BIOLOGY

101. Unlinked genes show recombination frequency of
(1) 100% (2) 0%
(3) 50% (4) 10-30%

102. Presence of heterochromatin ..... the frequency of crossing over
(1) Increases (2) Decreases
(3) does not effect (4) Is directly related to

103. First linkage maps were made for
(1) Drosphila and humans
(2) Drosophila and Pisum sativum
(3) Drosophila and Maize
(4) Humans and maize

104. Sex pie balds are
(1) Haploids (2) Gynanders
(3) Free martins (4) Nutritional mutants

105. When two alleles coming from different parents tend to enter different gametes to remain apart in offspring, it is
(1) Non-disjunction (2) Criss cross inheritance
(3) Repulsion (4) Diagynic inheritance

106. Sex determination in moths and butterflies is
(1) ZO–ZZ (2) XX–XY
(3) ZW–ZZ (4) XX–XO

107. The chromosomes bearing loops for rapid transcription and informosomes production are
(1) Lampbrush chromosomes
(2) Polytene chromosomes
(3) SAT chromosomes
(4) B chromosomes

108. Individuals showing presence of one barr body in nucleus of somatic cells
(1) Normal female (2) Normal male
(3) Turner's syndrome (4) Both (1) and (4)

109. Differential staining of chromatin is termed as
(1) Constitutive banding
(2) Heteropycnosis
(3) Chromomeric staining
(4) Interkinesis

110. Non-separation of synapsed homologous chromosomes is
(1) Mitotic non-disjunction
(2) Meiotic non-disjunction
(3) Repulsion
(4) Heteropycnosis

111. Wheat plant is 6n = 42. What will be the number of chromosomes in it's Monosomic, haploid and Trisomics?
(1) 41, 21 and 7 (2) 43, 21 and 7
(3) 15, 7 and 7 (4) 13, 7 and 15

112. If there is complete linkage in F_2 generation
(1) Parental types and recombinants appear in equal ratio
(2) Recombinants are less than parental types
(3) Recombinants are more than parental types
(4) There will be only parental types

113. X-rays cause mutation by
(1) Transition (2) Transversion
(3) Deletion (4) Base substitution

114. Crossing over results in
(1) Recombination between linked genes
(2) Linkages between genes
(3) Segregation of genes
(4) Dominance of genes

115. In *Melandrium*, sex determination is of
(1) XX–XO (2) ZZ–ZW
(3) XX–XY (4) XY–XO

116. Mustard gas was used as a chemical mutagen for the first time by
(1) Muller
(2) Alterberg
(3) Auerbach and Robinson
(4) Stadler

117. A chromosome with sub-terminal centromere is
(1) Acentric (2) Acrocentric
(3) Metacentric (4) Telocentric

118. Which of the following is first Man Made Plant?
(1) Triticale (2) Raphanobrassica
(3) Upland cotton (4) *Brassica juncea*

119. Higest number of chromosomes in plants have been recorded in
(1) *Marsilia* (2) *Aulosira*
(3) *Ophioglossum* (4) *Parthenium*

120. Which of the following histones is associated with linker DNA?
(1) H_1 (2) H_{2A}
(3) H_3 (4) H_4

121. Which of the following increases the frequency of crossing over when increased ?
(1) Temperature (2) X rays
(3) Radium radiations (4) All of these

122. The number of linkage groups correspond to
(1) Number of pairs of chromosomes in a diploid
(2) Number of chromosomes in a diploid
(3) General structure of an organism
(4) Tetraploid number of chromosomes

123. Mendel observed that some characters did not assort independently. Later researches found it to be due to
(1) Crossing over
(2) Linkage
(3) Dominance of one trait over theother
(4) Amitosis

124. Individuals homozygous for cd genes were crossed with wild type (++). The F_1 dihybrid thus produced was test crossed. It produced progeny in the following ratio
++900
cd 880
+d 115
+c 105
What is distance between c and d genes ?
(1) 5.75 units (2) 11 units
(3) 47 units (4) 88 units

125. If two genes "a" and "b" are linked and show 20% recombination, the proportion of gametes produced in F_1 by a dihybrid ++/ab derived from a cross between ++/++ and ab/ab would be
(1) ++80 : ab 20
(2) ++50 : ab 50
(3) ++40 : ab 40 : +a 10 : +b10
(4) ++20 : ab 20 : +a 20 : +b 20

126. When two genes are situated very close to each other in a chromosome
(1) The percentage of crossing over between them is very high
(2) Hardly any crossover are detected
(3) No crossing over can take place between them
(4) Only double crossovers can take place between them

127. When two genetic loci produce identical phenotypes in *cis* as well as *trans* position, they are considered to be
(1) Pseudoallele
(2) The parts of the same gene
(3) Multiple alleles
(4) Different genes

128. In crossing over, exchange takes place between
(1) Homologous chromosomes
(2) Chromatids of same chromosomes
(3) Chromatids of homologous chromosomes
(4) All the above are true

129. For the preparation of genetic maps, the recombination frequencies between genes are additive over short distances, but not over long distances due to
(1) Multiple crossovers
(2) Lethal mutations
(3) Epistasis
(4) Synaptonemal complex

130. If the frequency of allele B in a population is 0.70, the frequency of allele b would be
(1) 0.30 (2) 0.35
(3) 0.70 (4) 0.45

131. The recombination frequencies between the genes A and B; A and C; B and C are 9%, 17% and 26% respectively. The sequence of genes A, B, C on the chromosome is
(1) ABC
(2) ACB
(3) BAC
(4) Information provided is insufficient to draw any conclusion

132. The more is the number of chromosomes in an organism, the more genetic variability it gets from
(1) Crossing over
(2) Independent assortment
(3) Linkage
(4) None of these

133. Linkage betweeen a pair of genes is indicated when their recombination frequency is
(1) Less than 25% (2) Less than 50%
(3) Less than 60% (4) More than 60%

134. Bateson and Punnett (1909) discovered linkage while working in:
(1) *Pisum sativum*
(2) *Lathyrus odoratus*
(3) *Drosophila melanogaster*
(4) *Lychmis alba*

135. A and B genes are linked. What should be the genotype of progeny in across between AB/ab and ab/ab :
(1) AAbb and aabb (2) AaBb and aabb
(3) AABB and aabb (4) None of these

136. If the leaf cells of a flowering plant have 22 chromosomes, the number of chromosomes will be
(1) 11 in gametes (2) 22 in gametes
(3) 44 in embryo (4) 44 in stem cell

137. Triticale has been evolved by Intergenic hybridization between
(1) Wheat & Rice (2) Rice & Maize
(3) Wheat & Rye (4) Wheat & Aegilops

138. A chromatid represents
(1) One half of a chromosome
(2) Haploid number
(3) Genes
(4) Complete chromosome

139. A chromosome with the centromere present in a diffused condition along its length is known as
(1) Polycentric (2) Telocentric
(3) Acentric (4) Dicentric

140. Centromere is concerned with
(1) Splitting of chromosomes
(2) Formation of spinidle fibres
(3) Movement of chromosomes to poles
(4) Duplication of DNA

141. The chromosomes with genetically identical arms are called
(1) Isochromosomes
(2) Isosomes
(3) Polycentric
(4) None of these

142. The characteristic size and shape of chromosomes of an organism at the mitotic metaphase comprise its
(1) Genome (2) Karyotype
(3) Phenotype (4) Genotype

143. Heterochromatic regions in comparison to the euchromatic regions are
(1) Late replicating
(2) More loosely coiled
(3) Store house of genetic information
(4) Confined to sex chromosomes only

144. The division of the chromosome without division of the nucleus leading to higher number of chromosomes than intially present, is known as
(1) Duplication (2) Amitosis
(3) Replication (4) Endomitosis

145. Which of the following chromosomes are typically banded ?
(1) Lampbrush chromosomes
(2) B chromosomes
(3) Polytene chromosomes
(4) Allosomes

146. A child is born with extra chromsome in each of its cells. This condition is usually the result of
(1) Segregation (2) Hybridisation
(3) Non disjunction (4) Crossing over

147. The broken parts of two chromosomes may join because of the absence of
(1) Centromere
(2) Chromomere
(3) Telomeres
(4) Neocentromere

148. A terminal section of a chromosome separated from the main body of the chromosome by a narrow constriction is called
(1) Scaffold
(2) Satellite
(3) Satellite chromosomes
(4) Satellite DNA

149. Arm ratio is high in
(1) Telocentric chromosomes
(2) Metacentric chromosomes
(3) Submetacentric chromosomes
(4) Acrocentric chromosomes

150. The alkaloid from *Colchicum autumnale* of family *Liliaceae* induces :
(1) Sterility (2) Dormancy
(3) Cell division (4) Polyploidy

151. The condition required for Hardy- Weinberg equilibrium is
(1) No mutation and no gene flow between populations
(2) Very large population and random mating
(3) There must be no natural selection
(4) All of the above

152. Mutations
(1) Are the ultimate source of genetic variability
(2) Are goal directed
(3) Are commonly occurring phenomenon
(4) Arise as a result of, or in anticipation of environmental necessities

153. Which of the following statement is correct ?
(1) When individuals move from one population to another and interbreed at the new location, alleles are transferred from one gene pool to another
(2) Gene flow spreads advantageous alleles throughout the species
(3) Gene flow helps to maintain all the organisms over a large area as one species
(4) All of the above

154. Genetic drift is a
(1) Random process (2) Directed process
(3) Selection-driven process
(4) Co-evolutionary process

155. Which of the following is not a characteristic of natural selection?
(1) Natural selection causes genetic changes in individuals
(2) Natural selection acts on individuals but evolution occurs in populations
(3) Fitness of an organism is measured by its reproductive success
(4) Natural selection is not the only evolutionary force

156. Disruptive selection
(1) Adapts individuals within a population to different habitats
(2) Favours individuals who possess relatively extreme values for a trait at the expense of individuals with average values
(3) Favours organisms at both ends of the distribution of the trait
(4) All of the above

157. In Co-evolution
(1) Two species interact extensively, and each exerts strong selection pressure on the other
(2) When one species evolves a new feature or modifies an old feature, the other species typically evolves new adaptations in the response
(3) Both species shows mutual feedback
(4) All of the above

158. Speciation is the process by which new species form. The scientist who played a major role in describing the process of speciation was
(1) Charles Darwin (2) Ernst Mayr
(3) G. J. Mendel (4) George Palade

159. Allopatric speciation can occur in populations that are
(1) Physically separated
(2) In the same area
(3) Physically non-separated
(4) In the same area and within the same ecological conditions

160. Darwinian fitness is a measure of
(1) Survival (2) Number of mating
(3) Adaptation to the environment
(4) Number of viable offspring

161. According to the Hardy- Weinberg theorem
(1) The genetic structure of a population should remain constant from one generation to next if, there is no selection, mutation, migration and random drift
(2) The genetic structure of a population should remain constant from one generation to next, if there is mutation, selection, migration and random drift
(3) Only natural selection, resulting in unequal reproductive success, will cause evolution
(4) Genetic drift, gene flow, mutations and non-random mating are non-adaptive causes of micro-evolution, natural selection being the only adaptive cause

162. Gene flow often results in
(1) Populations that are better adapted to the environment
(2) A reduction of the allele frequency differences between populations
(3) An increase in sampling error in the formation of the next generation
(4) adaptive micro-evolution

163. Two animals are considered different species if they
(1) Look different
(2) Cannot inter-breed
(3) Live in different habitats
(4) Are members of different populations

164. A new species can arise in a single generation
(1) Through geographical isolation
(2) In a very large population that is spread over a large area
(3) If a change in chromosome number creates a reproductive barrier
(4) If allopatric speciation occurs

165. The evolution of numerous species, such as Darwin's finches, from a single ancestor is called
(1) Adaptive radiation (2) Sympatric speciation
(3) Gradualism (4) Convergent evolution

166. Individuals of different species living in the same area may be prevented from inter-breeding by responding to different mating chances. This is called
(1) Ecological isolation (2) Hybrid break down
(3) Mechanical isolation (4) Behavioural isolation

167. Genetic basis of adaptation was demonstrated through experiments by
(1) Lederberg (2) Hugo de Vries
(3) Charles Darwin (4) Lamarck

168. Population of dark *Biston betularia* increased greatly in England from 1848 to 1898. The selective agent causing the change was/were
(1) Tree bark (2) Birds
(3) Human beings (4) Toxins from smoke

169. Many hybrids are sterile because their chromosomes don't pair up correctly during meiosis. Why aren't polyploid plants sterile ?
(1) They backcross to the parental generation
(2) Most are triploid
(3) They cross-pollinate
(4) They self-fertilize, using their diploid gametes

170. ..... and ..... generate variation, while ..... results in adaptation to the environment.
(1) Genetic drift ..... natural selection ..... mutation
(2) Mutation ..... sexual recombination ..... natural selection
(3) Overproduction of offspring ..... mutation ..... sexual recombination
(4) Natural selection ..... mutation ..... sexual recombination

171. The smallest unit that can evolve is a
(1) Species (2) Genotype
(3) Gene (4) Population

172. In evolutionary terms, an organism's fitness is measured by its
(1) Health
(2) Contribution to the gene pool of the next generation
(3) Mutation rate (4) Genetic variability

173. Darwin
(1) Was the first person to realize that organisms can evolve
(2) Believed that organisms could pass on acquired changes to the offspring
(3) Was eager to publish his theory so that he could get all the credit
(4) Worked out the mechanism of evolution by natural selection

174. If a new allele suddenly becomes very abundant in, a population, most likely it is
(1) Mutating rapidly
(2) Flowing with emigrants
(3) Strongly selected for
(4) A product of assortative mating

175. People, who carry an allele for normal haemoglobin and an allele for sickle cell, are resistant to malaria. They are examples of
(1) Heterozygote advantage
(2) Extreme diploidy
(3) Out-breeding (4) Recessive superiority

176. Natural selection is often called "survival of the fittest". Which of the following statements best describes an organism?
(1) The number of fertile offspring it has
(2) How strong it is compared to other individuals of the same species
(3) The ability to adapt to the environment in the niche it occupies
(4) How much food and resources it is able to gather for its offspring

177. Why is it unlikely that humans will undergo speciation in the future ?
(1) Migration among populations is high
(2) Natural selection is no longer operating on humans
(3) Random effects have become more important in large populations
(4) The environment on Earth is being controlled and stabilized

178. The change of the lighter coloured variety of peppered moth *Biston betularia* to its darker variety (*Carbonaria*) is due to :
(1) Mutation of single Mendelian gene for survival in the smoke-laden industrial environment
(2) Deletion of a segment of gene due to industrial pollution
(3) Industrial, carbon deposited on the wings of moth resulting in the darker variety
(4) Translocation of a block of genes in chromosomes in response to heavy carbons

179. Appearance of dark coloured pepper moths among the light coloured ones as a result of increased industrial pollution is an example of:
(1) Disruptive selection (2) Stabilizing selection
(3) Directional selection (4) None of these

180. Which of the following observations was not important in helping Darwin and Wallace to develop their theory of natural selection ?
(1) In most species more offspring are produced that can be supported by their environment
(2) The earth, and life on earth, is very old
(3) There is variability in populations
(4) All cells contain DNA which transmits coded information to other cells

181. Which statement explains, why parasitic bacteria typically evolve more quickly than their hosts?
(1) Bacteria are always under stronger selection than their hosts
(2) Bacteria lack DNA
(3) Infection by these parasites usually kill the hosts, but not the bacteria
(4) Bacteria usually have a shorter generation time than their hosts

182. Which of the following would best demonstrate Lamarckian evolution ?
(1) The discovery of a fossil that is anatomically partway between a reptile and a human
(2) The tails of laboratory mice were cut off and the progeny from such mice were born without tails
(3) More red rabbits than brown rabbits survive to reach sexual maturity in a red soil environment with a large fox population
(4) The discovery of a series of fossils that showed a progression in anatomical features

183. Which of the following would generally reduce the likelihood of speciation ?
(1) Geographical isolation
(2) Genetic variation in populations
(3) Natural selection
(4) Immigration and emigration

184. Which of the following statements best describes the effect of genetic drift on the gene frequencies of a population ?
(1) Genes enter a population through immigration, thus changing gene frequencies
(2) Gene leave a population through emigration, thus changing gene frequencies
(3) Chance alone can cause significant changes in gene frequencies of small populations
(4) Mutations over time cause gene frequencies to change

185. Today there are many different breeds of dogs. What mechanism is responsible for most of this variation ?
(1) Inbreeding (2) Genetic drift
(3) Natural selection (4) Artificial selection

186. Jean Baptist Lamarck published his theory of evolution in 1809, the year that Charles Darwin was born. Lamarck's theory of evolution has been rejected by modern biologists because:
(1) His theory provided a genetic mechanism for how evolutionary change occurred
(2) His theory was based on special creation
(3) Increase in length of on giraffe's neck involved artificial and not natural selection
(4) The characteristics an organism acquires during its lifetime cannot be passed on to its offspring

187. On the Galapagos islands evolutionary divergence has resulted in 14 species of finches that are differentially adapted to feed on seeds, insects, and the buds of various plant species. This example of adaptive radiation occurred because the Galapagos islands are:
(1) Close enough to one another to favour considerable inter-island migration
(2) Close to the mainland
(3) Small, favouring divergence through genetic drift alone
(4) Sufficiently isolated from one another that inter-island migration rarely occurs

188. Which evolutionary process would best account for the observation that there is a striking similarity in both form and function between the enlarged horns observed in males of some insects and some mammals ?
(1) Descent with modification
(2) Evolution by natural selection
(3) Convergent evolution
(4) Rapid speciation

189. Which of the following statements are true for genetic drift?
(i) It upsets the Hardy-Weinberg equilibrium
(ii) It operates in small as well as large population
(iii) It is responsible for preserving certain genes
(iv) It is responsible for eliminating certain genes
(1) i, ii and iii (2) i, ii and iv
(3) ii, iii and iv (4) i, ii, iii and iv

190. A small, isolated population is more likely to undergo speciation than a large population because a small population :
(1) Is more affected by genetic drift and natural selection
(2) Contains, relatively more genetic diversity
(3) Is more susceptible to gene flow
(4) Has higher mutation rate

191. Which member of the genus *Homo* has the largest brain (a cranial capacity ranging from 1300-1750 cm^3)?
(1) *Homo habilis* (2) *Homo erectus*
(3) *Homo sapiens neanderthalensis*
(4) *Homo sapiens sapiens*

192. Which of the following did not influence the formulation of Darwin's theory of evolution ?
(1) Lyell's theories on geological change, which indicated that earth must be very old
(2) The resemblance between the fauna of South America and the fauna of the Galapagos islands
(3) Mendel's crossing experiments with peas
(4) The development of new varieties by plant and animal breeders

193. Oceanic islands are often called "natural laboratories for evolutionary studies." This is because they:
(1) Are isolated from other land masses
(2) Are geologically very young
(3) Have low speciation rates
(4) Are ecologically very similar

194. Which statement best defines evolution ?
(1) The close resemblance between parents and their offspring
(2) Difference between individuals in survival
(3) Individuals in two populations look different
(4) Change in genetic composition of a population with time

195. Many people were sceptical of the theory of evolution when Darwin first proposed it. Darwin received such sharp crititicism because :
(1) The bones in the wings of bats, fins of porpoises, and legs of humans were known to be analogous structures
(2) He could not explain completely, how evolution occurred because he did not know the mechanism of inheritance
(3) The fossil record indicated that there were links between birds and reptiles
(4) Earth was thought to be much older than it actually is

196. The concept that formed the basis of Lamarck's theory of evolution and later disproved experimentally was :
(1) Environment plays an important role in producing phenotypic changes in an individual
(2) Acquired traits of an individual in the life time are genetic and inherited
(3) Individuals within a population have a great reproductive potential
(4) Individuals best adapted to their environment have advantage

197. What is the main target of natural selection ?
(1) The population (2) Individual phenotype
(3) Individual genotype (4) Individual gene

198. Which statement about geographical speciation is false ? The diverging populations :
(1) Initially belong to the same species
(2) Become genetically differentiated from one another
(3) Acquire some degree of reproductive isolation
(4) Live in the same geographical region

199. Two unrelated organisms that become similar in appearance and ways in life as they adapt to similar environmental situation exhibit :
(1) Adaptive radiation (2) Convergent evolution
(3) Parallel evolution (4) Homology

200. Which one of the following stated "Nothing in Biology makes sense except in light of evolution"?
(1) Charles Darwin
(2) Louis Pasteur
(3) Theodosius Dobzhansky
(4) Lamarck