ Mixed liquor leaves aeration tank
- ❖ Flows to another sedimentation tank where suspended solids settle out for reuse as Activated sludge

10. Homology And Analogy

Homology and Common Descent

- ❖ Divergent evolution
- ❖ Existence of shared ancestry between a pair of structures, or genes, in different taxa
- ❖ Once related lineages are reproductively isolated, evolution can lead to modifications of the Basic plan.
- ❖ Forelimbs of vertebrates

Analogy

- ❖ Convergent Evolution
- ❖ Independent evolution of similar features in species of different lineages
- ❖ Creates analogous structures that have similar form or function but were not present in the last Common ancestor of those groups

11. Explain Adeptness and Fitness

Adeptness or fitness: Is a measure of the capacity for successful reproduction in a given environment.

- ❖ Not every characteristic is an adaptation to some kind of environmental situation.
- ❖ Neither adaptation led to perfection.

12. Genetic Drift

Genetic drift, also known as random genetic drift, allelic drift or the Wright effect, is the change in the frequency of an existing gene variant (allele) in a population due to random chance.



Genetic drift may cause gene variants to disappear completely and thereby reduce genetic variation. It can also cause initially rare alleles to become much more frequent and even fixed.

13. Rates Of Evolution

Evolutionary changes are occurring gradually over millions of years.

- ❖ This concept, called phyletic gradualism.
- ❖ It has been the traditional interpretation of the tempo, or rate, of evolution.
- ❖ Species do not change significantly over millions of years.
- ❖ Periods of stasis or equilibrium

14. Detail Note On Binomial Culture

Binomial Nomenclature

The binomial system of nomenclature brings order to a chaotic world of common names. Common names vary from country to country, and from region to region within a country. There was need of globally recognized names.

In binomial system, no two kinds of animals have the same binomial name. Every scientific name has two parts:

- ❖ First from genus
- ❖ second from species

Names are written in italics

Example:

- ❖ Common name: Indian frog
- ❖ Genus's name: Rana
- ❖ Species name: tigrine
- ❖ Scientific name: Rana tigrine
- ❖ This scientific name is universally accepted.

15. Types Of Ecological Pyramids

There are three main types of ecological pyramids, each illustrating different aspects of energy, biomass, or population within an ecosystem:

Pyramid of Energy:

Represents the flow of energy through different trophic levels.

Typically measured in units like kilocalories per square meter per year. Shows that energy decreases as it moves up the food chain, with less energy available at higher trophic levels.



Pyramid of Biomass:

Represents the total amount of living organic matter (biomass) at each trophic level. Measured in units like grams of organic matter per unit area. Demonstrates that biomass decreases at higher trophic levels due to energy loss through respiration and metabolic activities.

Pyramid of Numbers:

Represents the number of individuals at each trophic level in an ecosystem. Provides a visual representation of the population size at each level. Can be upright, inverted, or roughly rectangular depending on the structure of the ecosystem.

16. Components Of Mitochondrial Membrane

Outer Membrane

- ❖ Simple phospholipid bilayer.
- ❖ Contain large number of integral protein structures called porins.
- ❖ Porins allow molecules to freely diffuse from one side of the membrane to the other.
- ❖ Easy transport of ions, nutrient molecules, ATP, ADP.

Inner Membrane

- ❖ Permeable only to oxygen, CO₂, H₂O.
- ❖ Cellular respiration
- ❖ Transport of proteins
- ❖ Exchange of anions between the cytosol and the mitochondria

Intermembrane Space

- ❖ It has high proton concentration.
- ❖ Because the outer membrane is freely permeable to small molecules, the concentration of Small molecules such as ions and sugars in the intermembrane space is same as that of The cytosol.

Cristae

- ❖ Folds of inner mitochondrial membrane
- ❖ Expand its surface area, enhancing its ability to produce ATP
- ❖ Contains stalked particles on inner side called as F1 particles.

17. Actinopoda Characteristics

- ❖ Mostly marine
- ❖ Spherical, planktonic
- ❖ Axopodia supported by microtubules
- ❖ Includes marine radiolarians with siliceous tests
- ❖ About 3,000 species.



18. Phylum Platyhelminthes Characteristics

Usually flattened dorsoventrally

- ❖ Triploblastic
- ❖ acoelomate
- ❖ Bilaterally symmetrical
- ❖ Unsegmented worms
- ❖ Beginning of cephalization with an anterior cerebral ganglion
- ❖ Longitudinal nerve cords
- ❖ Protonephridia as excretory structures
- ❖ Hermaphroditic
- ❖ Complex reproductive systems

19. Reproductive System of Arthropods

- ❖ Mostly dioecious
- ❖ Paired genital opening
- ❖ Male often packages sperm in a spermatophore
- ❖ Transfer them into the female genital tract
- ❖ Copulation occurs.
- ❖ Sperms are transferred via modified pedipalp

20. Digestive System Of Echinodermata

- ❖ Complete digestive tract that may be secondarily reduced
- ❖ Mouth opens to a short oesophagus
- ❖ Large stomach
- ❖ Stomach is divided into two regions
- ❖ Larger, oral stomach (cardiac stomach)
- ❖ Smaller, aboral stomach (pyloric stomach)
- ❖ Absorptive structure called pyloric cecae

21. Three Order of Reptiles

1. Order Testudines

Tortoises, turtles

2. Order Squamata

Snakes, lizards, worm lizards, Lizard like reptiles, single species, Sphenodon and Tuataras

3. Order Crocodilian

Crocodiles, alligators, gavials



22. Circulatory System of Mammals

- ❖ Four chambered hearts
- ❖ Have two atria and two ventricles
- ❖ Separate systematic and pulmonary circuit
- ❖ Distribute the respiratory gases and nutrients in the fetus

23. Origin of Eukaryotic Cells

Endosymbiotic Theory

- ❖ Chloroplasts and Mitochondria evolved from symbiotic bacteria that lived inside of a larger prokaryote.
- ❖ Also known as Symbiogenesis
- ❖ Chloroplasts evolved from endocytosis of Cyanobacteria
- ❖ Mitochondria evolved from endocytosis of aerobic bacteria.

24. Ecological Importance Of Phylum Myxozoa

- ❖ Commonly called myxosporeans
- ❖ All obligatory extracellular parasites in freshwater and marine fish.
- ❖ They have a resistant spore with one to six coiled polar filaments.
- ❖ The most economically important myxosporean is *Myxosoma cerebralis*.
- ❖ Which infects the nervous system and auditory organs of trout and salmon.
- ❖ Causing whirling or tumbling disease
- ❖ About 9,000 species
- ❖ Some of the most complex protozoa
- ❖ Ciliates are widely distributed in freshwater and marine environment

25. Succession And It's Types

Communities may begin in areas nearly devoid of life. The first community to become established in an area is called the pioneer community. Death, decay, new species and additional nutrients establish this community. Over thousands of years nutrients accumulate, communities established. Complex ecosystem becomes functional. Each successional stage is called a seral stage. Entire Successional sequence is a sere. Dominant life-forms of a sere gradually make the area less favourable for themselves due to consumption of resources. But more favourable for organisms of the next successional stage. The final community is the climax community. It is different from the seral stages that preceded it because it can tolerate its own reactions. Complexity of ecosystem makes it more stable.

Types of Succession

Primary



Occurring in an environment in which new substrate devoid of vegetation and other organisms usually Lacking soil

Secondary

An event reduces already established ecosystem.

26. Frequency Dependant Selection

Frequency-dependent selection is a concept in evolutionary biology where the fitness of a particular phenotype or genotype depends on its frequency in the population. In other words, the success of an individual's traits is influenced by how common or rare those traits are within the population.

There are two main types:

Positive frequency-dependent selection

The fitness of a trait increases as it becomes more common in the population. This can lead to the maintenance of genetic diversity because rare traits have a selective advantage.

Negative frequency-dependent selection:

The fitness of a trait decreases as it becomes more common. This can result in a cycling pattern where different traits become more or less common over time, preventing fixation of a single trait.

27. Sources of Land Pollution?

- ❖ Littering
- ❖ Herbicides, insecticides, and pesticides
- ❖ Construction debris and waste
- ❖ Mining waste
- ❖ Overcrowded landfill
- ❖ Deforestation
- ❖ Chemical and nuclear plants
- ❖ Industrial factories
- ❖ Oil refineries
- ❖ Human sewage
- ❖ Oil and antifreeze leaking from motor vehicles.

28. Cascade Effect?

- ❖ Removal of apex predator in environment
- ❖ It leads to dramatic increase in their prey species.



- ❖ Unchecked prey can then overexploit their own food resources
- ❖ Shortage in food resources disturbs whole food web.
- ❖ Cascade of overexploitation at different trophic levels
- ❖ Population numbers dwindle, possibly to the point of extinction.

Example:

Overhunting of sperm whale; an apex predator.

29. Theory Of “Inheritance of Acquired Characteristics or Soft Inheritance”?

- ❖ If an organism developed a characteristic feature through adapting to a new way of life during its lifetime, it would pass this on to its offspring
- ❖ The classic example given is that of the giraffe's neck.
- ❖ As the giraffe's ancestors searched for a richer food supply, they stretched to reach higher branches in trees.
- ❖ Thus, their stretched bodies were passed onto their offspring.
- ❖ Characteristics acquired during the lifetime of a parent are not passed onto the offspring.
- ❖ Changes only in the germ cells/DNA are transferred to next generation.
- ❖ Modern genetics confirmed germ plasm theory.

30. Effects of Global Warming?

- ❖ Physical Environmental Effects
- ❖ Effects on Biosphere
- ❖ Effects on Humans
- **Disappearing Glaciers:** early snowmelt, and severe droughts will cause more dramatic water shortages and continue to increase the risk of wildfires in the American West.
- **Rising Sea Levels:** will lead to even more coastal flooding on the Eastern Seaboard, especially in Florida, and in other areas such as the Gulf of Mexico.
- **Forests, Farms, And Cities:** will face troublesome new pests, heat waves, heavy downpours, and increased flooding. All of these can damage or destroy agriculture and fisheries.
- **Disruption of Habitats:** such as coral reefs and alpine meadows could drive many plant and animal species to extinction.
- **Allergies, Asthma, And Infectious Disease:** outbreaks will become more common due to increased growth of pollen-producing ragweed, higher levels of air pollution, and the spread of conditions favourable to pathogens and mosquitoes.

31. Properties of R Selected Species?

R-selected species

- ❖ High growth rates
- ❖ Typically exploit less crowded ecological habitats



- ❖ Produce many offspring
- ❖ Relatively low probability of surviving to adulthood.
- ❖ High reproductive rate supports their survival.
- ❖ Especially in unstable environment.

32. Sources of Nitrogen?

- ❖ Lightning
- ❖ Inorganic fertilizers
- ❖ Nitrogen Fixation
- ❖ Animal Residues
- ❖ Crop residues
- ❖ Organic fertilizers

33. Write the Name of Nitrogen Fixing Bacteria?

Nitrogen-fixing bacteria are prokaryotic microorganisms that are capable of transforming nitrogen gas from the atmosphere into “fixed nitrogen” compounds, such as ammonia, that are usable by plants.

Name of Nitrogen Fixing Bacteria Are As:

- ❖ **Azobacter**: Require the enzyme nitrogenase
- ❖ **Beijerinckia**
- ❖ **Azospirillum**: Inhibited by oxygen
- ❖ **Clostridium**: Inhibited by ammonia
- ❖ **Cyanobacteria** (End product)

34. Symbiosis?

Symbiosis Relationship between two different species living together

- ❖ Parasitism
- ❖ Mutualism
- ❖ Commensalism

Chief:

Survivorship curve is one tool. It measures the proportion of individuals in a given species that are alive at different ages.

- ❖ Y-axis is a logarithmic plot of numbers of survivors
- ❖ X-axis is a linear plot of age

Kinds of Survivorship Curve

Type 1 (Convex)



Populations survive to an old age, then die rapidly. Un importance of environmental factors in influencing mortality Potential life span

Example: Humans

Type II (Diagonal)

- ❖ Constant probability of death throughout lives
- ❖ Influence of environmental factors on mortality
- ❖ Mortality independent of age

Example: birds, rodents

Type III (Concave)

- ❖ High juvenile mortality
- ❖ Influence of environmental factors and less resistance of juveniles on mortality
- ❖ Lower mortality in adults

Example: Fish

35. Tropospheric Ozone?

Tropospheric Ozone is a highly reactive oxidant that significantly reduces crop productivity as well as the uptake of atmospheric carbon by vegetation. Its effects on plants include impeded growth and seed production, reduced functional leaf area and accelerated ageing

36. Write the Sources of Waste Water?

Human excreta (faeces, urine, blood and other bodily fluids) often mixed with used toilet paper or wet wipes; this is known as **blackwater** if it is collected from flush toilets. Washing water (personal hygiene, clothes, floors, dishes, cars, etc.), also known as **greywater or sullage**. Surplus manufactured liquids from domestic sources (drinks, cooking oil, pesticides, lubricating oil, paint, cleaning detergents, etc.

- ❖ Domestic wastewater from households
- ❖ Municipal wastewater from communities (also called sewage)
- ❖ Industrial wastewater from industrial activities
- ❖ Agricultural wastewater from agricultural activities
- ❖ Storm water

37. What Is Aestivation?

Survival in extended period of drying. Avoid temperature damage and dehydration.

Examples: Insects, frog, turtle.



38. Aerosols?

- ❖ Small (or “tiny”) solid particles or liquid droplets (excluding clouds and rain)
- ❖ Aerosols can be man-made (anthropogenic) or naturally occurring (like ocean salt, dust, plant emissions)
- ❖ Aerosols are not synonymous with pollution
- ❖ Some aerosols are very beneficial and, in fact, are required for precipitation processes to occur.

Aerosol is a word that is used to describe a mixture of small liquid and/or solid particles dispersed in a gaseous system, such as air. The word aerosol comes to us from "aero-," which refers to gas in general or air specifically (easy enough, right?) and "-sol,' which refers to a mixture of particulate matter in a fluid system (gas or air is a fluid).

The diameters of these small particles are roughly between 0.002 micrometers and 100 micrometers in size.

39. Two Heat Producing Mechanisms in Humans?

The external heat transfer mechanisms are radiation, conduction and convection and evaporation of perspiration. The process is far more than the passive operation of these heat transfer mechanisms, however. The body takes a very active role in **temperature** regulation.

40. Ozone Depleting Substances?

- ❖ Halocarbon refrigerants
- ❖ Solvents
- ❖ Propellants in aerosols
- ❖ Chlorofluorocarbons
- ❖ Hydro chlorofluorocarbons
- ❖ Methyl bromide
- ❖ Carbon tetrachloride
- ❖ Methyl chloroform

41. Upper Height and Lower Height of Mesosphere?

The exact upper and lower boundaries of the mesosphere vary with latitude and with season (higher in winter and at the tropics, lower in summer and at the poles), but the lower boundary is usually located at altitudes from **50 to 65 kilometers (31 to 40 mi; 164,000 to 213,000 ft.)** above the Earth's surface and the upper boundary (the mesopause) is usually around **85 to 100 kilometers (53 to 62 mi; 279,000 to 328,000 ft.)**

42. Mesosphere Boundaries and Temperature?

- ❖ Layer, directly above the stratosphere and directly below the thermosphere



- ❖ Lower boundary is 50 to 65 kilometres
- ❖ Upper boundary is around 85 to 100 kilometres
- ❖ It is called as “near space”.
- ❖ Temperature decreases with increasing height
- ❖ Due to decreasing absorption of solar radiation

Mesopause

- ❖ Boundary between the mesosphere and the thermosphere
- ❖ Height: 85 – 100 km
- ❖ Temperature: 100 – 102 °C

43. Height of Stratosphere at Equator and Pole

The second major layer of Earth's atmosphere. Above the troposphere, and below the mesosphere

Height

- ❖ 20 km (66,000 ft; 12 mi) at equator
- ❖ 10 km (33,000 ft; 6.2 mi) at mid latitudes
- ❖ 7 km (23,000 ft; 4.3 mi) at the poles.

44. Define Sere in Own Words?

A seral community (or **sere**) is an intermediate stage found in **ecological** succession in an **ecosystem** advancing towards its climax community. In many cases more than one seral stage evolves until climax conditions are attained.

45. Activities Contribute to Biomagnification?

- ❖ Increasing concentration of toxic substance
- ❖ In the tissues of tolerant organisms at successively higher levels in a food chain ❖ It occurs as result of three activities.
- ❖ Concentration of the persistent toxins increases higher up the food chain.
- ❖ **Persistence:** Substance cannot be broken down by environmental processes
- ❖ **Food chain energetics:** Substance's concentration increases progressively as it moves up a food chain
- ❖ **Low or non-existent rate of internal degradation or excretion of the substance** often due to water insolubility

46. Layers of Atmosphere?

- ❖ **Exosphere:** 700 to 10,000 km (440 to 6,200 miles)
- ❖ **Thermosphere:** 80 to 700 km (50 to 440 miles)
- ❖ **Mesosphere:** 50 to 80 km (31 to 50 miles)



- ❖ **Stratosphere:** 12 to 50 km (7 to 31 miles)
- ❖ **Troposphere:** 0 to 12 km (0 to 7 miles)

47. What Is Habitat? Write Its Components?

A habitat is a place where an organism makes its home. A habitat meets all the environmental conditions an organism needs to survive. For an animal, that means everything it needs to find and gather food, select a mate, and successfully reproduce.

The main **components** of a **habitat** are shelter, water, food, and space. A **habitat** is said to have a suitable arrangement when **it** has the correct amount of all of these.

48. Types of Grazing?

Types of Grazing

Graminivore

Feeding primarily on grass. Specifically, "true" grasses in family Poaceae

Examples: Horses, cattle, hippopotamus, grasshoppers

Coprophagy

Feeding on grass, forbs, leafy weeds, fruits, tree bark. Heavy grazing for half an hour of grazing period. Followed by half an hour of selective feeding

Example: Horses, cattle, hippopotamus, grasshoppers

- ❖ Later feeding in intervals
- ❖ Eat their or other species' soft faces (caecotrophy)

49. Analogy & Homology?

- ❖ **Homology** involves the study of organs that have evolved from same origin or from common ancestor but have different functions. For example, wings of bat and hands of humans.
- ❖ **Analogy** involves the study of organs that are evolved from different ancestors but perform a similar function. For example, wings of bat and wings of insects.

50. Types of Biological Clocks?

Biological clocks are an organism's innate timing device. They're composed of specific molecules (proteins) that interact in cells throughout the body. **Biological clocks** are found in nearly every tissue and organ

Biological Clocks

Diurnal



Distribution, sleep-wake cycle

Annual

Reproduction, migration

51. Binomial Nomenclature?

The binomial system of nomenclature brings order to a chaotic world of common names. Common names vary from country to country, and from region to region within a country. There was need of globally recognized names. In binomial system, no two kinds of animals have the same binomial name. Every scientific name has two parts:

- ❖ First from genus
- ❖ Second from species

Names are written in italics

Example:

- ❖ Common name: Indian frog
- ❖ Genus's Name: Rana
- ❖ Species Name: tigrina
- ❖ Scientific Name: *Rana tigrina*

This scientific name is universally accepted.

52. Name of Different Stages of Foraging?

These stages form a foraging Cycle.

- ❖ Search
- ❖ Assessment
- ❖ Capture
- ❖ Handling

53. Factors Affecting Reproductive Level of An Organism?

Factors affecting reproductive rate

- ❖ Number of offspring produced
- ❖ Likelihood of survival to reproductive age
- ❖ Duration of the reproductive period
- ❖ Length of time to reach maturity
- ❖ Environmental factors

54. How Microbiology Affects Evolution?



Molecular biology has yielded a wealth of information on evolutionary relationships.

- ❖ Related animals have similar DNA derived from their common ancestor.
- ❖ Molecular biologists can estimate the elapsed time since divergence from a common ancestral molecule by looking for:
- ❖ Extraction and analysis of the structure of proteins from animal tissue, and compare the DNA of different animals.
- ❖ Dissimilarities in the structure of related proteins and DNA
- ❖ By assuming relatively constant mutation rates

55. What Is Thylakoid Write Its Function?

Thylakoids are membrane bound components inside chloroplasts and cyanobacteria. They are the site of the light-dependent reactions of photosynthesis. **Thylakoids** consist of a **thylakoid** membrane surrounding a **thylakoid lumen**.

Thylakoids are the internal membranes of **chloroplasts** and cyanobacteria, and provide the platform for the light reactions of **photosynthesis**.

56. When Adaptation Occurs?

- ❖ Characteristics that increase the potential of an organism or species to successfully reproduce in a specified environment.
- ❖ Adaptation occurs when a change in a phenotype increases an animal's chance of successful reproduction.
- ❖ Change in environment is the force behind adaptations.
- ❖ It may result in the evolution of multiple new groups.
- ❖ To exploit the changed environment
- ❖ Adaptation is confused with fitness or adapted

57. 32. Write the Process of Condensation?

Condensation

- ❖ Opposite of evaporation
- ❖ Condensation occurs when a gas is changed into a liquid. When the water droplets formed from condensation are very small.
- ❖ They remain suspended in the atmosphere. These millions of droplets of suspended water form clouds in the sky or fog at ground level.

58. Discuss the Decomposer with Example?

Decomposer is an organism that decomposes, or breaks down, organic material such as the remains of dead organisms. Decomposers include bacteria and fungi. These organisms carry out the



process of decomposition, which all living organisms undergo after death. Decomposition is an important process because it allows organic material to be recycled in an ecosystem.

Examples of Decomposers

Include bacteria, fungi, some insects, and snails, which means they are not always microscopic. Fungi, such as the Winter Fungus, eat dead tree trunks.

Decomposers can break down dead things, but they can also feast on decaying flesh while it's still on a living organism.

59. Types of Omnivores?

An **omnivore** is a kind of animal that eats either other animals or plants. Some **omnivores** will hunt and eat their food, like carnivores, eating herbivores and other **omnivores**. Some others are scavengers and will eat dead matter. Many will eat eggs from other animals

Omnivores generally occupy the third trophic level alongside **meat**-eating carnivores. Omnivores are a diverse group of animals. Examples of omnivores include bears, birds, dogs, raccoons, foxes, certain insects, and even humans.

60. Components of Water Pollutants?

It includes detergents and other cleaning materials, surfactants, pesticides and other organic industrial wastes. Many of these materials are poisonous for living organisms and cause serious **water pollution** problems

61. Overview of Vestigial Organs?

- ❖ Retention during the process of sexual reproduction of genetically determined structures or attributes
- ❖ That have lost some or all of their ancestral function in a given species.
- ❖ Vestigiality is loss of feature due to loss of its value in changed environment.
- ❖ The human vermiform appendix on the vestigial caecum.
- ❖ Blind cave fish has no eye
- ❖ Genes for functional eyes are still in their DNA

These 'useless' **body**-parts, otherwise known as vestigial organs, are remnants of lost functions that our ancestors possessed. They once represented a function that evolved out of a necessity for survival, but over time that function became non-existent.

62. Define Tropic Level with Example?



A *trophic level* is the position in an ecosystem an organism occupies in relation to primary sources of energy and the food chain. The first *trophic level* is always Composed of primary producers that convert either solar or chemical energy into biomass

63. What Is Speciation?

Speciation, the formation of new and distinct species in the course of evolution. Speciation involves the splitting of a single evolutionary lineage into two or more genetically independent lineages.

64. Evidence of The Natural Selection?

Darwin based his theory on many solid evidences from his observations and collected samples.

Three Major Evidences:

- ❖ Geology
- ❖ Fossil Evidences
- ❖ Galápagos islands

Geology

- ❖ Darwin was impressed by Charles Lyell and James Hutton's ideas of geology.
- ❖ Theory of uniformitarianism

Theory states:

Changes in the earth's crust throughout history have resulted from the action of uniform, continuous processes.

Theory of uniformitarianism planted two ideas in Darwin's mind:

- ❖ The earth could be much older than 6,000 years.
- ❖ If the face of the earth changed gradually over long periods, living forms also change during that time?
- ❖ Gradual changes over the time with changing environment was foundation of theory of natural selection.

65. 40. Types of Genetic Drift?

Two special cases of genetic drift have influenced the genetic makeup in a population.

- ❖ Founder Effect
- ❖ Bottleneck Effect

Founder Effect

- ❖ When a few individuals from a parental population colonize new habitats.



- ❖ The new colony that emerges from the founding individuals is likely to have a distinctive genetic makeup
- ❖ Far less variation than the larger population
- ❖ Founder effect: The original population (left) could give rise to different founder populations (right).

Bottleneck Effect

- ❖ It occurs when number of individuals in a population is drastically reduced
- ❖ Mostly by any disaster e.g. natural catastrophe, over hunting, habitat damage
- ❖ Survivors have gene pool not representing the initial population.

66. 41. Oscillating and Frequency Selection?

Oscillating Selection

In some cases, selection favors one phenotype at one time and another phenotype at another time.

Example: Medium ground finches of the Galápagos Islands

Frequency Dependent Selection

This type of selection favors certain phenotypes depending on how commonly or uncommonly they occur. It has two types:

- ❖ Negative
- ❖ Positive

Negative Frequency Dependent Selection

Rare phenotypes are favored by selection Making them more common thus maintaining variation.

Reason

Commonly abundant animals are easy and recognized prey for predators. Animals having rare alleles for that trait will have higher chances to survive.

Example:

Fish predation on an insect, the water boatman, which occurs in three different colours. Experiments indicate that each of the colour types is preyed upon disproportionately. Fish eat more of the common-colored insects than uncommon colours.

67. Adaptedness Or Fitness?

Adaptedness is a measure of the capacity for successful reproduction in a given environment. Not every characteristic is an adaptation to some kind of environmental situation. Neither adaptations lead to perfection.



68. Ways of Reproductive Isolation?

Premating Isolation

- ❖ **Geographical Isolation:** prevents mating from taking place. Barriers, such as rivers or mountain ranges, may separate subpopulations.
- ❖ **Mechanical Isolation:** If courtship behavior patterns of two animals are not mutually appropriate for each other. Mating does not occur.
- ❖ **Temporal Isolation:** type of reproductive isolation due to reproducing at different times.
- ❖ **Behavioral Isolation:** reproductive isolation due to differences in mating or courtship behavior. Even though they are able to physically interbreed.

Example:

Different ways to decorate nests to attract females. **Satin bowerbird &**

MacGregor's Bowerbird

Post mating Isolation

Prevents successful fertilization and development. Even though mating may have occurred.

Example:

Conditions in the reproductive tract of a female may not support the sperm of male. Though successful fertilization

69. Balanced Polymorphism?

Balanced Polymorphism:

It occurs when different phenotypes are maintained at relatively stable frequencies in the population. Resemble a population in which disruptive selection operates.

Example:

- ❖ Sickle cell anemia is homozygous recessive trait.
- ❖ Most common in Africa where malaria is common as well. Heterozygous alleles carriers are less more susceptible to malaria. Homozygous dominant alleles carriers are more susceptible to malaria.
- ❖ Homozygous recessive alleles carriers have low survival due to anemia.

70. How Many Kinds of Selection?

Three kinds of Selection

- ❖ Disruptive Selection
- ❖ Directional Selection
- ❖ Stabilizing Selection



71. What Is Allopatric Speciation?

Geographical isolation of subpopulations from one another is called allopatric speciation. Allopatric speciation, also known as geographic speciation, is speciation that occurs when biological populations of the same species become isolated due to geographical changes such as mountain building or social changes such as emigration

72. What Is Lysosome?

A **lysosome** is a membrane-bound cell organelle that contains digestive enzymes. ... They break down excess or worn-out cell parts. They may be used to destroy invading viruses and bacteria. If the cell is damaged beyond repair, **lysosomes** can help it to selfdestruct in a process called programmed cell death, or apoptosis.

Lysosomes were discovered by the Belgian cytologist de Duve in the 1950s. Lysosomes are vesicles produced by the Golgi apparatus. Present in cytoplasm of eukaryotic cells. It contains degradative enzymes enclosed in a membrane. Internal environment is acidic (**pH: 7**)

73. Polyplody and Aneuploidy?

❖ **Aneuploidy:** Non disjunction at a single chromosome result in an abnormal number of chromosomes.

Aneuploidy is a chromosomal mutation in which there is one or more extra chromosomes, or one or more fewer chromosomes. In humans, the genetic disorders Down syndrome and Turner's syndrome are examples of aneuploidy. Individuals with Down syndrome have three copies of chromosome 21, so their genomes contain 47 chromosomes rather than the usual 46. Individuals with Turner syndrome have only one sex chromosome, which is the X-chromosome, so their genomes contain 45 chromosomes.

❖ **Polyplody:** Product of non-disjunction during meiosis which results in additional copies of the entire genome.

Polyplody is a chromosomal mutation in which a cell has entire extra sets of chromosomes. Instead of being diploid, in which the cell contains two sets of chromosomes, it may be triploid (three sets of chromosomes), or tetraploid (four sets of chromosomes). Polyplody is common in plants, and plant growers may exploit this fact to produce plants with flowers having double petals. Polyplody is generally lethal in animals.

74. Write the Function of the Ribosome?

Ribosomes have two main **functions** — decoding the message and the formation of peptide bonds. These two activities reside in two large ribonucleoprotein particles (RNPs) of unequal size, the



ribosomal subunits. Each subunit is made of one or more **ribosomal** RNAs (rRNAs) and many **ribosomal** proteins (r-proteins)

75. What Is Meant by Counter Shedding?

Counter shedding is a type of coloration commonly found in animals and means that the animal's back (dorsal side) is dark while its underside (ventral side) is light. This shading helps an animal blend in with its surroundings.

76. Write the Economic Importance of Phylum Myxozoa?

- ❖ The most economically important myxosporean is *Myxosoma cerebralis*.
- ❖ Which infects the nervous system and auditory organs of trout and salmon.
- ❖ Causing whirling or tumbling disease

77. What Is the Role of University of Wisconsin Madison Arboretum in Restoration Ecology?

Geologists from the University of Wisconsin-Madison backed up this theory by studying rocks and publishing the results in a 2008 issue of the journal Earth and Planetary Science Letters. "At [those levels of carbon dioxide], you would have had vicious acid rain and intense greenhouse [effects]. That is a condition that will dissolve rocks," said study team member John Valley

78. Phylum Ciliophora?

- ❖ About 9,000 species
- ❖ Some of the most complex protozoa
- ❖ Ciliates are widely distributed in freshwater and marine environments.
- ❖ A few ciliates are symbiotic.
- ❖ Cilia for locomotion and for the generation of feeding currents in water
- ❖ Relatively rigid pellicle and more or less fixed shape
- ❖ Distinct cytostome (mouth) structure
- ❖ Dimorphic nuclei, macronucleus and micronuclei

79. What Is Trichocyste?

- ❖ Trichocysts are pellicular structures primarily used for protection.
- ❖ They are rodlike or oval organelles
- ❖ Oriented perpendicular to the plasma membrane
- ❖ Pellicle can discharge trichocysts, which then remain connected to the body by a sticky thread

80. Write A Note on Origin of Eukaryote?



Endosymbiotic Theory

- ❖ Chloroplasts and Mitochondria evolved from symbiotic bacteria that lived inside of a larger prokaryote.
- ❖ Also known as Symbiogenesis
- ❖ Chloroplasts evolved from endocytosis of cyanobacteria
- ❖ Mitochondria evolved from endocytosis of aerobic bacteria.

Evidence of evolution of mitochondria

Membranes- Have double cell membrane

- ❖ DNA- Have circular DNA, like bacterial genome
- ❖ Reproduction- via budding, just like bacteria
- ❖ Size- similar size to bacteria (1-10 microns)
- ❖ Multicellularity
- ❖ Cell specialization, larger size, more complexity
- ❖ Volvox algae with division of labor

81. Kingdom of Eukaryota?

- ❖ Organisms whose cells have a nucleus enclosed within membranes.
- ❖ Contain other membrane-bound organelles such as mitochondria and the Golgi apparatus.
- ❖ Can be multicellular unlike to other domains.
- ❖ Cells make different types of tissues and systems
- ❖ Animals and plants are common examples.
- ❖ Evolved 2.7 billion years ago

Classification

- ❖ Kingdom Protista (unicellular eukaryotes)
- ❖ Kingdom Plantae
- ❖ Kingdom Fungi
- ❖ Kingdom Animalia.

82. Phyletic Gradualism?

Evolutionary changes are occurring gradually over millions of years. This concept, called phyletic gradualism

83. Structure and Function of Golgi Apparatus?

Golgi Body

Named after Camillo Golgi. An Italian biologist who discovered the organelle with a light microscope in 1897.



Structure

Located near the end of the ER close to the nucleus. Composed of several layers of cisternae (fluid-filled sacs)

Functions

- ❖ *cis* is first cisternae. *trans* is final cisternae.
- ❖ From trans, proteins are packaged into vesicles destined to lysosomes, secretory vesicles, or the cell surface.
- ❖ Transport vesicles are used to move back and forth between the ER and Golgi bodies
- ❖ One side of the Golgi body receives transport vesicles produced by the ER. This side is called *cis* face.
- ❖ Opposite side releasing vesicle is *trans* face.
- ❖ The Golgi body marks and sorts the molecules into different groups. These groups are sent in secretory vesicles inside or outside of the cell.
- ❖ Proteins are modified before sending by adding specific sugar molecules are added to a core oligosaccharide that is attached to a protein.

84. Characteristics of Bacteria?

- ❖ Average bacteria 0.5 - 2.0 μm in diameter.
- ❖ Surface Area $\sim 12 \mu\text{m}^2$
- ❖ Volume is $\sim 4 \mu\text{m}^3$
- ❖ Surface Area to Volume is 3:1
- ❖ Gel-like matrix of water, enzymes, nutrients, wastes and gases and contains cell structures like numerous ribosomes and polysomes.
- ❖ No endoplasmic reticulum and no membrane bound organelles.
- ❖ Location of growth, metabolism, and replication.

85. Composition of Matrix in Mitochondria?

- ❖ Enclosed in inner membrane
- ❖ Gel like consistency, Dense, homogenous.
- ❖ Contains 2/3 rd of total protein of mitochondria.
- ❖ Contains enzymes, DNA genome, ribosomes, tRNA, granules, fibrils and tubules.

In the mitochondrion, the matrix is the space within the inner membrane. The mitochondrial matrix contains the mitochondria's DNA, ribosomes, soluble enzymes, small organic molecules, nucleotide cofactors, and inorganic ions

86. Structure and Function of Microfilaments?

Structure



Microfilaments, also called **actin filaments**, are polymers of the protein actin that are part of a cell's cytoskeleton. They are long chains of G-actin formed into two parallel polymers twisted around each other into a helical orientation with a diameter between 6 and 8nm

Functions

- ❖ 3-D network inside cell membrane
- ❖ In muscle cells, actin filaments interact with myosin filaments to create muscle contraction.
- ❖ Cell movement
- ❖ Intracellular transport/trafficking
- ❖ Maintenance of eukaryotic cell shape
- ❖ Cytokinesis
- ❖ Cytoplasmic streaming

87. 62. What Is Panting?

Panting, a method of cooling, used by many mammals, most birds, and some reptiles, accomplished by means of the evaporation of water from internal body surfaces.

88. Phylum Microsporidia?

Microsporidia are obligate intracellular spore-forming parasites that are fungi or closely related to them. **Microsporidia** used to be classified as protozoa.

- ❖ Members of the phylum are commonly called microsporidia
- ❖ Small, obligatory intracellular parasites
- ❖ Several species that parasitize beneficial insects.
- ❖ ***Nosema bombicus*** parasitizes silkworms
- ❖ Causing the disease **pebrine or pepper disease**
- ❖ Worms hatching from the infected eggs will die in their larva stage
- ❖ ***N. apis*** causes serious dysentery in honeybees.
- ❖ These parasites have a possible role as biological control agents for insect pests.

Example:

U.S. Environmental Protection Agency has approved and registered ***N. locustae*** for use in residual of rangeland grasshoppers.

89. Differentiate Between Top-Down and Bottom-Up Effect?

- ❖ **Top-Down Effect:** Effect flows down through a trophic chain. From apex predator to lower trophic levels
- ❖ **Bottom-Up Effect:** Effect flows up through a trophic chain. From primary producers to higher trophic levels.



90. Examples of Zoomastigophorans?

Examples:

- ❖ *Trypanosoma brucei*: It has three sub species.
- ❖ *T. b. brucei*: Parasite of non-human. Common host are mammals of Africa
- ❖ *T. b. gambiense*: Causes sleeping sickness in humans
- ❖ *T. b. rhodesiense*: Causes sleeping sickness in humans

91. What Is Nematocyst?

- ❖ Fluid-filled, intracellular capsule enclosing a coiled, hollow tube
- ❖ A lid like operculum caps the capsule at one end
- ❖ The cnidocyte has a modified cilium called a **cnidocil**
- ❖ On stimulation, cnidocil discharge a coiled tube

92. Different Types of Pseudopodia?

Types of pseudopodia: Majorly amoeba has four types

- ❖ Lobopodia
- ❖ Filopodia
- ❖ Reticulopodia
- ❖ Axopodia

93. What Is Cytoskeleton?

The cytoskeleton is a network of filaments and tubules that extends throughout a cell, through the **cytoplasm**, which is all of the material within a cell except for the nucleus. It is found in all cells, though the proteins that it is made of vary between organisms.

- ❖ Cytoskeleton provides support and shape to cell
- ❖ Present in both eukaryotic and prokaryotic cell.
- ❖ It is a network of protein fibers
- ❖ Supporting cell shape
- ❖ Anchoring organelles within the cell

94. Classes of Coelenterate?

Classification

- ❖ Class Hydrozoa
- ❖ Class Scyphozoa
- ❖ Class Cubozoa
- ❖ Class Anthozoa



95. Characteristics of Protista?

- ❖ Protists are unicellular.
- ❖ It cannot be implied that they are simple.
- ❖ Often, they are more complex than any particular cell in multicellular organism.
- ❖ Organelles that are similar to the organelles of other eukaryotic cells carry out specific functions in protists.
- ❖ Some protozoan organelles, however, reflect specializations for unicellular lifestyles.

96. Annelida Circulation?

Circulation

- ❖ Segmented vessels expand and may be contractile
- ❖ Expanded segmented vessels surround the esophagus
- ❖ Propel blood between dorsal and ventral blood vessels
- ❖ Branches from the ventral vessels supply the intestine and body wall

97. Write the Functions of Chloroplast?

- ❖ Chlorophyll absorbs energy from light in form of photons.
- ❖ Transfer this energy to Photosystems present in thylakoid membrane.
- ❖ Photosystems convert light energy into chemical energy i.e., ATP and NADPH.
- ❖ ATP and NADPH are released into stroma.
- ❖ They are used to provide energy to run Calvin cycle in stroma to produce glucose.
- ❖ CO₂ and water are used as raw material for glucose synthesis.
- ❖ Synthesis of glucose and other oligosaccharides.
- ❖ Synthesis of structural carbohydrates like cellulose and starch.

98. Write Down the Coxal Gland and Malpighian Tubules?

1. Coxal Glands

The **coxal gland** is a **gland** found in some arthropods, for collecting and excreting urine. They are found in all arachnids (with the exception of some Acari), and in other chelicerates, such as horseshoe crabs. The **coxal gland** is thought to be homologous with the antennal **gland** of crustaceans.

2. Malpighian Tubules

Absorb waste material from the blood and empty them into the gut tract. Major excretory product is uric acid. Uric acid is excreted as a semisolid with little water loss

99. What Is Limits Selection?

- ❖ Evolution requires genetic variation



- ❖ Gene interactions affect fitness of alleles
- ❖ Genes have multiple effects

100. Different Types of Flagella?

- ❖ **Monotrichous:** one flagellum
- ❖ **Lophotrichous:** tuft at one end
- ❖ **Amphitrichous:** both ends
- ❖ **Peritrichous:** all around bacteria.

101. Three Orders of Class Reptiles with Example?

Classification

- ❖ **Order Testudines:** Tortoises, turtles
- ❖ **Order Squamata:** Snakes, lizards, worm lizards, Lizard like reptiles, single species, Sphenodon and Tuataras
- ❖ **Order Crocodilian:** Crocodiles, alligators, gavials

102. Process of Heat Formation in Mammals?

Thermoregulation is the ability of an organism to keep its body temperature within certain boundaries, even when the surrounding temperature is very different. A thermoconforming organism, by contrast, simply adopts the surrounding temperature as its own body temperature, thus avoiding the need for internal thermoregulation. The internal thermoregulation process is one aspect of homeostasis

103. Navigation in Birds?

Two Forms of Navigation

- ❖ Route based navigation
- ❖ Location based navigation

Animal navigation is the ability of many animals to find their way accurately without maps or instruments. Birds such as the Arctic tern, insects such as the monarch butterfly and fish such as the salmon regularly migrate thousands of miles to and from their breeding grounds and many other species navigate effectively over shorter distances.

104. Theria Infra Class Names?

Theria has 3 infra classes

- ❖ Infraclass Ornithodelphia Beaked **Example:** Monotremes
- ❖ Infraclass Metatheria Viviparous; primitive placenta **Example:** Marsupials
- ❖ Infraclass Eutheria **Example:** Placental



105. Thermoregulation in Reptiles?

The body temperature of a **reptile** will be exactly the same as its surroundings. **Reptiles** regulate their body temperature through what is called **thermoregulating**. Simply put this means basking in a warm area to heat up and moving to a cool area to cool down.

106. Explain the Characteristics of Nematodes?

- ❖ Triploblastic
- ❖ Bilateral
- ❖ Vermiform
- ❖ Unsegmented
- ❖ Pseudocoelomate
- ❖ Complete digestive tract
- ❖ Unique excretory system comprised of two or more renette cell
- ❖ Body wall has only longitudinal muscles
- ❖ Cuticle may contain spines, bristle papillae and ridges
- ❖ Pseudocoelom is a spacious fluid filled cavity
- ❖ Visceral organs
- ❖ Form hydrostatic skeleton
- ❖ May be herbivores, carnivores, omnivores and saprotrophs
- ❖ Feed on blood and tissue fluid of their hosts
- ❖ Complete digestive tract
- ❖ Excretion of nitrogenous waste
- ❖ Ventral gland cells, called **renette**
- ❖ Nervous system consists of anterior nerve ring

107. Median Eye in Reptiles?

Median (parietal) eye that develops from outgrowths of the roof of the forebrain. It is an eye with a lens, a nerve, and a retina. The parietal eye is also known as the third eye, **median eye**, or pineal accessory apparatus. It is found in two distinct groups of **reptiles** (order Squamata, suborder Saurian [Lacertilian], and order Rhynchocephalian)

108. What Are the Diagnostic Features of Phylum Mollusca?

- ❖ Body divided into three parts
- ❖ Head-foot, visceral mass and mantle
- ❖ Mantle secretes a calcareous shell
- ❖ Bilateral symmetry
- ❖ Coelom reduced to cavities surrounding the heart, nephridia and gonads



109. Function of Amnion in Amniotic Egg?

- ❖ Amnion protects embryo from desiccation,
- ❖ The amnion, along with the chorion, yolk sac, and allantois, form a series of protective barriers that provide a life-support system for the developing embryo. The four membranes work to exchange oxygen and carbon dioxide between the embryo and the placenta, to provide nutrients to the embryo, and to remove nitrogenous wastes from the embryo.
- ❖ The amnion forms a sac filled with amniotic fluid. The amniotic fluid acts as a buffer to protect the embryo from physical damage due to mechanical shock. The amniotic fluid also helps to prevent dehydration and desiccation by bathing the embryo. The amniotic fluid is released at birth when the amnion breaks. In humans, this is the phenomenon known as the mother's "waters" breaking

110. Characteristics of Chordata?

- ❖ Fresh water, saltwater, on land
- ❖ Bilaterally symmetrical,
- ❖ Four unique characteristics present at some stage in development:
 - ❖ Notochord, pharyngeal slits or pouches, dorsal tubular nerve cord, and postanal tail
 - ❖ Presence of an endostyle or thyroid gland
 - ❖ Complete digestive tract
 - ❖ Ventral, contractile blood vessel (heart)

111. Reproduction in Arthropods?

Arthropods reproduce by sexual reproduction, which involves the generation and fusion of gametes. Most arthropods are either male or female, and they undergo internal fertilization. Once the egg has been fertilized, the female usually lays the egg, and it continues developing outside of the mother's body. During most of their life cycle, arthropods have the segmented bodies described earlier. Early on in arthropod development, however, some species exist in intermediate stages that are very different from the adult form. These are called **larval stages**. None of the arthropod larval stages include the **trochophore larva** that is characteristic of molluscs and annelid development. You are probably most familiar with this process in caterpillars that form a cocoon in which they undergo a drastic change in form called **metamorphosis**, ultimately emerging as a moth or butterfly. Development involving larval stages is called indirect development. There are also many species, such as spiders, that undergo direct development, in which the young hatch looking essentially like a smaller version of the adult. These species do not go through larval stages or metamorphosis

112. Phylum Platyhelminthes And Classifications?

Platyhelminthes are triploblastic, bilaterally symmetrical, dorso ventrally flattened, acoelomate flatworms with organ grade of construction without a definite anus, circulatory, skeletal



or respiratory system but with Protonephridia excretory system and mesenchyme filling the space between the various organ of the body.

Classification

- ❖ Class Turbellaria (Free-Living Flatworms)
- ❖ Class Monogenea
- ❖ Class Trematoda (Flukes)
- ❖ Class Cestoidea (Tapeworms)

113. Characteristics of Mammalian?

- ❖ Mammary gland
- ❖ Specialized teeth
- ❖ Skin is thick and protective
- ❖ Three middle ear Ossicles
- ❖ Parental care
- ❖ Have hair
- ❖ Endothermic

114. Excretory System of Amphibia?

Excretory System

- ❖ Nitrogenous waste products are ammonia or urea
- ❖ Fresh water species excrete ammonia
- ❖ Terrestrial species excrete urea
- ❖ Osmoregulation by regulating excess of water and conserve essential ions (Na, Cl and other ions)

115. Main Body Parts of Hemichordate?

Body divided into three regions:

- ❖ Proboscis
- ❖ Collar
- ❖ Trunk

116. Features of Echinodermata?

- ❖ 7000 species are exclusively marine
- ❖ Pentaradial symmetry
- ❖ Skeleton consists of a series of calcium carbonate plates called Ossicles
- ❖ Water vascular system
- ❖ Series of water-filled canals, and their extensions called tube feet



- ❖ Hemal system derived from coelomic cavities
- ❖ Nervous system consists of nerve net, nerve ring and radial nerves

117. How Digestion Occur in Class Pisces??

Digestion

- ❖ Herbivore, carnivore and omnivore
- ❖ Complete gut
- ❖ With stomach/without stomach
- ❖ Liver, pancreas, pyloric caeca and endocrine system help in digestion

118. Respiratory System in Amphibia?

- ❖ Cutaneous respiration (salamander 30 to 90%)
- ❖ Buccopharyngeal respiration (1 to 7% total gas exchange)
- ❖ Pulmonary ventilation
- ❖ Sac like lungs

119. Basic Characteristics Of Class Pisces?

- ❖ In oceans and freshwater habitats around the world
- ❖ Streamlined body
- ❖ Fins and tail for locomotion
- ❖ Can be very fast swimmers like sharks
- ❖ Endoskeleton of cartilage or bones
- ❖ Use gills for respiration

120. What Is the Evolutionary Adaptation of The Class Pisces?

- ❖ **Streamlined Body (Boat-Shaped):** Streamlined body produces little resistance in water during swimming.
- ❖ **Swim Bladder** _ Swim bladders are hydrostatic organ. Fish can change its gravity by filling gas in the swim bladder. So, the fish can float higher or skin lower in water.
- ❖ **Fins:** Fins and tail for locomotion
- ❖ **Circulatory System:** Their heart has two chambers. It has afferent (which supplies blood to gills) and efferent (it carries away blood from gills) branchial system.
- ❖ **Respiratory System:** In most fishes, the respiratory organs are gills

121. Class Aves? Five Characteristics of Aves?

- ❖ Endothermic
- ❖ Spindle shaped body with four divisions



- ❖ Head, neck, trunk and tail
- ❖ Forelimbs modified for flying
- ❖ Epidermal covering of feathers and leg scales
- ❖ Presence of beak or bill
- ❖ Fully ossified skeleton with air cavities
- ❖ Covering of feathers is called a plumage

122. Nervous System of Echinoderm?

Nervous System

Nervous system consists of nerve net, nerve ring and radial nerves. Statocysts and another complex photoreceptor.

123. 98. Birds Flying Types?

- ❖ Birds wing act as airfoil
- ❖ Horizontal flight
- ❖ Gliding flight
- ❖ Flapping flight
- ❖ Soaring flight

124. 6 Classes of Arthropods.?

- ❖ Class Crustacea (lobster, prawns, barnacles, crabs)
- ❖ Class Diplopoda (Millipede)
- ❖ Class Arachnida (spider, ticks, mites, scorpions)
- ❖ Class insecta (grasshopper, cockroach)
- ❖ Class chilopoda (centipedes)
- ❖ Class Merostomata (only 3 genera of horseshoe crabs)

125. Classification of Invertebrate?

- ❖ Porifera
- ❖ Cnidaria
- ❖ Echinodermata
- ❖ Platyhelminthes
- ❖ Nematoda
- ❖ Annelida
- ❖ Arthropoda
- ❖ Mollusca

126. What Is Crypsis?



- ❖ In ecology, **crypsis** is the ability of an animal to avoid observation or detection by other animals. It may be a predation strategy or an antipredator adaptation. Methods include camouflage, nocturnality, subterranean lifestyle and mimicry.



**Education is not
preparation for
life, education is
life itself**