MUHAMMAD IMRAN

BT201 -Ecology, Biodiversity & Evolution-II

ALL PAST MCQs AND SOLVED QUESTIONS

QUIZ NO 1 | QUIZ NO 2 | GRAND QUIZ | MID TERM MCQs | FINAL TERM MCQs

FINAL TERM SOLVED QUESTIONS

Grand quiz

1. The complete and published genomes of plant by June 2005 _____ 4
2. The complete and published genomes of Apicomplex by June 2005 _____ 6
3. The complete and published genomes of Entamoeba by June 2005 _____ 1
4. The complete and published genomes of archaea by June 2005._____47
5. The complete and published genomes of animal by June 2005_____ 16
6. The complete and published genomes of bacteria by June 2005 _____ 211
7. The complete and published genomes of aves by June 2005_____ 1
8. The complete and published genomes of bacillariophyta by June 2005 _____ 1
9. The complete and published genomes of pisces by June 2005_____03
10. The complete and published genomes of mammalia by June 2005._____ 5
11. The complete and published genomes of nemaoda by June 2005._____2
12. The complete and published genomes of tunicata by June 2005._____1
13. The complete and published genomes of Kinetoplastida by June 2005._____2
14. the complete and published genomes of eukarya in total by June 2005 _____ 47
15. The complete and published genomes of insecta by June 2005._____4
16. The complete and published genomes of Myxomycota by June 2005._____ 1
17. The complete and published genomes of Rhodophyta by June 2005._____1
18. The members of Subphylum Crustacea contain ---------- pair(s) of antennae._____2
19. The complete and published genomes of fungi by June 2005._____14
20. The complete and published genomes of animals by June 2005._____16
21. Cladistics method was developed by _____Willi Hennig
22. The international human genome project initiated by the US national institutes of health and the US department of energy. was completion due in_____2005
23. The euchromatin part of the genome in Human Genome Project was not completed until mid.__ 2004
24. Similarity detection involves_____ in genome annotation._____ reference genome
25. Signal sensors don not detect____ in genome annotation._____ codon usage
26. Signal sensors detects____ in genome annotation._____ start codon
27. Signal sensors detects____ in genome annotation._____ TATA BOX
28. Stop codon is detected by ____ bioinformatics software._____ signal sensors
29. Poly-A signal is detected by ____ bioinformatics software. _____Signal sensors
30. Content sensors detect____ in genome annotation_____ G+C Content

31. The number of organisms whose genome has been sequenced completely and published is now approaching _____._____ **300**

32. Saccharomics is the study of all the …… in the cell _____ **carbohydrates**

33. …..elements that can 'jump' into the DNA of drosophila for introduction of foreign DNA. _____ **p**

34. Species richness is generally highest in …. latitudes, and then decreases to the north and south, with zero species in the Arctic regions. _____ **tropical**

35. Brittle star belongs to which phylum _____ **Echinoderms**

36. Leeches belong to phylum _____ **Annelida**

37. A ….. grouping consists of various species that lack a common ancestor _____ **polyphyletic**

38. A …. is a group of species that includes an ancestral species and all its descendants _____ **clade**

39. One of the following option is not an example of Ex situ conservation of species

_____ **natural parks and nature reserves**

40. the smallest units that can sustain life in isolation from all but atmospheric surroundings is known as

_____**Ecosystem**

41. Habitat destruction is a major cause for _____ **biodiversity loss**

42. Class Clitellata belongs to phylum. _____ **annelida**

43. The template nucleic acid used for translation is _____ **mRNA**

44. …… uses DNA and other molecular data to determine evolutionary relationships

_____**Molecular systematics**

45. Adult Echinoderms are _____ **radially symmetry**

46. Australopithecus afarensis was first bipedal hominid found in east Africa about _____**3.0-3.2 MYBP**

47. Phanerozoic consists of _____ **all of them**

48. In an individual organism, is the state of possessing different alleles at a given locus in regard to a given character? _____ **Heterozygosity**

49. The puffer fish, takifugu rubripes one-eighth of …… genome _____ **homo sapiens**

50. The kudzu plant was introduced to the….. from Asia in the late 1800s as an ornamental plant

_____**America**

51. Gymnosperms have _____ **naked seeds**

52. large areas of protected land for conservation of biodiversity and the traditional life of the tribals living there. _____ **Biosphere reserves**

53. Earliest fossils dated to 200 million years ago are _____ **Turtles and tortoises**

54. RNA shows enzymic (catalytic) properties called ------_____. **Ribozymes**

55. Genetic diversity, means that the population contains most of the possible alleles for each particular

_____ **gene locus**

56. Zoologist who study birds are called _____ **Ornithologist**

57. Some expert's estimate that around 30% of all species on earth will be extinct by _____**2050**

58. Different individuals carry different genetic information, The sum of the variation of an interbreeding population is called _____ **Gene pool**

59. sequencing using mass spectrometry, in which masses are estimated for ….. generated from proteolytic digests of the protein _____ **peptides**

60. how the birds are designed to fly?_____ _____ _____

_____**Three toes pointing forward and one toe pointing backward**.

61. Cynobacteria introduced significant amount of _____ **o2**

62. Ticks belong to phylum _____ **Arthropoda**

63. arctic communities include just a …..species packed into each cubic meter _____ **few**

64. ballooning occur in _____ **Chelicerata**

65. which of the following system is found in Echinoderms? _____ **system of internal skeleton**

66. ….. species are those species of plants and animals found only in a particular area and not found anywhere else. _____ **Endemic**

67. Which of the following structure is present in all the chordates_____ **Notochord**

68. The protease used in Mass spectrometry is _____ **Trypsin**

69. the study of ecology in urban areas and the interactions between organisms is called …. Ecology _____**urban**

70. One of the following is not the consequences of deforestation _____**Decrease in the level of carbon dioxide in the atmosphere**

71. Notochord is _____ **flexible**

72. Spider belong to subphylum _____ **Chelicerata**

73. human genome project the assembled the ….billion bp of DNA, _____**3.12**

74. the …..is a function of both the number of different species in the community (species richness) and their relative abundances _____ **Species diversity**

75. dinoflagellate belong to _____ **Protozoans**

76. larvae of Echinoderms are _____ **bilaterally symmetrical**

77. contribution of an individual's genotype to the next generation_____ **Fitness**

78. are the plants found in a particular area _____ **Flora**

79. Large scale areas of similar vegetation and climatic characteristics are known as _____ **Biome**

80. The study of transcriptomes is part of …..genomics _____ **functional**

81. Trochophore larvae develop, which are remarkably similar to the_____ **Molluscs**

82. Features that have no apparent function _____ **Vestigial Structures**

83. …..is the ordered division and naming of organisms _____ **Taxonomy**

84. Some species known as ….. have unusually strong impacts on community structure, preserving the balance of the community or even making its existence possible_____ **keystone**

85. Humans have been evolved about …. Year ago._____ **5 million**

86. Seeds can be maintained for decades or even centuries if the conditions are controlled _____**<5% humidity**

87. Crabs have ……. Body symmetry _____ **Bilateral**

88. Breeding in annelids occurs in _____ **spring**

89. …….. may also be used to determine the amino acid sequence of a protein.___ _____**Mass spectrometry**

90. In bioinformatics HMM stand for _____**Hidden Markov Models**

91. The molecular clock says ….. million years ago the human-chimp line split. _____ **~ 5**

92. Who is not an invertebrate? _____ **amphibians**

93. property of a human society in which ecosystems (including humans) are managed such that the conditions supporting present day life on Earth can continue. Is known as _____ **Sustainability**

94. The more variation, the better the chance that at least some of the individuals will have an …… that is suited for the new environment. _____ **allelic variant**

95. Pharyngeal gill slits_____ **are unique chordate characteristic**

96. Which of the following is a typical feature of prokaryotic cell _____**Absence of nucleus**

97. the silver carp, eats…, a key food for many native fish species _____ **plankton**

98. Evolutionary fitness is a measure of -_____ **Reproductive fitness**

99. The genome size of living organisms ranges across …. orders of magnitude,_____**09**

100. The laborious ..technique has now been replaced mostly by sequencing using mass spectrometry__ _____**edman degradation**

101. According to the International Union for Conservation of Nature (IUCN), globally about …..of all known species are threatened with extinction_____ **one third**

102. Which of the following are characteristics of prokaryotic cell _____ **all of the above**

103. sea squirt is a model and belongs to a group the _____**Urochordata**

104. Oxidizes amino acids, fatty acids and alcohol known as _____ **Peroxisome**

105. the velvet worm, , traditionally seen as a missing link between the ___**arthropods and annelids**

106. Loss of genetic diversity can imply lack of …and premature extinction _____ **evolution**

107. ….. is the evolutionary history of a species or group of related species _____ **Phylogeny**

108. The spread of Homo out of Africa is presumed to have taken place about …by Homo erectus _____ **1.5 MYBP**

109. coral reefs which are biodiversity hotspots will disappear in _____**20-40 years.**

110. 18th century, ….published a system of taxonomy based on resemblances ____**Carolus Linnaeus**

111. Ancient order inhabit few small islands of new Zealand _____ **Rhynchocephalia**

112. Invertebrates Makes up …. of all Animal species _____**95%**

113. The size of puffer fish, ….of the human genome _____ **one-eighth**

114. One of the following is not example of positive interaction among the microbes _____**Amensalism**

115. Gregor Mendel's experiments with plant hybridization led to his establishing _____**laws of inheritance**

116. Cockroach has ……. Body symmetry_____ **bilateral**

117. arabidopsis employs the …. photosynthetic pathway. _____ **C3**

118. A taxonomic method that uses a short genetic marker in an organism's DNA to identify it as belonging to a particular species _____ **Barcoding**

119. ecologists use to describe the composition of a community are species richness and …diversity _____ **species**

120. which is not a foundation species_____ **green algae**

121. Black carp eat…., limiting their availability for native fish and damaging shellfish populations _____ **mussels**

122. Haldane (1929): gave the _____ **"Hot, dilute soup" theory**

123. Genetic diversity is the variation at the level of _____ _____**both at individual genes, and In a population,**

124. …… carp illustrate the potential impact of invasive species _____ **Asian**

125. one of the following is the not part of maintaining balance of the ecosystem__ _____**protecting food crops**

126. levels of studying are _____ **Population Cell/Organism Organelle Molecule Atom**

127. .is a foundation species that forms the basis of the kelp forests off the coast of california._____ **brown algae**

128. **intermediate disturbance hypothesis** suggests that communities with a …may have greater species diversity than communities _____ **intermediate disturbance**

129. Humans are members of the order _____ **Primates**

130. Genetic modification of plants is achieved by adding a specific gene or genes to a plant, or by knocking down a gene with…., to produce a desirable phenotype. _____ **RNAi**

131. Class Polychaeta is the class of Phylum _____**Annelida**

132. A valid clade is ---, signifying that it consists of the ancestor species and all its descendants. _____ **monophyletic**

133. Extra chromosomal self replicating circular DNA molecules present in bacteria are called;____**plasmid**

134. In leeches, salivary glands excrete _____ which prevents the blood from coagulating.____**hirudin**

135. ..... mutations are often lost from a population over subsequent generations___ **Bad or lethal**

136. In which of the following animal sexual reproduction takes place?_____ _____**cockroach**

137. A taxonomic unit at any level of hierarchy is called a _____**taxon**

138. Methanogens fall under the domain of;_____ **Archaea**

139. Sharp beak instead of teeth is characteristic of;_____ **Order Chelonia**

140. _____ Species are species that have been introduced into areas outside their native range and can cause—or have caused—harm in their new area._____ **invasive**

141. Vestimentiferans belong to phylum _____ **Annelida**

142. ….assumes that the tree that requires the fewest evolutionary events (appearances of shared derived characters) is the most likely _____ **Maximum parsimony**

143. Krill is the major food for _____.**whales**

144. Ecologists use to describe the composition of a community are _____richness and species diversity._____**species**

145. Trypanosoma is spread by _____._____**tsetse fly**

146. On 26 June 2000, when US president _____, J. Craig venter of Celera genomics, and Francis Collins of the national institutes of health jointly announced that a working draft of the human genome had been completed._____ **B. Clinton**

147. Sea anemone has_____ body symmetry._____ **radial**

148. Who is not a model organism?_____ **hony bee**

149. --------- was probably the first hereditary molecule having the ability to copy itself.____ _____**RNA**

150. Populations of endangered species are small and tend to lose;_____ **genetic diversity**

151. Group of interacting and interbreeding organisms is known as; _____**population**

152. Systematists have proposed the----------, which recognizes only groups that include a common ancestor and all its descendents._____ **phylocode**

153. Species richness is the number of different species in a particular _____.**community**

154. Assigning functions to genes and recognizing _____ sequences in a model genome can greatly benefit from comparison with a set of carefully chosen reference organisms at defined phylogenetic distances._____ **promoter**

155. The following are the major activities of plant breeding One of following gives the correct sequence of events in Plant breeding _____ **Collection of variation. Selection Evaluation Release**

156. The.., , traditionally seen as a missing link between the arthropods and annelids _____**velvet worm**

157. Centipedes belong to subphylum_____. **myriapoda**

158. The international human genome project initiated by the US national institutes of health and the US department of energy, was launched in _____-__.**1990**

159. Which one is an extinct group of arthropoda?_____ **crustacea**

160. Acritarchs are very likely the cysts of;_____ **algae**

161. _____ theory states that groups of similar organisms are descended from a common ancestor _____ **Evolutionary**

162. Seeds which are not of agricultural importance yet hold traditional importance; these seeds are kept in seed banks and are still maintained by some gardeners and farmers are known as;_ _____**Heirloom**

163. By june 2005, no fewer than prokaryotic organisms and 496 eukaryotes were the subject of ongoing genome sequencing projects. _____**730**

164. …..and wildlife can be conserved by setting up areas like Biosphere reserves Wildlife sanctuaries, National parks, etc. _____ **Forest**

165. ….. is the study of all low molecular weight cellular constituents. _____ **Metabolomics**

166. If for genetic modification genes of the species or of a crossable plant are used under control of their native promoter, then they are called_____ **cisgenic plants**

167. Aves are ----_____- , **both A and B**

168. The locomotary organ of echimnoderm are called ------._____ **Tube feet**

169. Antibiotic resistance gene rapidly spread within and between bacterial populations by transposons called ._____ **R plasmid**

170. Two million people died in potato famine in ---_____. **Ireland**

171. The international human genome project initiated by US was completion due in. _____**2000**

172. The proterozoic eon alone accounts for ---- of all geologic time. _____**42.5**

173. Haldane 1929 gave the ----_____ **Hot dilute soup theory**

174. CRF stands for-----_____**Conditional random field**

175. Wormlike and algae fossils come from ----- million years old rock in china. _____**700-900**

176. Homo sapien are believerd to have originated around how many years ago. _____ **100,000-200,00**

177. Class squamata has ------.Backbones of _____**100-400 vertebrates**

178. The -----synthesize glucose using sloar or chemical energy which is broken down through respiration._____**Autotrophs**

179. By 2 billion years ago free oxygen was appearing in the atmosphere due to the activity of --- _____**Photosynthetic bacteria**

180. Which of the following is not true about Diatoms? They cannot perform photosynthesis

181. Dinoflagellates belong to_____. _____**Protozoans**

182. Toucans is a _____._____ **Tropical Bird**

183. Fundamental characters of chordates are;_____ **A and B both**

184. The complete and published genomes in total by June 2005 was._____ **279**

185. Spiders belong to subphylum_____._____ _____**Chelicerata**

186. The order of Turtles is _____.**Chelonia**

187. The _____ plant was introduced to the United States from Asia in the late 1800s as an ornamental plant, and it and was planted widely in the South in the early 1900s to reduce soil erosion._____ **Kudzu**

188. Areas reserved for wildlife where they can freely use the habitats and natural resources are;_____ **National parks**

189. Fauna are the ---------- found in a particular area._____ **Animals**

190. Bilateral symmetry is seen in the body organization of;_____ **Only chordates**

191. Some tropical rainforest communities have _____ numbers of species packed into each cubic meter_____ _____**Huge**

192. Phylum Arthropoda contain ---------- species._____ **900,000**

193. Cystic fibrosis trans-membrane conductance regulator gene regulates ____ ion transport across the plasma membrane._____ **Cl**

194. Sea cucumbers are a member of the phylum_____. **Echinodermata**

195. Notochord is replaced by;_____ **Vertebral column**

196. Cystic fibrosis trans-membrane conductance regulator gene is located on human chromosome number_____. **07**

197. The velvet worm is traditionally seen as a missing link between the_____ _____ **arthropod and annelida**

198. The third gene identified through positional cloning was the _____ transmembrane conductance regulator gene._____ **Cystic fibrosis**

199. Which of the following caused Irish potato famine resulting in deaths of almost 2 million people?_____ **Mildew and Water Molds**

200. ------ is the number of different species in a particular community._____ **Species richness**

201. Ecdysis is the characteristic of phylum _____._____ **Arthropoda**

202. Microlesions are;_____ **Both a and b**

203. Genetic diversity is the variation at the level of_____ _____ **both at individual genes and In a population**

204. Physical location of a gene is known as;_____ **Locus**

205. The notochord is a flexible and non-rigid rod-like structure resulting from _____. **Mesoderm**

206. Herpetology is the study of____._____ **Reptiles and amphibians**

207. A supportive rod that extends dorsally in the animals to the body cavity into the tail is called;_____ **Notochord**

208. Plant breeding is a practice estimated to Date Back;_____ **9,000 to 11,000 years**

209. _____ is a genomic model because it produces surfactants._____ **A. borkumensis**

210. Humans are a member of the family;_____ **Hominidae**

211. Two DNA molecules may recombine segments of their molecule in a process called;_____ **Crossing over**

212. The first human ---------- seems to have an angle between the femur and tibia (Upper and lower leg) that is intermediate to that of humans and gorillas_____**Australopithecus afarensis**

213. Cystic fibrosis transmembrane conductance regulator gene was identified in _____ **1989**

214. The highest number of mammal species, _____ per square kilometer, occurs in the Amazon region of South America._____ **179-228**

215. In vitro early earth conditions were recreated by;_____ **Stanley Miller**

216. Nodes in gene tree relate either to speciation or gene duplication events._____**Duplication**

217. One of the following is NOT the example of Positive interactions among the microbes_____ _____**Amensalism**

218. Which of these is true for members of Animal Kingdom?_____ **None of these**

219. Earthworms belong to phylum _____._____**Annelida**

220. In Phylum Echinodermata, the ossicles may compose up to -- of dry body weight._____**80%**

221. Trochophore larvae of annelids are remarkably similar to the _____._____**Molluscs**

222. Over _____ % of global fisheries are being overfished at unsustainable levels._____ **25**

223. The two-part scientific name of a species is called a;_____ **Binomial**

224.

225.

QUIZ NO 01

1. **In protozoa era only ---------- are recognized.** _____**Bacteria**
2. **------- mutations are often lost from a population over subsequent generation.** _____**Bad or lethal mutations**
3. **Evolutionary fitness is a measure of ----------.** _____**Reproductive fitness**
4. **Coral reefs which are biodiversity hotspots will disappear in -------- year** _____**2040**
5. **In the 18th century Carolus Linnaus published a system of taxonomy based on resemblance . two key features of his system remain useful today two part names of species and hierarchical classification._____ Two part names for species and hierarchical classification**
6. **One of the following is not a part of maintaining balance of the ecosystem.** _____**Protecting food crops**
7. **Gregor Mendals experiments with plant hybridization led to the establishing.**_____ **Laws of inheritance**
8. **Haldane 1929 gave the ----------.**_____ **Hot dilute soup theory**
9. **---------- uses DNA and other molecular data to determine evolutionary relationship.** _____**Molecular systematic**
10. **In genome evolution gene number and the complexity of an organism-------.**

_____Are not strongly linked

11. Medicines from nature account for usage by -------- of the world population. _____80%
12. One of the following is not the consequences of deforestration.
_____ Decrease in the level of CO2 in the atmosphere
13. Large scale areas of similar vegetation and climate characteristics is --------. ____Biome
14. If for genetic modification genes of the species or of a crossable plants are used under control of their native promoter then they are called --------- plants. _____Cisgenic

MID TERM

1. Humans are included in the order ----------._____primates
2. The field of biology specializing in storing and analyzing data -------. _____Bioinformatics
3. The possibility of working with molecules on the scale of few micrometers is called ----- .
_____micro ecology
4. First question asked when a species is bought for genome sequencing ----------
_____ What is the size of its genome
5. The study of transcripts that are present at any time in the cell are called --------
_____transcriptomics
6. Importants measures used to describes community composition are ---------
_____ Species richness and species diversity
7. Vertebrates makes --------- % of the animals . _____5%
8. The number of allelle in a sample ----------. _____Allelic richness
9. Mass spectromatry used to determine ----- sequence.____ Amino acid sequence of protein
10. Oparin 1924 work ----------. _____Primeval soup theory
11. Quinine is obtained from quina it is used to treat ----------._____ Malaria
12. The common extension of genomics are except ---------. _____Vaccinomics
13. To assemble a genome from a series of sequence fragment require tremendous.
_____Computational power
14. The first genome sequenced completely was that of ----------. _____Hemofelues influenza
15. The ------- technique has now been replaced mostly by sequencing using mass spectrometry._____ Edman degradation
16. Annelids do not have feeling style -------. _____Filter feeders
17. Modern bread wheat is a mixture of recombined genes from --------._____ 3
18. Gymnosperms means ---------. _____Naked seeds
19. Medicines from nature account for usage by --------- of the world population. _____80%
20. Habitat destruction is the majorcause ---------. _____Biodiversity loss
21. Coral reefs which are biodiversity hotspot will disappear in ----------. _____20-40 years
22. Plants found in a particular area is ----------. _____Flora
23. Gregor mendal eperiments with plants hybridization led to this establishing of -_
_____Law of inheritance
24. Genetic modefication of plant is achieved by adding a specific gene or genes to a plant or by knocking down a genewith to produce a desirable phenotype. _____RNAI
25. They posses hotochord in any period of their life --------. _____Chordata
26. One of the following is not the consequences of deforestration ----------
._____Decrease in the level of carbon dioxide in the atmosphere
27. If for genetic modefication genes of the species or of a crossable plant are usedunder control of their native promotor then they are called --------- plants. _____CISGENIC

28. The following are the major activities of plant breeding one of thefollowing , gives the correct sequence of events in plant breeding ----------
._____Collection of variation , selection, evluation, release

29. One of the following is the NOT part of maintaining balance of the ecosystem. ---------
_____.Protecting food crops

30. Which one is not related to human genome project --------- three synteny _____analysis, phylogentic, foot printing, phylogenetic shadowing. Other than following

31. Species differ from foundation species in that they are more like to belong to
_____All of above

32. Which is not related to endosymbiosis ----------. _____Prokaryotic cell study

33. Which is not the part of horizental gene transfer----------. _____
_____Conjugation, transformation, transduction. Other than these

34. Which one in not related to protozoa reproduction. _____ Parthenogensis

35. Taxonomy was established by ---------. _____CAROLUS LINNAEUS

36. Linus Pauling called science a way to find truth or logic , select correct. _____Truth

37. ---------- assumes that the tree that requires the fewest evolutionary events is the most likely._____ Maximum parismony

38. The field of biology specializing in developing hardware and software to store and analyze the huge amount of data being generated by life scientists --_____Bioinformatics

39. There are some so called --------- to identify ecologically genes in incompletely genome.
_____Pregenomic molecular approaches

40. The international human genome project initiated by except ----------.
_____US national institutes of genetics

41. Comparative genomics is developing an increasing array of bioinformatics technique except ----------. _____Synteny shadow

42. Keystone species differ from foundation specie higher trophic level and top predator , tend to modefy their environment. _____All give above

43. Eukaraya have been evolved from since --------- million year ago. _____Two

44. Group consisting various species that lack a common ancestor called ---__polyphlyletic

45. Types of selection which favor more than two extreme phenotype is -
_____ Disruptive selection

46. Which of the following is not mode of feeding of annelids ----------._____ Predators

47. A philospher concept of value of something independent of its value to anything else called -------._____ Intrinsic value

48. Krill is a major food for ---------. _____Whales

49. Most important measures ecologists use to describe composition of community are ----- ----. _____Species richness and species diversity.

50. Major technological developments of 1990 computing, communication, micro technology.
_____All of above

51. --------- are found in more than one copy in the genome. _____Paralogus genes

52. In Edman degradation technique study of all the proteins in the cell which is not related. _____Fragment pattern is not compared with genomic sequence
53. Which is not true about protein degradation. ------_____Sequencing using mass spectrometry replaced by degradation
54. ……..is used to cleave the protein. _____Trypsin
55. Arabia thaliana's is……..._____ Fly
56. All peptide technique are…….. _____All
57. …….. Is used to predict the protein structures. _____Mass spectrometry
58. Trochophore resembles like …….. _____Larvae
59. Plasrnid size …….. _____2 to 200 bp
60. Humans differ from gorilla…….. _____bipedal
61. That's are transfer …….. _____Traits
62. Kimber Ella is …….. _____Animal.
63. Coral reef are disappeared due to …… _____Global Warming
64. Vertebrates are …….. _____5%
65. …….. The possibility of working with molecules on the scale of a few micrometers, _____Micro ecology
66. Which institute was not involved in human genome project? …_____ U.S...Center of health
67. Krill component of plankton major food for ----------. _____Whales
68. Muscular pharynx of annelids is called ---------. _____Eversible proboscis
69. Segmentation is confined to rear portion of annelids called --------. _____Opisthosome
70. Zoologist that study birds known as ---------. _____Ornithologist
71. Birds are ----------. _____Homeothermic
72. Turtles and tortoise belong to order ----------. _____Chelonian
73. Biodiversity is the result of 3.5 billion years of ----------._____ Evolution
74. 80% of human food supply comes from -------- kinds of plants. _____ 20
75. ------- is the application of biotechnology and molecular biology. _____Molecular breeding
76. Edward Wilson described the ----------._____ Acronym
77. ---------- of all species on earth will be extinct by 2050. _____ 30%
78. -------- ecosystems are the most threatened ecosystems. _____ Freshwater
79. Over ------- of global fisheries are being overfished. _____25%
80. Ayubia national park is the first --------- in Pakistan. _____Reserve forest
81. Effective population size is much smaller than ------ population size. _____Census
82. Seeds can be maintained in seed bank at ----------. _____ 20℃
83. CITES the convention in international trade in endangered species set up in --------.___ 1988
84. Plasmids size ----------. _____2-200bp
85. Conjugation, transformation and transduction are --------- gene transfer. _____Horizontal
86. Oparian 1924 gave the --------. _____Primeval soup theory
87. RNA shows enzymic properties called ------. _____Ribozymes
88. Analogies are also known as ----------. _____Homoplasis
89. --------- years ago free oxygen was in atmosphere. _____2 billion years
90. Human order primates consist of -------- species. _____180

91. ---------- groups of organisms by common descent. _____Cladistics
92. All known protozoic animals wre ----------._____ Softed bodied
93. Malaria is caused by plasmodium technically a member of phylum ---------._____ Sporozoa
94. Lyme disease caused by ----------. _____Tick
95. Larva of annelids trochophore similar to the ----------._____ Mollusks
96. Gut tissues form an organ ----------. _____Trophosome
97. Trophosome play a role in ----------. _____Nutrition
98. --------- is a small ball above the tube foot. _____Ampullae
99. Vertebtrates are evolved from ---------- 540 million years . _____chordates
100. Chordates are bilaterian animals that belong to clad of animals known as ----------. _____Deterostomia
101. The study of traditional reptile orders ----------._____ Herpetology
102. Humans use ---------- species for food clothing and shelter. _____40,000
103. --------- of all mammals will be extint in 20 years. _____20%
104. The sum of the variations of an interbreeding population is celled -------__----- gene pool
105. Homology is similarity due to ---------- b/w wolf and coyote. _____Shared ancestory
106. Analogy is similarity due to --------- in similar condition. _____Convergent evolution
107. A ---------- is a group of species that includes on ancestral species._____ Clade
108. ---------- an anmal from latest proterozoic rocks in Russia. _____Kimberella
109. Three types of homology, 1-structural 2-developmental 3-genetic _____ All
110. Homologus structures ----------. _____Same structure & different functions

MUHAMMAD IMRAN	BT201 Ecology, Biodiversity & Evolution-II
LESSON NO 51 TO 61	QUIZ NO 02
77 MCQs	

1. Light within this band, which is called photosynthetically active radiation, or PAR, accounts for about ….% of the total energy content of the solar spectrum at sea level. _____45
2. Light within photosynthetically active radiation band ranges from ….to…. nm._____ 400-700
3. In 1997 ……..% of the global human population was spread across Africa_____12.8
4. ……. Realized life could not all be ordered in a single chain._____ Lamarck
5. Co-operative groups of females in African lions are called ……_____ prides
6. ……. Showed that the claims of undeniable catastrophes in the record where much exaggerated ._____ Lyell
7. …… found a significant positive correlation between population size and genetic diversity in populations of chihuahua spruce._____ Ledig
8. The type of survivorship in which there is fairly constant probability throughout the life is called …….._____ type II
9. In 1997 ……. % of the global human population was concentrated in Asia._____61.4

10.…… explored the unity of parts and their patterns of development-skeletons in different vertebrates._____ **Hilaire**

11. The relationship between photon flux density and plant photosynthetic rate is called _____**photosynthetic response.**

12.….. is not involved in exploring the extent and source of morphological vibration in plant population including both the influences of environment and genetics._____ **Kerner**

13. One of the most fundamental social interactions between individual take place during._____ **sexual reproduction.**

14. Photosynthetic plants and algae use light, of wavelengths between….. and …..nm, as a source of energy _____ **400 and 700**

15. The turnover of water in the various reservoirs of the hydrologic cycle ranges from only …….days for the atmosphere to 3,100 years for the oceans._____ **9**

16. The first biologists to conduct thorough studies of phenotypic and genotypic variation and to incorporate experiments in their studies, focused on_____ **plants**

17. Only ……. Is a desert plant genus _____**Encelia**

18.……..identified four basic body plans for animals– vertebrates, molluscs, arthropods, and radiata (jellyfish & others)_____ **Cuvier's**

19. The nature of …….assemblages is being used to assess the "biological integrity" of freshwater communities._____ **fish**

20.……. reported that soapberry bug populations living on native and introduced host plants have undergone natural selection for traits that favor their survival and reproduction on particular host plant species_____ **Carroll**

21.……..are the most tropically diverse organisms in the biosphere._____ **Bacteria**

22. He cited teeth in fetal baleen whales_____ **Lamarck**

23. Kelp forests are generally limited to areas where temperature ranges from about …….. ^{0}C to …….^{0}C _____ **10°to 20^{0}C**

24. The salinity of lakes, which ranges from very dilute waters to over …..‰, is much more variable than that of the oceans_____**200**

25. The …..distribution of a population reflects its history of survival, reproduction, and potential for future growth._____ **age**

26. Water potential, osmotic pressure, and vapor pressure deficit can all be measured in _____**pascals**

27. Detritivores feed on dead ……material, which is even lower in nitrogen than living plant tissues._____ **plant**

28.…… showed that island populations generally include less genetic variation as compare to mainland population._____ **Frankham**

29.camel and……, use similar mechanisms to survive in arid climates.____ **saguaro cactus**

30. Plants and ectothermic animals regulate their heat exchange through their _____**Both**

31.niches of Galapagos finches are largely determined by their_____ **feeding**

32. In 1997, …….. % of the global population was spread across oceanic island _____**0.1**

33. Of the water in the biosphere, the polar ice caps and glaciers contain_____**2%**

34. Optimal foraging theory attempts to model how organisms ……as an optimizing process_____ **feed**

35. expanded the logistic model of population growth to represent interspecific competition.__ _____**Lotka**

36. The turnover of water in the various reservoirs of the hydrologic cycle ranges from only 9 days for the atmosphere to ……years for the oceans _____ **3,100**

37. Schoenerused replicated field experiments to study natural selection for changes in morphology in Anolis ……populations_____ **lizard**

38. The trophic diversity of……., which is critical to the health of the biosphere, can also be used as a tool to address some of our most challenging waste disposal problems _____ **bacteria**

39. low mortality among the young but high mortality among older individuals is …… **survivorship**_____ **type I**

40. Since the environment is steadily changing for….., some plants and animals will become extinct because they're no longer adapted to the environment they're in_____ **Lyell**

41. Reported that the difference in growth form were the result of temporary adjustments to environmental variation and not hereditary changes in the experimental plants._____**Kerner**

42. a state of reduced metabolism that may last several months_____ **tropor**

43. Kelp forests are found mainly at …..latitudes_____ **temperate**

44. Kelp beds share several structural features with ……. Forests. _____ **terrestrial**

45. The relationship between food density and animal feeding rate is called the_____ **functional response.**

46. Leafhoppers are an example of …….. competition._____ **Intraspecific**

47. He added the concepts of the fundamental niche, the physical conditions under which a species might live in the absence of other species,_____ **Hutchinson**

48. In 1997, …….. % of the global population was spread across Australia_____**0.3%**

49. a state of low metabolic rate and lowered body temperature, when food is scarce and night temperatures cold_____**tropor**

50. C4 and CAM plants are more …..in their use of water than are C3plants. _____**efficient**

51. ……. found that higher heterozygosity (genetic diversity) was associated with lower rates of population extinction_____ **Saccheri**

52. instead of dying out (in most cases, anyway) ancient animals and plants evolved into different forms that continue today was by _____ **Lamarck**

53. The first biologists to conduct thorough studies of phenotypic and genotypic variation of plants was _____. **Bonnier**

54. ____ studies provided evidence for genetic differences among populations.__**Turesson's**

55. Population growth stops when populations reach a maximum size called the_____ _____**. carrying capacity**

56. On land, the tendency of water to move from organisms to the atmosphere can be approximated by the vapor pressure deficit of the_____ **air**

57. The water potential of pure water, which by convention is set at_____ **0**

58. Population densities in different regions vary from less than 1 person per square kilometer to nearly …..persons per square kilometer_____ **1,000**

59.……may enter a state of torpor_____ **Hummingbirds**

60.One of the best predictors of rm is_____ **body size**

61.The ……reflects the environmental requirements of species _____ **niche**

62.Plants appear to allocate ……to roots versus shoots in a way that increases their rate of intake of the resources that limit their growth. _____ **energy**

63.Chemosynthetic autotrophs, which consist of a highly diverse group of chemosynthetic_____ **bacteria**

64.Of the water in the biosphere fresh water is less than ……% _____ **1**

65.…….replicated field experiments to study natural selection for changes in morphology in Anolis lizard populations. _____**Warhelt**

66.Reef-building corals are limited to areas with temperature of about __ C to ___C. ____**18-29**

67._____factors affect the population growth, _____**both**

68._____ replicated field experiments to study natural selection for changes in morphology in Anolis populations. _____**Losos**

69.The niche of salt marsh grass is determined by _____. _____**Tidal levels**

70.In 1997, ____ % of the global human population, was spread across South America.___ **(5.7)**

71.Photosynthetic plants and algae ……as a source of carbon and light from the sun _____ **CO2**

72.Both seaweeds and reef-building corals grow only in _____ waters. ___ **surface waters**

73.In 1997, about _____ billion people of the global human population, were concentrated in Asia._____**3.5**

74.Self-thinning occurs in _____ as a competition for their survival._____ **Plants**

75.The type of survivorship having high mortality among the young and low mortality among older individuals is_____. _____**type III**

76.Of the water in the biosphere, the oceans contain _____% water_____**97**

77.____ replicated field experiments to study natural selection for changes in morphology in Anolis populations._____ **Schoenerused**

78. ……are the most trophically diverse organisms in the biosphere._____ **Bacteria**

1- **-------- factors effect the population growth. Abiotic, biotic _____** **both**

2- **The physical environment limits ------ distribution of species. _____**Geographic

3- **Community changes during succession include ------- in species diversity. ___**Increase

4- **A food web summarizes the ---------- relations in a community._____** Feeding

5- **Percentage of oceanic water on earth is ----------. _____**97%

6- **Leaf hoppers are an example of --------- competition. _____**Intra specific

7- **Secondary forest succession on the piedmont platean takes about --------. Years. ___**150

8- **A species that is dependent on other organism is called as --------. _____**Obligate

9- **The total amount of energy fixed by all the autotrophs in the ecosystem is ---------- production. _____**Gross

10- **On islands and habitat patches on continents, species richness --------- with area.**

_____Increase

11- **Plants and ectothermic animals regulates their heat exchange through their ----------.**

Morphology & behavior _____ both

12---------- **studies provided evidence for genetic differences among populations.**

_____Tureson,s

13- **C4 and CAM plants are more ---------- in their use of water than C3 plants.** _____Efficient

14- **----------- use organic molecules.** _____Heterotrophs

1. Recent research in Kenya has shown that a crayfish controls the_____ _____Snails
2. The rate of decomposition in terrestrial ecosystems increases with content of litter._____N
3. discovered five coexisting warbler species feed in different layers of forest vegetation_ _____ _____Robert MacArthur
4. Reef-building corals depend upon mutualistic relationships with,____ ____Algae and animals
5. Though intense human disturbance reduces species diversity. moderate levels of disturbance may increase the diversity of some such as the European chalk grasslands._____ ___communities
6. Human disturbance also increases export of from aquatic catchments.__ _____Phosphorous
7. A food web summarizes the feeding relations in a_____ _____Community
8. Total amount of energy fixed by all the autotrophs in the ecosystem is___ _____ _____ _____Gross primary production
9. proposed that high diversity is a consequence of continually changing conditions, not of competitive accommodation at equilibrium.___ _____Joseph Connell
10. He found that even the so-called simple communities included very complex feeding relations._____ Charles Elton

FINAL TERM

1. **On Island and habitat patches on continents ----------.** _____Species richness increase with an area and decrease with isolation.
2. **Succession in the intertidal zone require --------.** _____1-3 years
3. **Highest rate terrestial primary production occur under ------.** _____Warm and moist conditions
4. **-------- in physical and chemical conditions across aquatic and terrestial environment can account for significant portion of the diversity among planktonic algae and terrestial plants --------.** _____Heterogeneity
5. **The refuges that promote the persistance of hosts and prey include ----------.** _____Secure places to which the exploiterhas limited access
6. **The environment limits population growth by -------.** _____Changing birth and death rate
7. **An environment in which resources are patchy also fosters--------.** Clumped distribution
8. **Eusoctalty is -------- .** _____more complex level of social behavior which is considered to be the pinnacle of social evolution
9. **The most familiar relative measures of watercontent of air is --------.**___ relative humidity
10. **The rate at which organism can take in energy is ------- either by external or internal constraints --------.**_____ Limited
11. **The earth ecosystem interacting with physical environment as a whole maintained a steady state system intermediate in the flow of energy between the high input of the sun and thermal sink os specie is called ----------.**_____ Biosphere
12. **Ist multi cellular organism found in China as carbonaceous filament were --------** .**_____** 1.8 billion years
13. **Multicellular algae appear as carbonaceous filament from -------- old rock of china.**

_____1.8 billion years

14. Human is in which order ----------._____ Primates

15. Maximum parsimony assume that the -------- is the most likely the. _____Tree that require the fewest evolutionary events

16. Oparian in 1924 gives ----------. _____Primeval soup theory

17. In 18th century Carlus Linnaeus published a system of taxanomy on resemblance------ _____. Two parts names of species and hierarchiel classification

18. One of the following is not example of horizental gene transfer ---------._____ Conjunction

19. Which one of the following is not one of the positive interactions on microbe-------. _____Amensalism

20. Not positive interaction ----------._____ Competition

21. ---------- type of natural selection which favor more than two extreme phenotype is ------- ._____ Disruptive selection

22. Which one of the following is not one of the advantages of in situ conservation ----------. _____The species have less space

23. The advantage of in situ conservation except ----------. _____The specie will not evolve in their environment

24. Which of the following is not common extension of omics --------._____ Vaccinomics

25. Verebrates make ---------- % of total animals. _____5%

26. Gymnosperms means ----------._____ Naked seeds

27. Protozoa reproduce except ----------. _____Parthenogenesis

28. Number of alleles in a sample population is called ----------. _____Allelic richness

29. One of the first question that is asked when a species is considered for whole genome sequencing is ----------. _____What is the size of its genome

30. Modern bread wheat is a mixture of recombined genes from ---------- different wild species . _____Three

31. Quinine is a drug used to treat ---------. _____Malaria

32. Annelids are not ----------._____Predator

32. Species differ from foundation species is that are likely to belong ----------. _____Higher trophic levels

34. The ------- technique has now been replaced by sequencing using a mass spectrometry ---------._____ Laborios edman degradation

35. The first genome sequenced completely was that of -------._____ Homophilus influenza

36. To assemble a genome from a series of sequences requires tremendous ----------. _____Computational power

37. Community structure is measured by ----------. _____Species richness and diversity

38. A resilient community or ecosystem may be ---------- disrupted by distrubance but quickly return to former state._____ Completely

39. The ability to bounce back after disturbance is called ----------._____ Resilience

40. --------- demonstrated that the influence of consumers on community structure depends upon their feeding preferences, their local population density and the relative competitive abilities of prey species . _____Jane lubchenko

41. Notochord is present throughout life oe at least during embryonic stages in ----------. _____Chordates

42. Possibility of working with molecules on the scale of few micrometers is --------- ._____ Micro technology

43. Phylogenetic trees are evaluated in order to find the relationship among ----------. _____Species , phylum, family. All of given

44. Field experiment has ---------- points._____ Four

45. There are so called ---------- that may be used to identify ecological important genes in incompletely characterized genome. _____Pre-genomic molecular approaches

46. ---------- are using these new toools to study large scale dynamic ecological phenomenon such as international variation. _____Ecologists

47. The local population is density of the Glanville Fritillary --------- Meliteacinxia , is lower on larger and on isolated habitat patches._____ Butterfly

48. ---------- cells are combination of proteins synthesing system. _____Eukaryotes
49. Sonoran desert plant distribution map clearly on the soils of different ages and form a mosaic that closely matches soil mosaic. _____Vegetative
50. --------- occur on nearly exposed geological substrate not significantly modified organism. _____Primary succession
51. Supporting evidence for endosymbiosis except ------- comes from studies of living. Prokaryotic _____cells
52. ---------- can be used to detect long term ecological changes. _____Repeat photography
53. Who worked on the developing of paleontology --------. _____Smith,buckland, curvier, brongniart
54. A food ---------- summarizes the feeding relation in a community. _____Web
55. -------- proposed the feeding activities of few species have inordinate influence on community structure. _____Robert Paine
56. Hardy Weinburg principle conditions necessory to maintain constant alleles frequences in a population except ---------. _____Immigration
57. ---------- indepently expanded the logistic model of population growth to represent interspecific competition._____ Lotka Volterra
58. --------- explored the extent and sources of morphological variation in plant population including both the influence of environmrent and genetics. __Clausen, Keck, and Hiesey
59. The validity of field experiments depend upon several design features except ------- _____ Knowledge of final conditions
60. Populations include --------- variations among individuals which are significant aspect of population structure. _____ Genetic and phenotypic effects
61. ---------- soon found that even these so called simple communities included vary complex feeding relations. _____Charles Elton 1927
62. If for genetic modefication genes of the species or of a crossable plant are used under control of their native promoter, then they are called --------- plants. _____Cisgenic
63. A philosphical concept of value of something independent of its value to anything else is called ----------. _____Intrinsic value
64. Mass spectrometry is replaced by ----------._____ Edman Degradation
65. Which of the following is an example of negative interaction. _____Amensalism
66. The Noble Prize winning scientist Linus Pauling aptly described as the ---------. _____Search for truth
67. Study of transcripts that are present in an organism any time is called ------. _____Transcriptomics
68. Mass spectrometry is used to determine the sequence of --------. _____Amino acids
69. Which of the following is not part of human genome project----------. _____US department of medicines
70. Comparatvie genomics is developing an increasing array of bioinformatics techniques, which of the following is not done. _____ Synteny foot printing
71. The bark of this tropical tree contains a drug called quinine is used in the prevention of -----. _____Malaria
72. Medicines from nature account for usage by ------- of the world population. _____ 80%
73. Habitat destruction is major cause for ----------. _____Loss of biodiversity
74. Coral reefs which are biodiversity hotspots will disappear in -------- years. _____20-40
75. Plants founded in particular area is ----------. _____Flora
76. Georgemendal,s Experiments with plant hybridization led to his establishing ----------. _____Laws of inheritance
77. Genetic modefication of plants is achieved by adding a specific gene or gene to a plant or by knocking down a gene with ----------. _____RNAI
78. The following are major actvities of plant breeding , one of the following is correct sequence of plant breading ----------. _____Collection of variation-selection- evaluation- release (CSER)
79. One of the following is not the correct sequence of deforestration ----------

_____. Decrease in the level of carbon dioxide in the atmosphere

80. One of the following is NOT the part of nmaintaing balance of the ecosystem .--------
_____-. Protection of food crops

81. In genome evolution gene number and complexity of an organism ----------
_____-. Are not strongly linked

82. Gene diversity is the variation at the level of ---------- .
_____both at individual gene and in a population

83. Haldane 1929 gave the ----------. _____Hot , dilute soup theory

84. Not example of Ex-situ Conservation ----------. ____Natural park and natural reserves

85. One of the following a population over subsequent generations----------.
_____Bad or lethal mutation

86. The fossil record is relatively incomplete for several reasons , which one is not true statement.----------. _____Soft tissues are mostly preserved

87. Annelids dot not have feeding style --------. _____Filter feeders

88. Annelids are not -------. _____Predators

89. Evolutionary fitness is the measure of ----------. _____Reproductive fitness

90. ---------- uses DNA and other molecular data to determine evolutionary relationships.
_____Molecular systematics

91. The number of allele in a sample ----------. _____Allelic richness

92. Plant complete when --------- nuterients are less. _____More intensively

93. The process of synthesis of protein is called ----------. _____Translation

94. Conjugation is a process of ----------. _____Sexual reproduction

95. Animals eat other animals are called -------. _____Predators

96. ----------group have common ancestor. _____Clade

96. - -------- could not all be ordered in a single chain._____ Life

98- ---------- arises from interaction b/w organism and environment._____ Evolution

99- -------- identified the ------- basic body plans for animals. _____4

100- Smith, Buckland and Curvier himself were developing --------. _____Paleontology

101- development proceed up the tree of life. All animals begin as eggs._____ Von Baer

102- oceans contains ---------- of water. _____97%

103- the turn over of water of the hydrological cycle ranges from on ------ days for the atmosphere.
_____9

104- ------- form the largest continuos environment on the earth. _____ Oceans

105- Photosynthetic organisms restrict to ---------- zone. _____Euphotic or epipelagic

106- Oceanic temperature much more stable than -------- temperature. _____Terrestrial

107- Highest productivity occurs along --------. _____Costlines

108- --------- are found mainly at temperate latitudes. _____Kelp forests

109- -------- are limited to the trophic & subtrophic. _____Coral reefs

110- There are ---- types of coral reefs, frining reef, barrier reef, atolls. _____ 3

111- Kelp forests limited to areas with temperature range --------. _____10-20℃

112- Reef building corals limited to areas with temperature-------. _____18-29℃

113- Tidal fluctuation produce -------- due to gravitational effects of sun and moon.
_____Steep gradience

114- Sult marshes dominated by -------- vegetation. _____Herbaceous

115- --------- grows in the tropic and subtropics. _____Mangrove forests

116- --------are extremely dynamic physically, chemically and biologically. _____Estuaries

117- ---------- are much like small seas. _____Lakes

118- The salinity of lakes ranges from very dilute waters to over -------. _____200%

119- Freshwater environment are particulary vulnerable to introduction of -------
._____ Exotic species

120- The nature of fish assemblage is used to assess the ------- of fresh water.
_____Biological integrity

121- For the individual organism macroclimate may be ------- significant than microclimate.
_____Less

122- **Most species perform best in a fairly -------- of temperature. _____Narrow range**

123- **The influence of temperature on the performance of organisms begins at the -------. _____Molecular level**

124- **Plants and ectothermic animals use morphology and behavior. _____Both**

125- **Birds and mammals rely heavily on --------- to regulate body temperature. _____Metabolic energy**

126- **Most endothermic aquatic species are ----------. _____Air breathers**

127- **Flying insects & marine fish improve performance by heating parts of their ----------. _____Anatomy**

128- **The energetic requirements of thermoregulation may influence the -------- distribution of species. _____Geographic**

129- **-------- is a state of low metabolic rate and low body temperature when food is scarce and night temperature cold. _____Torpor**

130- **Hibernation occur in winter, if it occur in summer then called -------. __Aestivation**

131- **The most familiar relative measure of the water content of air is relative -------. _____Humidity**

132- **In --------- environment water moves from hypo osmotic to hyper osmotic solution._____Aquatic**

133- **Larger osmotic difference b/w organism and environment generate --------. _____High osmotic pressure**

134- **The water potential of pure water is set at ---------. _____Zero**

135- **Water potential, vapor pressure and osmotic pressure are all measured in ----------. _____Pascals (N/M^2)**

136- **Aquatic organisms gain or lose water through ----------. _____Osmosis**

137- **There are ---- source of energy. Light, organic & inorganic molecules. _____3**

138- **Photosynthetic plants and algae use light of wavelength b/w ------_____ a. 400-700nm**

139- **PAR stands for ----------._____ Photosynthetic active radiations**

140- **There are----major alternative photosynthetic pathways,C3,C4 & CAM. _____ 3**

141- **Heterotrophs use organic molecules as a source of carbon &----._____Energy**

142- **------- feed on dead plants material with lower nitrogen. _____Detritivores**

143- **Chemosynthetic bacteria use ------ molecules._____ Inorganic**

144- **Bacteria are most diverse in the --------._____ Biosphere**

145- **The relationship b/w food density and animal feeding rate is called ----- ._____ Functional response**

146- **Energy limitation is a assumption of ------- theory. _____Optimal fraging**

147- ……alters the outcome of competition by removing nutrient limitation on stress-tolerant plants _____ **Fertilization**

148- There Are **Four** Possible Outcomes of Interspecific Competition

149- PAR, accounts for about **45%** of the total energy

150- osmotic pressure, and vapor pressure can be measured in **Pascal's or (Newton's/m2)**

151- **Sociality** is generally accompanied by cooperative feeding, defense of the social group, and restricted reproductive opportunities

152- In the logistic model, the rate of population growth **decreases** as population density increases.

153- A **landscape** is a heterogeneous area composed of several ecosystems

154- **Exploitation** is an interaction between species that enhance the fitness of one individual at the expense of another

155- The pathogenic microbes such as moth larva reduced the coverage of prickly pear cactus in **Australia**

156- **Diarrhea and dysentery** caused by an amoeba

157- A **mutation** is any change in the proper nucleic acid sequence of a specific gene in a cell's genome

158- Ecology is derived from **Greek** word.

159- **Odum** --- "The structure and function of Nature"

160- A **polyphyletic** grouping consists of various species that lack a common ancestor

161- Freshwater contain less than **1%** water

162- The experiment failed because the original cause **rats** had not been eliminated.

163- The notochord is a flexible, rod-like structure derived from **mesoderm**.

164- Zooplankton feed on----------? Options a) bacteria b) fungi c) algae d) all

165- Chinese farmers have used **ants** as keystone predators to control pests in citrus orchard

BEST OF LUCK

1. Hibernation?

Animals can go into a state of reduced metabolism that may last several months. If this state occurs mainly in winter, it is called hibernation

2. Symbiosis example?

There are three different types of **symbiotic** relationships: mutualism, commensalism, and parasitism. Mutualism: both partners benefit.
An **example** of mutualism is the relationship between the Egyptian plover and the crocodile. ... Commensalism: only one species benefits while the other is neither helped nor harmed. **(Internet)**

3. Example of foundation species?

Foundation species are sometimes referred to as 'Ecosystem Engineers'.
Examples of Foundation Species are; Corals, Earthworms, Beavers and many more!

4. Nutrition and nutrition cycle?

A **nutrient cycle** refers to the movement and exchange of organic and inorganic matter back into the production of living matter. The process is regulated by the food web pathways previously presented, which decompose organic matter into inorganic **nutrients**. **Nutrient cycles** occur within ecosystems.

5. Factor of environment?

Environmental factor. An **environmental factor**, ecological **factor** or eco **factor** is any **factor**, abiotic or biotic, that influences living organisms. Abiotic **factors** include ambient temperature, amount of sunlight, and pH of the water soil in which an organism lives.

6. Reproduction of amoeba?

Asexual reproduction - • Binary fission (ppt)
Amoeba reproduces by the common asexual reproduction method called binary fission. After replicating its genetic material through mitotic division, the cell divides into two equal sized daughter cells. (Internet)

7. Mistake in natural selection?

A major driving force of evolution comes from **mistakes** made by cells and how organisms cope with the consequences, UA biologists have found ..... Charles Darwin based his groundbreaking theory of **natural selection** on the realization that genetic variation among organisms is the key to evolution.

8. Characteristic of protozoa?

• No cell wall • Free-living or parasitic • Consumers • Habitat – aquatic (ponds,lakes, oceans) • Examples: amoeba, paramecium, dinoflagellates

9. Landscape element?

The ecosystems making up a landscape generally form a mosaic of visually distinctive patches. These patches are called landscape elements.

10. Nutrient influence by human and terrestrial ecosystem?

Human activities are significantly and rapidly altering the form and function of **terrestrial ecosystems**. For example, we are changing the chemical composition of the atmosphere, converting natural landscapes to urban areas, and transporting floral and faunal species far beyond their natural boundaries. **(Internet)**

11. What is hibernation and example?

Hibernation is a state or condition of inactivity of a plant or animal spending the winter in a long snooze especially for the purpose of rest. **Examples:** Reptiles and amphibians, bees etc.

12. Population growth?

Population growth is the **increase** in the number of individuals in a **population**. Global human **population growth** amounts to around 83 million annually, or 1.1% per year.

13. What is genetic drift?

Many changes in genotype are neutral or benign to phenotype and survival; these —cryptic‖ changes over time may result in genetic drift,

14. Landscape ecology?

—Landscape ecology is concerned with spatial patterns in the landscape and how they develop, with an emphasis on the role of disturbance, including human impacts‖ (Smith and Smith). It is a relatively new branch of ecology, that employs Global Information Systems. The goal is to predict the responses of different organisms to changes in landscape, to ultimately facilitate ecosystem management

15. Nutrient enrichment human?

Nutrient enrichment by humans is altering aquatic and terrestrial ecosystems.
Nitrate concentration and export by the earth's major rivers correlate directly with human population density.
Human disturbance also increases export of ***phosphorus*** from aquatic catchments.
Nutrient enrichment appears to be reducing the diversity of plants and fungi in terrestrial ecosystems

16. Protein synthesis of Organelles?

That is, some of the organelles • within eukaryotic cells are capable of protein synthesis. • These organelles • with their own genetic material • and protein-synthesizing capabilities • are thought to have been free-living bacteria • that entered into a symbiotic relationship, • eventually giving rise to eukaryotic cells

17. Optimal Foraging theory?

Evolutionary ecologists predict that if organisms have limited access to energy, natural selection is likely to favor individuals that are more effective at acquiring energy and nutrients. Many animals select food in a way that appears to maximize the rate at which they capture energy.

18. Factor affecting decomposition of environment?

The rate of **decomposition** is governed by three sets of **factors**—the physical **environment** (temperature, moisture and soil properties), the quantity and quality of the dead material available to decomposers, and the nature of the microbial community itself.

19. Troper?

A state of low metabolic rate and lowered body temperature, when food is scarce and night temperatures cold. Other animals can go into a state of reduced metabolism that may last several months.

20. Landscape Elements

A landscape is a heterogeneous area composed of several ecosystems.

•The ecosystems making up a landscape generally form a mosaic of visually distinctive patches.

•These patches are called landscape elements.

•Landscape ecology is the study of landscape structure and processes.

21. Work of Clausen, Keck, and Hiesey

Clausen, Keck, and Hiesey explored the extent and sources of morphological variation in plant populations, including both the influences of environment and genetics.

Long 5 Marks

22. Nutrient loss from ecosystem?

Major pathways in which these **nutrients** are **lost** include: soil erosion, leaching and gaseous **losses**. Leaching is a physical process where **nutrients** exit terrestrial **ecosystems** in the downward flow of water through the soil. ... Another **loss** of **nutrients** from **ecosystems** is due to denitrification.

23. Lamark contribution?

Lamarck is best known for his **contributions** to evolution, or Lamarckism, which suggests organisms acquire or lose traits based on how much they use them in their lives.

24. Key stone speices?

A **keystone species** is often a dominant predator whose removal allows a prey population to explode and often decreases overall diversity. Other kinds of **keystone species** are those, such as coral or beavers, that significantly alter the habitat around them and thus affect large numbers of other organisms.

25. Importance of bacteria?

The ecosystem, both on land and in the water, depends heavily upon the activity of **bacteria**. The cycling of nutrients such as carbon, nitrogen, and sulfur is completed by their ceaseless labor.

26. Food Web?

A food web is the natural interconnection of food chains and a graphical representation of what-eats-what in an ecological community. Another name for food web is consumer-resource system.

27. Role of bacteria in environment?

The cycling of nutrients such as carbon, nitrogen, and sulfur is completed by their ceaseless labor..... Decomposition is the breakdown of these organisms, and the release of nutrients back into the **environment**, and is one of the most important **roles** of the **bacteria**.

28. Foundation species?

Foundation species is used to refer to a **species** that has a strong role in structuring a community. A **foundation species** can occupy any trophic level in a food web (i.e., they can be primary producers, herbivores or predators).

29. Importance of protists?

The slime molds are important to ecosystems because they are decomposers, which release vital nutrients back into the environment. You could say life on Earth depends on the protists because they supply us with **oxygen**, are critical organisms in food chains, and recycle important nutrients for other life forms to use.

30. Sigmoidal population growth / movement

•Sigmoidal population growth can be modeled by the logistic growth equation, a modification of the exponential growth equation that includes a term for environmental resistance. In the logistic model, the rate of population growth decreases as population density increases. Research on laboratory populations indicates that zero population growth at carrying capacity may be attained by many combinations of reduced birthrates and increased death rates.

31. How Birds and mammals / Animals regulate body temperature

Birds and mammals rely heavily on metabolic energy to regulate body temperature. The physical nature of the aquatic environment reduces the possibilities for temperature regulation by aquatic organisms.

Most endothermic aquatic species are air breathers. Some organisms, mainly flying insects and some large marine fish, improve performance by selectively heating parts of their anatomy. The energetic requirements of thermoregulation may influence the geographic distribution of species.

32. Mode of Feeding of Amoeba

Feeding structures- •food vacuole •digestive enzymes •diffusion **(ppt)**

Amoeba feeds on microscopic organisms such as single-celled algae and bacteria. When the amoeba encounters a suitable organism, the cytoplasm flows round the prey and engulfs it, with a drop of water, in a food vacuole. The cytoplasm secretes enzymes into the food vacuole. **(Internet)**

33. Logistic population growth

•**As resources are depleted, population growth rate slows and eventually stops; this is known as logistic population growth**.

34. Torpor

A state of low metabolic rate and lowered body temperature, when food is scarce and night temperatures cold. Other animals can go into a state of reduced metabolism that may last several months.

35. How nutrient enrichment says the human is altering the aquatic and terrestrial ecosystem?

Nutrient enrichment by humans is altering aquatic and terrestrial ecosystems.

Nitrate concentration and export by the earth's major rivers correlate directly with human population density. Human disturbance also increases export of ***phosphorus*** from aquatic catchments.

Nutrient enrichment appears to be reducing the diversity of plants and fungi in terrestrial ecosystems

36. Keystone species

A **keystone species** is often a dominant predator whose removal allows a prey population to explode and often decreases overall diversity. Other kinds of **keystone species** are those, such as coral or beavers that
significantly alter the habitat around them and thus affect large numbers of other organisms

37. Role of foundation species

A **foundation species** is a **species** that has a strong **role** in structuring a community. The activities of **foundation species** physically modify the environment and produce and maintain habitats that benefit other organisms using that benefit.

Elements of landscape

A **landscape** includes the physical **elements** of geophysically defined landforms such as (ice-capped) mountains, hills, water bodies such as rivers, lakes, ponds and the sea, living **elements** of land cover including indigenous vegetation, human **elements** including different forms of land use, buildings, and structures

38. Factor affects the decomposition

Decomposition rate is influenced by temperature, moisture, and chemical composition of litter and the environment.

•The rate of decomposition affects the rate at which nutrients, such as nitrogen and phosphorus, are made available to primary producers. Rates of decomposition in terrestrial ecosystems are higher underarm, moist conditions.

Organelles Capable of Protein Synthesis

That is, some of the organelles within eukaryotic cells are capable of protein synthesis. These organelles with their own genetic material and protein-synthesizing capabilities are thought to have been free-living bacteria that entered into a symbiotic relationship, eventually giving rise to eukaryotic cells

39. Reproduction of Amoeba

Asexual reproduction

•Binary fission

Amoeba reproduces by the common asexual **reproduction** method called binary fission. ... **Amoeba** is a shapeless tiny unicellular organism that has a porous cell membrane which encloses the cell organelles and cytoplasm. **Amoeba** reproduces by the common asexual **reproduction** method called binary fission.

40. Importance of bacteria in environment

In summary, **bacteria** are single-celled **microbes** without a nucleus. **Bacteria** play many roles in our ecosystem. **Bacteria** are decomposers which break down dead material and recycle it. They also can be producers, making food from sunlight, such as photosynthetic **bacteria**, or chemicals, such as chemosynthetic **bacteria**.

41. Food web and structure of communities

The feeding activities of a few keystone species may control the structure of communities
Robert Paine (1966) proposed that the feeding activities of a few species have inordinate influences on community structure. He predicted that some predators may increase species diversity by reducing the probability of competitive exclusion. Manipulative studies of predaceous species have identified many keystone species, including starfish and snails in the marine intertidal zone and fish in rivers. On land, birds exert substantial influences on communities of their arthropod prey .

42. Importance of protistis

Plant-like **protists** produce almost one-half of the oxygen on the planet through photosynthesis. Other **protists** decompose and recycle nutrients that **humans** need to live. ... For example, medicines made from **protists** are used in treatment of high blood pressure, digestion problems, ulcers, and arthritis.

Examples of Symbiosis:

1. **Toxoplasma**

It is a parasitic protist that may infect a range of animals including mice, rats, and people. To reproduce sexually, the protist must infect a cat. The cat is not directly affected, but when a mouse is infected it brings harm. Mice infected with toxoplasma lose their fear of cats, which of course may bring them in close contact with a predator.

2. **Microbes**

Microbes are important for human health. For example, human breast milk contains oligosaccharides, which are short chains of sugar molecules. There is no nutritional value to babies, but the microbes are important for developing a baby's immune system.

3. **Cattle and Egrets**

Cattle do not benefit but are unaffected as egrets eat the insects that have been disturbed as the cattle forage for food.

43. Gene and Characteristics of Genes

Genes are functional units of heredity as they are made of DNA. The chromosome is made of DNA containing many genes. Every gene comprises of the particular set of instructions for a particular function or protein coding. Speaking in usual terms, genes are responsible for heredity

The human cell contains 23 pairs of chromosomes. The trait is one of the characteristics determined by one or more genes. Abnormal genes and genes that are formed due to new mutations also result in certain traits. Genes vary in size depending on the code or the protein they produce. All cells in the human body contain the same DNA. The difference between the cells occurs due to the different type of genes that are turned on and therefore produce a variety of proteins.

44. Define Codon, nonsense codon and describe the relationship between genotype and phenotype? 10

CODON-A codon is a sequence of three DNA or RNA nucleotides that corresponds with a specific amino acid or stop signal during protein synthesis. DNA and RNA molecules are written in a language of four nucleotides; meanwhile, the language of proteins includes 20 amino acids. Codons provide the key that allows these two languages to be translated into each other. Each codon corresponds to a single amino acid (or stop signal), and the full set of codons is called the genetic code.

NONSENSE CODON

-There are 3 codons out of 64 in genetic code which do not encode for any Amino Acid. These are called termination codons or stop codons or nonsense codons. The stop codons are UAA, UAG, and UGA. They encode no amino acid. The ribosome pauses and falls off the mRNA. They signal release of the nascent polypeptide from the ribosome because no cognate tRNA has anticodons complementary to these stop signals, allowing a release factor to bind to the ribosome instead

Difference Between Genotype and Phenotypes

The genotype is the set of genes in our DNA which is responsible for a particular trait. Genotype is the genetic makeup of an organism and it results in some of the physical characteristics of that organism.The entire genetic information about an organism is contained in a genotype.. Genotype is determined by the makeup of something called "alleles

The phenotype is the physical expression, or characteristics, of that trait. For example, two organisms that have even the minutest difference in their genes are said to have different genotypes. These two mice may have different genotypes and both can still be white if they share the particular phenotype for white fur.

The phenotype is the physical appearance of an organism, while the Genotype is the genetic composition of an organism. Phenotype is observable and is the expression of the genes of an individual. So even the organism with the same species may differ, with a minute difference in their genotype. This is the main difference between the two.

We can notice one's hair colour, eye colour, height, weight, skin colour, etc. but cannot look at genes responsible for these characters, so the observable physical look is the phenotype while the unnoticed genes responsible for such characters present in the DNA of cell of the individual is genotype. (From ppts)

Populations include genetic and phenotypic variation among individuals, which are significant aspects of population structure. The first biologists to conduct thorough studies of phenotypic and genotypic variation and to incorporate experiments in their studies, focused on plants. By using plants cloned from the same parent, Bonnier was able to control for the effects of genotype on plant form and observe the effects of climate.

45. What are the processes of the ecosystem influenced by landscape structure? 2

Landscape structure influences processes such as the flow of energy, materials, and species between the ecosystems within a landscape.

46. Define Hardy-Weinberg principle. 2

One of the most fundamental concepts in population genetics, the Hardy-Weinberg principle, states that "in a population mating at random in the absence of evolutionary forces, allele frequencies will remain constant."

47. How nutrient enrichment says the human is altering the aquatic and terrestrial ecosystem? 3

Nutrient loss by stream ecosystems is highly pulsed and associated with disturbance by flooding. Nutrient enrichment by humans is altering aquatic and terrestrial ecosystems. ***Nitrate*** concentration and export by the earth's major rivers correlate directly with human population density. Human disturbance also increases export of ***phosphorus*** from aquatic catchments.

Nutrient enrichment appears to be reducing the diversity of plants and fungi in terrestrial ecosystems.

48. Define and explain optical foraging theory 3

Optimal foraging theory attempts to model how organisms feed as an optimizing process. Evolutionary ecologists predict that if organisms have limited access to energy, natural selection is

likely to favour individuals that are more effective at acquiring energy and nutrients. Many animals select food in a way that appears to maximize the rate at which they capture energy. Plants appear to allocate energy to roots versus shoots in a way that increases their rate of intake of the resources that limit their growth. Plants in environments with abundant nutrients but little light tend to invest more energy in the growth of stems and leaves and less in roots. In environments rich in light but poor in nutrients, plants tend to invest more energy in the growth of roots.

49. Lyell's Mistake on natural selection. 3

As a part of his general resistance to direction/ substantial change in geology, Lyell maintained there was no real direction of change in the fossil record either. This was greeted with pretty general astonishment, but Lyell claimed the apparent changes were just due to our having bad (misleading) samples…more mammals would soon appear in older formations, etc., as we extend our fossil collections. Within ten years (1840) it was clear that this was completely untenable.

50. Explain with example how exotic predators disturb the structure of food web. 5

Exotic predators can collapse and simplify the structure of food webs. Introduced fishes have devastated the native fishes of Lake Atitlan and Gatun Lake in Central America.

Example:

The influence of the Nile perch on the fish community of Lake Victoria is enmeshed with massive changes in the lake's ecosystem.

Introduction of the Nile perch is rapidly reducing the species-rich fish fauna of Lake Victoria to a community dominated by a handful of species.

51. How evolution of mutualism took place, how humans developed relationship with other species. 10

Evolution of Mutualism

- Theory predicts that mutualism will evolve where the benefits of mutualism exceed the costs. **Keeler** built a cost-benefit model for the evolution and persistence of facultative plantant protection mutualisms in which the benefits of the mutualism to the plant are represented in terms of the proportion of the plant's energy budget that ants protect from damage by herbivores.
- The model assesses the costs of the mutualism to the plant in terms of the proportion of the plant's energy budget invested in extrafloral nectaries and the water, carbohydrates, and amino acids contained in the nectar. The model predicts that the mutualism will be favored where there are high densities of ants and potential herbivores and where the effectiveness of alternative defenses are low.

Humans in Mutualism

- Humans have developed a variety of mutualistic relationships with other species, but one of the most spectacular is that between the greater honeyguide and the traditional honey gatherers of Africa. In this apparently ancient mutualism, humans and honeyguides engage in elaborate communication and cooperation with clear benefit to both partners.
- The mutualism offers the human side a higher rate of discovery of bees' nests, while the honeyguide gains access to nests that it could not raid without human help. Careful observations

have documented that the honeyguide informs the honey gatherers of the direction and distance to bees' nests as well as of their arrival at the nest.

52. Cuvieraaa's advantage ?2

Cuvier's anatomical and classificational work was impeccable.

He identified four basic body plans for animals– vertebrates, mollusks, arthropods, and radiate (jellyfish & others).

With these groups clearly distinguished, the chain of being was no longer part of biology.

53. endosymbionts and evolution of eukaryotes?5

Formed from several prokaryotic cells . In a symbiotic relationship Symbiosis involving a prolonged association of two or more dissimilar organisms, is quite common today. In many cases both symbionts benefit from the association as occurs in lichens, once thought to be plants but actually symbiotic fungi and algae

Evidence for Endosymbiosis

Supporting evidence for endosymbiosis comes from studies of living eukaryotic cells containing internal structures called organelles, such as mitochondria and plastids which contain their own genetic material. In addition, prokaryotic cells synthesize proteins as a single system, whereas eukaryotic cells are a combination of protein-synthesizing systems.

Organelles Capable of Protein Synthesis

That is, some of the organelles within eukaryotic cells are capable of protein synthesis. These organelles with their own genetic material and protein-synthesizing capabilities are thought to have been free-living bacteria that entered into a symbiotic relationship, eventually giving rise to eukaryotic cells

54. Proterozoic Animal Fossils 3

Although scarce, a few animal fossils older than those of the Ediacaran fauna are known.

A jellyfish-like impression is present in rocks 2000 m below the Ediacara Hills Pound Quartzite.

Burrows in many areas presumably made by worms, occur in rocks at least 700 million years old.

Wormlike and algae fossils come from 700 to 900 million-year-old rocks in China but the identity and age of these "fossils" has been questioned

55. Cuvier's advantage On natural selection?

Cuvier's anatomical and classificational work was impeccable.

- ❖ He identified four basic body plans for animals– vertebrates, molluscs, arthropods, and radiata (jellyfish & others).
- ❖ With these groups clearly distinguished, the chain of being was no longer part of biology.
- ❖ But links between distinct groups were still striking– Lamarck cited teeth in fetal baleen whales, for instance, which St. Hilaire took as an instance of 'unity of plan'. A broader sort of unity could restore the chain to some respectability…

56. Protozoan characters?

- All are unicellular eukaryotes
- Many species are both heterotrophic and autotrophic simultaneously or at different stages of the lifecycle

- Protozoans are ecologically important primary producers, consumers and as vital links in the food chain
- Humans are greatly effected by parasitic protozoans either directly or indirectly
- Effects range from irritating - fatal
- Malaria (*Plasmodium spp.*) worldwide epidemic

57. Incomplete fossil record of soft bodies?

The fossil record is relatively incomplete for several reasons:

1. Soft tissues are rarely preserved
2. Movement of the earth crust has obliterated or erased and or covered many fossils.
3. Fossilization takes place only in certain types of habitats and favorable environments
4. Paleontologists have not dug up every place

58. What are the processes of the ecosystem influenced by landscape structure?

Landscape structure influences processes such as the flow of energy, materials, and species between the ecosystems within a landscape.

Examples

Studies of the movements of small mammalsin a prairie landscape show that a smaller proportion of individuals moves in more fragmented landscape but that theindividuals that do move will move farther.

59. Hardy weinberg principal?

One of the most fundamental concepts in population genetics, the Hardy-Weinberg principle, states that
“in a population mating at random in the absence of evolutionary forces, allele frequencies will remain constant.”

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61. Advantage of being multicellular?

For something on the order of 1.5 billion years

all organisms were single-celled and life seems to have thrived .In fact, single-celled organisms are quite good at what they do but what they do is very limited .Single celled organisms can not grow very large, because as size increases proportionately less of a cell is exposed to the external environment in relation to its volume and the proportion of surface area decreases Transferring materials from the exterior to the interior becomes less efficient .

while multicelled organisms have cells specialized to perform specific functions such as respiration, food gathering, and reproduction multicelled organisms live longer, since cells can be replaced and more offspring can be produced Cells have increased functional efficiency when they are specialized into organs with specific capabilities

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64. How to documented genetic history in genome ?

Comparing nucleic acids or other molecules to infer relatedness is a valuable tool for tracing organisms' evolutionary history

DNA that codes for rRNA changes relatively slowly and is useful for investigating branching points hundreds of millions of years ago

mtDNA evolves rapidly and can be used to explore recent evolutionary events

65. EUsocialistic characteristics?

- The more complex level of social behavior, which is considered to be the pinnacle of social evolution, is called eusociality.
- Eusociality is generally thought to include three major characteristics:

(1) individuals of more than one generation living together,
(2) cooperative care of young, and
(3) division of individuals into sterile, or nonreproductive, and reproductive castes.

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67. Food web?

A food web summarizes the feeding relations in a community.

- The earliest work on food webs concentrated on simplified communities in areas such as the Arctic islands. However, researchers such as Charles Elton (1927) soon found that even these so-called simple communities included very complex feeding relations.
- The level of food web complexity increased substantially, however, as researchers began to study complex communities. Studies of the food webs of tropical freshwater fish communities revealed highly complex networks of trophic interaction that persisted even in the face of various simplifications.
- A focus on strong interactions can simplify food web structure and identify those interactions responsible for most of the energy flow in communities.

Food web and structure of communities

➢ **The feeding activities of a few keystone species may control the structure of communities.**

Robert Paine (1966) proposed that the feeding activities of a few species have inordinate influences on community structure. He predicted that some predators may increase species diversity by reducing the probability of competitive exclusion.
Manipulative studies of predaceous species have identified many keystone species, including starfish and snails in the marine intertidal zone and fish in rivers. On land, birds exert substantial influences on communities of their arthropod prey.

68. Endosymbiotic theory and origin of eukaryotic evolution?

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Examples

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Humans

Humans have acted as keystone species in communities. People have long manipulated food webs both as a consequence of their own feeding activities and by introducing or deleting species from existing food webs. In addition, many of these manipulations have been focused on keystone species. Hunters in tropical rain forests have been responsible for removing keystone animal species from large areas of the rain forests of Central and South America. Chinese farmers have used ants as keystone predators to control pests in citrus orchards for over 1,700 years.