

ASSIGNMENT

ORIGIN OF LIFE

Basic Level

1. The first organisms to appear on earth were more like plants because
 - (a) Plants are simpler
 - (b) Plants are more
 - (c) Plants do photosynthesis
 - (d) None of these
2. Formation of which complex molecules was noticed by Urey and Miller when they subjected substances like NH_3 , CH_4 , H_2O etc. to electric discharge
 - (a) Aquaregia
 - (b) H_2SO_4
 - (c) HCN
 - (d) Amino acids
3. The first life on the earth was observed in
 - (a) Air
 - (b) Water
 - (c) Soil
 - (d) Mountain
4. According to Oparin, life originated as
 - (a) Self reproduction
 - (b) God's desire
 - (c) Effect of sunlight on mud
 - (d) None of these
5. The most vital process for the existence of life on earth is
 - (a) Communication in animals
 - (b) Photosynthesis by plants
 - (c) Reproduction in plants and animals
 - (d) Respiration in animals
6. The organisms of earth are well protected from the layer of a gas which covers the earth. It is known as
 - (a) Nitrogen
 - (b) Ozone
 - (c) CO_2
 - (d) Dust
7. 'Origin of life' as a result of chemical evolution has been properly explained by
 - (a) Miller
 - (b) Oparin
 - (c) Haldane
 - (d) Fox
8. Louis Pasteur's view on the origin of life is that
 - (a) Life originated within six days
 - (b) Life originated spontaneously from the living organisms only
 - (c) Life originated spontaneously from the non living substances
 - (d) Life came from other planet
9. The viruses contain
 - (a) Proteins only
 - (b) DNA only
 - (c) Nucleic acids only
 - (d) Proteins, DNA or RNA (nucleic acids)
10. How has the free O_2 been released into the earth's atmosphere whereas there was no free O_2 at the time of origin of life
 - (a) By catabolic activity of animals
 - (b) By photosynthetic activity
 - (c) By heating of the earth
 - (d) None of the above
11. The viruses are known as
 - (a) Unicellular
 - (b) Acellular
 - (c) Multicellular
 - (d) Free genes

12. The best supporting fact that “*Viruses are living*” is that viruses
 - (a) Are made of chemicals
 - (b) Cause diseases
 - (c) Duplicate themselves
 - (d) Penetrate cell membrane
13. Which of the following is not concerned with viruses
 - (a) Viruses are made up of nucleic acid and proteins
 - (b) Viruses multiply only in living host cell
 - (c) Viruses can not use oxygen for respiration
 - (d) Viruses can be grown in sugary liquid
14. Abiogenesis means
 - (a) Origin of life from non-living organisms
 - (b) Origin of life from living organisms
 - (c) Origin of viruses and microbes
 - (d) Spontaneous generation
15. First respiration arose on earth was
 - (a) Anaerobic
 - (b) Aerobic
 - (c) (a) and (b) both
 - (d) Cellular respiration and N_2 as a respiratory gas
16. About how long ago was the earth formed
 - (a) 4.6 billion years ago
 - (b) 10 billion years ago
 - (c) 3.0 billion years ago
 - (d) 20 billion years ago
17. Inorganic evolution means
 - (a) Formation of molecules
 - (b) Formation of cell
 - (c) Evolution of new species
 - (d) Same as organic evolution
18. Which one of the following is the “*Secret of life*”
 - (a) Fatty acids
 - (b) Amino acids
 - (c) Proteins
 - (d) Nucleic acid
19. The primitive environment was reducing because in it
 - (a) CO_2 was more
 - (b) H_2 was more
 - (c) O_2 was more
 - (d) NH_3 was more
20. In his experiments for origin of life, Miller obtained
 - (a) Proteins
 - (b) Ammonia
 - (c) Amino acids
 - (d) Hydrogen
21. Who did an experiment to prove that “The organic compounds were the basis of life”
 - (a) Darwin
 - (b) Stanley Miller and Harold C. Urey
 - (c) Melvin
 - (d) Fox
22. Under certain conditions scientists have obtained cell-like structures. These are known as
 - (a) Microbes
 - (b) Protists
 - (c) Coacervates
 - (d) Prebiotic soup
23. Which is responsible for origin of life
 - (a) Spontaneous generation
 - (b) Special creation
 - (c) Catastrophy
 - (d) Chemosynthesis
24. Origin of life took place in/on
 - (a) Water
 - (b) Air
 - (c) Mountains
 - (d) Land
25. The four elements that make up 99% of all elements found in a living system are
 - (a) H, O, C, N
 - (b) C, H, O, S
 - (c) C, H, O, P
 - (d) C, N, O, P
26. Chemical theory of origin of life was given by
 - (a) Stanley Miller
 - (b) Oparin and Haldane
 - (c) Louis Pasteur
 - (d) Spallanzani

27. The spark-discharge apparatus to test chemical evolution of life was designed by
(a) Oparin and Haldane (b) Miller and Urey (c) Jacob and Monad (d) Dixon and Jolley
28. '*Origin of life*' was written by
(a) Darwin (b) Oparin (c) Gray (d) Smith
29. "Eternity of life" means
(a) Infinite life (b) Mortal life (c) Immortal life (d) None of the above
30. The structure present in nature which is living and non-living both is
(a) Protista (b) Monera (c) Virus (d) Bacteria
31. The idea of spontaneous generation was first refuted by
(a) Pasteur (b) L. Spallanzani (c) F. Redi (d) S.L. Miller
32. Nucleoprotein gave most probably the first sign of
(a) Life (b) Amino acids (c) Soil (d) Sugar
33. The cells which does not contain nucleus and mitochondria are known as
(a) Primitive protozoans (b) Primitive algae (c) Eubiont (d) Bacteria
34. There is no life on moon because there is no
(a) Carbon (b) Nitrogen (c) Water (d) Silicates
35. Stanley Miller (1950) was successful in synthesizing
(a) Nucleic acid from ammonia etc. (b) Gene in laboratory
(c) Simple amino acids from ammonia and CH_4 etc. (d) Insulin from protein and carbohydrates
36. An experiment to prove that organic compounds were the basis of life, was performed by
(a) Oparin (b) Miller (c) Melvin (d) Fox
37. The scientist related with the overthrow of the "Theory of spontaneous generation" and experiments with swan-necked flasks is
(a) Von Helmont (b) Louis Pasteur (c) Miller (d) Haeckel
38. The concept of spontaneous generation of life as not accepted by
(a) F. Redi (b) Louis Pasteur (c) Spallanzani (d) All of these
39. Who stated "Life originated from simple amino acids"
(a) Oparin (b) Muller (c) Urey and Miller (d) De Vries
40. All life starts with
(a) Four cells (b) Many cells (c) One cell (d) None of these
41. The water of primitive ocean during the time of 'origin of life', has been called 'hot dilute soup of organic substances' by
(a) Haldane (b) Miller (c) Oparin (d) Lamarck
42. Pasteur succeeded in disproving the spontaneous generation theory because
(a) He was lucky
(b) He was ingenious in drawing out the neck of the glass flasks so as to provide access to air but not to the micro-organism
(c) Of the fact that the sample of yeast taken by him was dead
(d) Of the clean surroundings of his laboratory

43. The presence of salts ($NaCl$ and others) in animal body fluid gives an inference that life originated in the
 (a) Salt solutions (b) Rain water (c) Primitive ocean (d) None of these
44. Contribution in chemical evolution in origin of life
 (a) Miller (b) Darwin (c) Lamarck (d) Wallace
45. Coacervates are
 (a) Colloid droplets (b) Contain nucleoprotein (c) Both (a) and (b) (d) Protobiont
46. Theory of special creation was given by
 (a) Weismann (b) Helmont (c) Manpertuis (d) Father Saurezi
47. The life begins above which level
 (a) Molecule (b) Amino acid (c) Mixture (d) Compound
48. If you go back in the history approx. 4500 million years back atmosphere was reducing the organism were
 (a) Autotroph, aerobic (b) Chemo-autotroph, anaerobic
 (c) Chemo-heterotroph, anaerobic (d) Heterotroph, anaerobic
49. Type of nutrition in the primitive cells
 (a) Heterotrophic or holozoic (b) Heterophytic or holophytic
 (c) Saprophytic (d) Saprozoic
50. Growth by the absorption of molecules from the environment from the
 (a) Macromolecules (b) Coacervates (c) Primitive molecules (d) Protomolecules
51. The complex organic compounds that may have first evolved in the direction of origin of life on earth, may have been
 (a) Proteins and amino acids (b) Proteins and nucleic acids
 (c) Urea and nucleic acids (d) Urea and amino acids
52. In his classic experiment on the formation of amino acids, Stanley Miller passed an electric discharge in a mixture of
 (a) Steam, CH_4 , H_2 and NH_3 (b) CH_4 , CO_2 , O_2 and H_2 (c) NH_3 , O_2 , H_2 and steam (d) CH_4 , H_2 , N_2 and steam
53. According to spontaneous generation theory, the sequence of origin of life may be considered as
 (a) Amino acid – protein - chlorophyll (b) Chlorophyll – starch - glycogen
 (c) Nucleic acid – amino acid - chlorophyll (d) Chlorophyll – nucleic acid – amino acid
54. Which one of the following is the correct sequence of chemical substances produced during the origin of life on the earth
 (a) Water, amino acid, nucleic acid and enzyme
 (b) Glucose, amino acid, nucleic acid and protein
 (c) Amino acid, ammonium phosphate and nucleic acid
 (d) Ammonia, amino acid, protein and nucleic acid

55. According to one of the most widely accepted theories the earth's atmosphere, before any life had originated on this planet, consisted of a mixture of
 (a) Water vapours, H_2 , NH_3 and CH_4 (b) H_2 , CO_2 , NH_3 and CH_4
 (c) O_2 , NH_3 , CH_4 and water vapours (d) Ozone, CH_4 , O_2 and water vapours
56. Finding of miller's experiment on origin of life has provided evidence for the
 (a) Theory of special creation (b) Theory of organic evolution
 (c) Theory of biogenesis (d) theory of abiogenesis
57. The abiogenesis occurred about how many billion years ago
 (a) 1.2 billion (b) 1.5 billion (c) 2.5 billion (d) 3.5 billion
58. Which of the following was most likely to have been absent in free form in the primordial atmosphere at the time of origin of life
 (a) O_2 (b) CH_4 (c) H_2 (d) NH_3
59. The organism which appeared first on earth is known as
 (a) Eubiont (b) Probiont (c) Eobiont (d) True biont
60. Photosynthetic bacteria evolved on the earth about million years ago
 (a) 3300 to 3500 (b) 3000 to 3300 (c) 3500 to 3800 (d) 3800 to 4000
61. An evolutionary explanation of the origin of plants and animals was given by
 (a) Lucretius (b) John Ray (c) Erasmus Darwin (d) Carl Linnaeus
62. Source of energy at the time of origin of life
 (a) Heat, cosmic rays and lightning (b) Heat only
 (c) Cosmic rays only (d) Lightning only
63. Group of earliest photosynthetic organisms appeared during origin of life
 (a) Probacteria (b) Protobacteria (c) Cyanobacteria (d) Primitive bacteria
64. The first evolved organisms were
 (a) Chemoautotrophs (b) Chemoheterotrophs (c) Cyanobacteria (d) Bacteria
65. Theory of spontaneous generation was given by
 (a) Louis Pasteur (b) Spallanzani (c) F. Redi (d) Van Helmont
66. If there was no CO_2 in the earth's atmosphere, the temperature of earth's surface would be
 (a) Same as present (b) Less than the present
 (c) Higher than the present (d) Dependent on the amount of oxygen in the atmosphere
67. Oparin and Haldane got the ideas from the new biochemistry founded by
 (a) T.H. Huxley (b) F.G. Hopkins (c) J. Tyndall (d) Their own ideas
68. Which of the following rules state that organisms have a tendency towards increase in the size during their evolution
 (a) Williston's rule (b) Cope's rule
 (c) Dollo's rule (d) Hardy-Weinberg's rule

69. The correct match is :
- | | |
|-------------|-------------|
| I. Lamarck | A. Russian |
| II. Oparin | B. Austrian |
| III. Mendel | C. Spanish |
| IV. Suarez | D. Frnech |
- (a) I-D, II-A, III-B, IV-C (b) I-A, II-B, III-C, IV-D
(c) I-D, III-C, III-B, IV-A (d) I-A, II-D, III-C, IV-B
70. The correct match is
- | | |
|-----------------------|-----------------------|
| I. Origin of life | A. Cuvier |
| II. Origin of species | B. Suarez |
| III. Special creation | C. Charles Darwin |
| IV. Catastrophe | D. A.I. Oparin theory |
- (a) I-A, II-B, III-C, IV-D (b) I-B, II-C, III-D, IV-A
(c) I-C, II-D, III-A, IV-D (d) I-D, II-C, III-B, IV-A
71. Consider the following statements and answer accordingly. Assertion (A). Amphibians have evolved from fishes; Reason (R) We can take the example of fossil *Archeopteryx*
- (a) A and R are true and R is correct explanation to A
(b) A and R both are true but R is not an explanation to A
(c) A is true but R is false (d) A is wrong but R is correct
72. The concept of evolution was given by
- (a) Aristotle (b) Empedocles (c) Lamarck (d) Darwin

EVIDENCES OF ORGANIC EVOLUTION

Basic Level

73. Which of the following are homologous
 - (a) Wings of butterfly, wings of flying fish and wings of bird
 - (b) Tail of scorpion, tail of bird and tail of monkey
 - (c) Sting of honey bee, sting of scorpion and poison fangs of snakes
 - (d) Paddles of whale, front legs of horse and arms of man
74. Which one of the following sets of structure includes only analogous organs
 - (a) Wings of butterfly, housefly and bat
 - (b) Hind legs of horse, grasshopper and bat
 - (c) Hands of man, monkey and kangaroo
 - (d) Mandibles of cockroach, mosquito and honey bee
75. Appearance of ancestral characters in the new borns, such as tail, monstrial face, gill slits, multiple mammae etc. are known as
 - (a) Homologous
 - (b) Analogous
 - (c) Atavistic
 - (d) Vestigial
76. Homologous organs are
 - (a) Similar in origin
 - (b) Similar in function
 - (c) Similar in development
 - (d) Similar in behaviour

77. Vestigial pelvic girdle and bones of hind limbs are the characteristic of
 (a) Whales (b) Dolphins (c) Sharks (d) Seal
78. Vestigial organs occur as
 (a) Useless because of incomplete development (b) Inefficient parts
 (c) Fully developed but useless (d) Analogous
79. Vestigial organ in man is
 (a) Extra-abdominal muscles (b) Thumb
 (c) Conjunctiva (d) Body hairs
80. Recapitulation theory forms
 (a) Anatomical evidence (b) Taxonomical evidence
 (c) Physiological evidence (d) Embryological evidence
81. Evolution means
 (a) History of race (b) development of race
 (c) History and development of race with variations (d) Progressive development of the race
82. Which is the vestigial organ in man
 (a) Vermiform appendix (b) Cervical vertebra (c) Atlas (d) None of the above
83. The evolution of groups of organisms is called
 (a) Phylogeny (b) Ontogeny
 (c) Atavism (d) Progressive evolution
84. Evolution is regarded as
 (a) Theory (b) Established fact (c) Principle (d) Hypothesis
85. Homologous organs are
 (a) Leg of man, leg of horse, wing of bat (b) Hand of man, tail of horse, wing of bat
 (c) Hand of man, forelimb of horse, wing of bat (d) Head of man, leg of horse, wing of bat
86. Brow spot in frog is
 (a) Vestige of nose (b) Vestige of median eye
 (c) Light sensitive spot (d) Swimming sensitive spot
87. Which of the following resembles the ancestral form from which the animals and plants have evolved
 (a) *Amoeba* (b) *Paramecium* (c) *Plasmodium* (d) *Euglena*
88. Birds are evolved from
 (a) Non-chordates (b) Reptiles (c) Amphibians (d) Fishes
89. Which one is not a vestigial organ in man
 (a) Vermiform appendix (b) Plica semilunaris (c) Ear muscles (d) Malleus
90. The early stage human embryo distinctly possesses
 (a) Gills (b) Gill slits (c) External ear (Pinna) (d) Eye brows
91. The humming bird, hawk and the humming moth illustrate
 (a) Adaptive radiation (b) Homology
 (c) Convergent evolution (d) Divergent evolution

92. Which of the sets represents vestigial structures in man
 (a) Hair, olecranon process, coccyx and vermiform appendix
 (b) Wisdom teeth, mammary glands, coccyx and patella
 (c) Coccyx, nictitating membrane, appendix and ear muscles
 (d) Hair, ear muscles, patella and atlas
93. The greatest evolutionary change enabling the land vertebrates to be completely free from water, was the development of
 (a) Four legs (b) Lungs
 (c) Shelled eggs and internal fertilization (d) Four chambered heart
94. Haeckel's theory of recapitulation (Biogenetic law) means that
 (a) All organisms start as an egg
 (b) Life history of an animal reflects its evolutionary history
 (c) Progeny of an organism resembles its parents (d) Body parts once lost are regenerated
95. Which one illustrates palaeontological evidence in favour of organic evolution
 (a) Duck bill platypus (b) Pappered moth (c) Archaeopteryx (d) Darwin's finches
96. In which case Darwin theory is wrong
 (a) Arrival of the fittest (b) Survival of the fittest
 (c) Origin of species (d) High efficiency of reproduction
97. De Vries discarded the principle of
 (a) Darwin (b) Lamarck (c) Haeckel (d) Mendel
98. It is found at some stage of life
 (a) Vertebral column (b) Pharyngeal gill clefts (c) Ventral heart (d) Red blood corpuscles
99. What is evolution
 (a) Development of DNA from nucleotides (b) Development of organism through time
 (c) Development of a cell from chemicals (d) None of these
100. Which of the following is connecting link showing organic evolution
 (a) *Plumnaeus* (b) *Pontobdella* (c) *Macropus* (d) *Peripatus*
101. Which on of the following is vestigial structure in man
 (a) Wisdom tooth (b) Ear (c) Eye (d) Tongue
102. Lamarck's theory on organic evolution is stated as
 (a) Inheritance of mutant characters (b) Inheritance of vestigeal characters
 (c) Inheritance of ancestral characters (d) Inheritance of acquired characters
103. Wings of bat, locust and pigeon are an example of
 (a) Vestigeal organs (b) Exo-skeleton structures (c) Homologous organs (d) Analogous oranges
104. Homologous organ have
 (a) Same morphology and different function
 (b) No common ancestral origin
 (c) Different morphology and function but common ancestral origin
 (d) Same morphology and function

105. The term for similarity in organ structure seen in great diversity is
 (a) Homology (b) Identical (c) Analogy (d) Symmetrical
106. Homologous structures have
 (a) Similar origin but similar or dissimilar functions
 (b) Dissimilar origin but similar functions
 (c) Dissimilar origin but dissimilar functions (d) Dissimilar origin and dissimilar structures
107. Which of the following are homologous organs
 (a) Wings of bird and wings of insect (b) Wings of bat and wings of cockroach
 (c) Wings of bird and hands of human (d) Nails of human being and claws in animals
108. 'Vestigial organs' are those organs which are
 (a) Characteristics of birds (b) Not of much use today
 (c) Helpful in locomotion (d) Common
109. The wings of an insect and a bat exhibit
 (a) Homology (b) Analogy (c) Atavism (d) Connecting link
110. Wesimann's experiment discarded the views of
 (a) Lamarck (b) Darwin (c) Khurana (d) Haeckel
111. Which one is vestigial organ of man
 (a) Epiglottis (b) Muscles of ear pinna (c) Fossa ovalis (d) Ileum
112. Analogous organs are those which are
 (a) Structurally similar (b) Structurally and functionally similar
 (c) Functionally similar (d) Normally non-functionable
113. Which one is not a vestigial organ
 (a) Wings of Kiwi (b) Coccyx in man (c) Pelvic girdle of Python (d) Flipper of seal
114. Which is a vestigial organ of python
 (a) Nose (b) Hind limbs (c) Scales (d) Teeth
115. Which of the following is not vestigial in human
 (a) Coccyx (b) Nail (c) Third molar (d) Abdomen
116. The embryonic development of an animal from the zygote to the adult stage is known as
 (a) Phylogeny (b) Biogeny (c) Ontogeny (d) Embryogeny
117. The evidence for the origin of birds from reptiles is the presence in them of
 (a) Feathers (b) Scales (c) Claws (d) Haris
118. Which is not likely to disappear in future generations of man
 (a) Body hair (b) Wisdom teeth (c) Ear ossicles (d) Ear muscles
119. *Archaeopteryx* is known as missing /connecting link because it is a fossil and has characters between
 (a) Fishes and amphibians (b) Birds and reptiles
 (c) Reptiles and mammals (d) Chordates and nonchordates

120. Which is a set of evidences of evolution
 (a) Homologous and analogous (b) Homologous and vestigial organs
 (c) Analogous and vestigial organs (d) All the above
121. Organic evolution is change in
 (a) Single individual (b) A few members of population
 (c) Major portion of population (d) Entire population
122. A bird with teeth is
 (a) Kiwi (b) Ostrich/King Vulture (c) Dodo (d) *Archaeopteryx*
123. Concept of Evolution is an excellent working hypothesis to approach the problem of
 (a) Matter, energy and life
 (b) Development of divers organisms on earth through time
 (c) Prodigality in reproduction (d) Environmental conditions
124. Most primitive mammals include
 (a) Armadillo (b) Spiny anteater (c) Scaly anteater (d) All anteater
125. *Peripatus* is a connecting link between
 (a) Reptiles and mammals (b) Molluscs and arthropods
 (c) Annelids and arthropods (d) Annelids and molluscs
126. Prototheria have evolved from
 (a) Snakes (b) Birds (c) Amphibians (d) Reptiles
127. The flightless bird, Cassowary is found in
 (a) Mauritius (b) Indonesia (c) New Zealand (d) Australia
128. The preserved fossil remains of *Archaeopteryx* shows that
 (a) It was a flying reptile in the triassic period
 (b) Reptiles gave rise to birds during jurassic period
 (c) It was flying reptile from the permian period
 (d) Reptiles gave rise to birds during permian period
129. The connecting link between annelida and mollusca is
 (a) *Neopilina* (b) *Glochidium larva* (c) *Nautilus* (d) *Veliger larva*
130. Earth was divided into six biogeographic areas by
 (a) Wallace (b) Malthus (c) Darwin (d) Stebbins
131. Fossils are dated now by
 (a) Stratigraphic position (b) Amount of calcium residue
 (c) Association with other animals (d) Radioactive carbon (C^{14}) contents
132. Fossilization occurs where
 (a) Animals are destroyed by environment (b) Animals are destroyed by scavengers
 (c) Animals are burried by natural processes
 (d) Animals are burried and preserved by natural processes

133. Fossils are
 (a) Fovea in the retina of vertebrate eye (b) Remains of organisms present in the rocks
 (c) The fossa present in the bones (d) Foramen through which nerves pass
134. Which of the following would be easily fossilized
 (a) Heart (b) Tooth (c) External ear (d) Skin
135. Which of the following is the most evident source of evolution
 (a) Fossils (b) Embryos (c) Morphology (d) Vestigial organs
136. Which one of the following is living fossil
 (a) *Sphenodon* (b) *Peripatus* (c) *Archaeopteryx* (d) Duck-billed platypus
137. Founder of 'palaeontology' is
 (a) Birbal Sahni (b) Cuvier (c) Dickensom (d) Darwin
138. The study of fossils is called
 (a) Herpatology (b) Cytology (c) Palaeontology (d) Organic evolution
139. Fossil contents of the alimentary canal are termed as
 (a) Casts (b) Coprolites (c) Impressions (d) Trails
140. The field in which zoology and geology are very intimately connected, is
 (a) Zoogeology (b) Zoogeography (c) Palaeontology (d) Archaeology
141. The fake fossils which resemble to the remains of plants are known as
 (a) Pseudo fossils (b) True fossils (c) Complete fossils (d) Incomplete fossils
142. The earliest fossil form in the phylogeny of horse is
 (a) *Merychippus* (b) *Eohippus* (c) *Equus* (d) *Mesohippus*
143. Living fossil is
 (a) Latimeria (b) Uromastix (c) *Archaeopteryx* (d) All the above
144. Which one provides direct and solid evidence in favour of organic evolution through ages
 (a) Atavism (b) Palaeontology
 (c) Vestigial organs (d) Galapagos island fauna
145. Fossil remains of *Archaeopteryx* indicates that
 (a) It was a flying reptile from Triassic (b) It was flying reptile from Permian
 (c) Reptiles gave rise to birds during Permian (d) Reptiles gave rise to birds during Jurassic
146. Living organism with oldest fossil history is
 (a) Dinosaur (b) *Archaeopteryx* (c) Horse (d) Man
147. Which one is used for dating archaeological specimens like bones, shells and wood
 (a) ^3H (b) ^{14}C (c) ^{121}I (d) ^{32}P
148. Fossils indicate the evolution of
 (a) Monkey (b) Dinosaur (c) Horse (d) Man
149. Which animal has become extinct recently
 (a) *Draco* (b) Dinosaur (c) Mammoth (d) Pteridosperms

150. Which statement is correct for stratification of fossils
 (a) Fossils of upper stratum are more recent than those of lower strata
 (b) Fossils of lower stratum are more recent than those of upper strata
 (c) There is no stratification of fossils
 (d) None of these
151. Fossil evidence for mammal-like reptiles data back to
 (a) Triassic (b) Cretaceous (c) Permian (d) Carboniferous
152. The age of fossils can be estimated now by
 (a) Earth's crust (b) Amount of calcium deposited
 (c) Remaining quantity of radioactive carbon in relevant rocks (d) All of these
153. Whose palaeontological history is older than that of the other three
 (a) Dinosaurs (b) Frog (c) Man (d) Horse
154. Birbal Sahni is associated with evolution in field of
 (a) Origin of bacteria (b) Special creation (c) Fossil plants (d) None above
155. Geologically one of the following eras is known as “*Golden age of Reptiles*” or “*Golden age of Dinosaurs*”
 (a) Mesozoic (b) Cenozoic (c) Palaeozoic (d) None of the above
156. The cenozoic era is known as
 (a) Age of mammals and modern flora (b) Age of reptiles and gymnosperms
 (c) Age of amphibia and lycopods (d) Age of marine invertebrates
157. The feature which enabled reptiles to dominate the land fauna for 100 million years was their
 (a) Large size (b) Heavy armour (c) Large teeth (d) Large eggs
158. Correct sequence is
 (a) Palaeozoic → Mesozoic → Coenozoic (b) Mesozoic → Archaeozoic → Proterozoic
 (c) Palaeozoic → Archaeozoic → Coenozoic (d) Archaeozoic → Palaeozoic → Proterozoic
159. The first life on earth came in water and evidences indicate that life originated in one of the following eras
 (a) Palaeozoic (b) Mesozoic (c) Cenozoic (d) Proterozoic
160. Which era is dubbed as the age of prokaryotic microbes
 (a) Phanerozoic (b) Proterozoic (c) Precambrian (d) Archean
161. Archeopteryx, a transitional fossil between birds and reptiles was discovered from the rocks of following period
 (a) Jurassic (b) Archeozoic era (c) Cretaceous (d) Triassic
162. In which era mammals and birds evolved
 (a) Mesozoic (b) Cenozoic (c) Palaeozoic (d) Precambrian
163. The dinosaurs were maximum during the period of
 (a) Jurassic (b) Triassic (c) Cretaceous (d) Palaeocene
164. Dinosaurs originated in which era
 (a) Paleozoic (b) Archeozoic (c) Cenozoic (d) Mesozoic

165. Evolution of unicellular organism was in the era
 (a) Proterozoic (b) Palaeozoic (c) Archaeozoic (d) Mesozoic
166. Prototherians have evolved from
 (a) Reptiles (b) Birds (c) Eutherians (d) Amphibians
167. There was no life in
 (a) Azoic era (b) Mesozoic era (c) Palaeozoic era (d) Cenozoic era
168. Which were dominant during mesozoic era
 (a) Pisces (b) Ruling reptiles (c) Birds (d) Ruling mammals
169. Reptiles were dominant during
 (a) Permian period (b) Cretaceous period (c) Oligocene period (d) Cambrian period
170. Dinosaurs disappeared during
 (a) Jurassic (b) Triassic (c) Cretaceous (d) Permian
171. Coenozoic era does not include
 (a) Pliocene (b) Miocene (c) Devonian (d) Pleistocene
172. Palaeozoic era was age of
 (a) Reptiles (b) Giant molluscs and fishes (c) Giant reptiles (d) All of these
173. Dinosaurs were
 (a) Giant mammals (b) First amphibians (c) Extinct reptiles (d) First mammals
174. The feature which enabled reptiles to dominate earth's fauna for 100 million years was their
 (a) Large lungs (b) Heavy armour (c) Big teeth (d) Shelled eggs
175. Which era could be called the "age of mammals" and "age of birds"
 (a) Mesozoic (b) Coenozoic (c) Palaeozoic (d) Cretaceous
176. Which of these evolved during Pliocene epoch
 (a) Man (b) Birds (c) Fishes (d) Insects
177. "Age of fishes" was
 (a) Ordovician (b) Devonian (c) Crustaceous (d) Silurian
178. *Tyrannosaurus* was abundant during
 (a) Archaeozoic (b) Coenozoic (c) Mesozoic (d) Palaeozoic
179. One of the following can be used as an illustration to demonstrate process of evolution in animals
 (a) Extinction of some animals like cheetah
 (b) Occurrence of tadpole in the life history of frog
 (c) Presence of egg laying mammals in Australia
 (d) Increasing incidents of DDT resistance in mosquitoes
180. Which one of the following sets includes all homologous organs
 (a) Hind legs of pig, duck and kangaroo (b) Wings of bats, butterfly and bird
 (c) Sting of honey bee, scorpion and snake (d) Tail of rat, peacock and cockroach
181. Evolution is best defined as
 (a) Inheritance of acquired characters (b) Descent by modifications
 (c) Spontaneous generation (d) Struggle for existence

182. The process of evolution
(a) is a continuous process
(b) is a discontinuous process
(c) was continuous in beginning but discontinuous now
(d) was discontinuous in beginning but continuous now
183. The presence of temporary gills in the embryos of snakes, birds and man indicates that
(a) These embryos need gills for breathing
(b) Ancestors of these animals had gills at one stage of evolution
(c) Lungs evolved from gills
(d) Medium in which these embryos develop resembles O_2 rich water
184. Mule is a hybrid, which of the following statement, is correct
(a) Mule is not a species
(b) Mule is a new species
(c) Horse and ass are two populations
(d) Mule represents a common ancestor of horse and ass
185. Homologous organs explain
(a) Convergent evolution (b) Divergent evolution (c) Pedogenesis (d) Prodigality
186. Connecting link between man and ape was
(a) Java man (b) Ape man (c) Java ape man (d) Ramapithecus
187. Which represents a connecting link as an evidence in favour of organic evolution
(a) *Archaeopteryx* between birds and mammals (b) Whale between fishes and mammals
(c) Duck bill platypus between reptiles and mammals
(d) Java ape man between modern man and Peking man
188. A scientist who worked on rats cut their tails upto 21 successive generations but at last he found that tail remained normal. By this experiment theory of which scientist is disapproved
(a) Darwin (b) Lamarck (c) Hugo de Vries (d) Mendel
189. In a bush pattern of evolution, the uppermost tips of the branches represent
(a) Early prosimians (b) Lower taxonomic rank
(c) Descendent lines (d) Currently living species
190. Derivation of homologues are caused by
(a) Time consequence along (b) Gradual changes in structure
(c) Drastic changes in structure (d) No changes in basic structure
191. Which is basis of evolution
(a) Cell (b) Individual (c) Population (d) Species
192. Which one of the following organs have no evolutionary significance
(a) Analogous organs (b) Atavistic organs (c) Non-functional organs (d) Functional organ

193. Which one of the following is a pair of homologous organs
(a) Lungs of rabbit and gills of rohu (b) Wing of bat and wing of butterfly
(c) Pectoral fin of rohu and the forelimb of horse
(d) Wings of grasshopper and wing of crow
194. Organisms are dependent on each other because
(a) They are forced to lead such life
(b) During the course of organic evolution the interdependency was progressively evolved
(c) It is a compulsory phenomenon
(d) It is a biological obligation
195. Which of the following animals has been extinct rather recently
(a) Dinosaurs (b) Sphenodon (c) Mammoth (d) Dodo
196. The book "*Descent of man*" and "*Selection in relation to sex*" was written by
(a) Lamarck (b) Lamarck and Darwin (c) Weismann (d) C. Darwin
197. Occurrence of vestigial organs is not explained by
(a) Theory of organic evolution (b) Theory of special creation
(c) Scala naturae (d) Natural classification system
198. The splint bone of present day horse is a vestige of
(a) Fourth toe (b) First toe
(c) Second toe (d) Second and fourth toes in limbs
199. The presence of gill slits in the embryos of all vertebrates supports the theory of
(a) Recapitulation (b) Organic evolution (c) Metamorphosis (d) Biogenesis
200. Vestigial organs in human are about
(a) 8 (b) 80 (c) 100 (d) 108

- 201.** Some of the important evidences of organic evolution are
 (a) Occurrence of homologous and vestigial organs
 (b) Occurrence of analogous and vestigial organs
 (c) Occurrence of homologous and analogous organs
 (d) Occurrence of analogous and vestigial organs
- 202.** Which one of the following evidences does not favour the Lamarckian concept of inheritance of acquired characters
 (a) Melanization in peppered moth in industrial areas
 (b) Presence of webbed toes in aquatic birds
 (c) Lack of pigment in cave-dwelling animals (d) Absence of limbs in snakes
- 203.** Monkeys and some lower groups have certain blood groups which are
 (a) Identical to those of man (b) Identical to those of anthrop apes
 (c) Somewhat similar to white persons (d) Not identical to those of man
- 204.** Homologous organs indicate
 (a) Convergent evolution (b) Parallel evolution (c) Natural selection (d) Common descent
- 205.** A connecting link between two phyla is
 (a) *Archaeopteryx*-Aves and Mammalia (b) *Amphioxus*-Echinodermata and Chordata
 (c) *Peripatus*-Annelida and Arthropoda (d) *Ornithorhynchus*-Aves and Reptilia
- 206.** Which of the following is not atavistic in humans
 (a) Tail in some babies (b) Enlarged canines (c) Six fingers (d) Dense body hair
- 207.** Similarities between organisms of different genotypes is due to
 (a) Convergent evolution (b) Divergent evolution (c) Microevolution (d) Macroevolution
- 208.** A vestigial tooth is
 (a) Incisor (b) Molar (c) Premolar (d) Canine
- 209.** Tasmanian Wolf is a marsupial while Wolf is a placental mammal. This shows
 (a) Convergent evolution (b) Divergent evolution
 (c) Parallelism (d) Inheritance of acquired characters
- 210.** Presence of some vestigial teeth in a species exemplifies
 (a) Genic adaptation (b) Unstable adaptation (c) Seasonal adaptation (d) Functional adaptation
- 211.** Which type of evolution is exemplified by wings of mosquito, bat and pigeon
 (a) Convergent (b) Divergent (c) Parallel (d) None of these
- 212.** Which structures provide strong evidence of organic evolution
 (a) Gill clefts in vertebrate embryo (b) Wings in insects, birds and bats
 (c) Jointed legs in arthropods and mammals (d) Excretory organs in earthworms and frogs

213. If the life-history of frog reflects and one aspect of evolution, it can be expressed by
(a) "Ontogeny repeats Natural Selection" (b) "Phylogeny repeats Ontogeny"
(c) "Ontogeny repeats Phylogeny" (d) Larval forms represent living fossils
214. Most primitive living mammals which provide an evidence of organic evolution from geographical distribution are found in
(a) China (b) India (c) Australia (d) Africa
215. Evolutionary convergence is characterized by
(a) Development of dissimilar characteristics in closely related groups
(b) Development of common set of characteristics in groups of different ancestry
(c) Development of characteristics by random mating
(d) Development of common characteristics in different groups
216. Existence of marsupials in Australia and New Zealand prove
(a) Continental drift (b) Geological period (c) Both (d) None of these
217. Precipitation test gives evidences from
(a) Comparative embryology (b) Comparative anatomy
(c) Comparative serology (d) None of the above
218. Phylectic evolution is the
(a) Evolution in a line
(b) Evolution that involves the development of reproductive isolation
(c) Evolution breaking into several pieces
(d) All above
219. Who discovered the fossil of archaeopteryx from bavaria (Germany)
(a) Thomas Huxley (b) Hermann von Meyer (c) Colin Harrison (d) Andreas Wagner
220. The age of rock is calculated on the basis of
(a) Types of fossile present (b) Number of strata present
(c) Amount of uranium present (d) Amount of lead present
221. Fossil X is older than fossil Y. Most evident answer is
(a) Fossil Y has got some of the vestigial organs, which are functional in X
(b) Fossil Y has got homologous and analogous organs of fossil X
(c) Fossil X is found in deeper sedimentation than Y
(d) Fossil Y was found in better state than that of X
222. Which one is not a true fossil
(a) *Placoderm* (b) *Limulus* (c) *Archeopteryx* (d) *Therapside*
223. Complete fossil of whose among the following is found
(a) *Archaeopteryx* (b) Birds (c) Reptiles (d) Horse
224. Potassium-argon dating can determine the age of the fossils
(a) Of about 5,00,000 years old (b) 2 billions years old
(c) Of all ages (d) Of azoic era only

225. Which is the largest known fossil of reptile
 (a) Dinosaurs (b) Diplodocus (c) Stegosaurus (d) Iguanodon
226. Which will be true in sedimentary rocks
 (a) Upper strata older and lower younger (b) Upper strata younger and lower older
 (c) There is no stratification (d) None of the above
227. Possibility of occurrence of coal in an area is determined by study of
 (a) Microfossils (b) Ecology (c) Economic Botany (d) Mining contents
228. Reptilian feature of *Archaeopteryx* is
 (a) U-shaped furcula (b) Beak (c) Abdominal ribs (d) Feathers
229. Half life of ^{14}C is
 (a) 50 years (b) 500 years (c) 5000 years (d) 5×10^4 years
230. One of the following is a fossil reptile with mammalian traits
 (a) *Tyrannosaurus* (b) *Dodo* (c) *Pelycosaurus* (d) *Archaeopteryx*
231. Half life of radioactive uranium is.....billion years
 (a) 4.5 (b) 1 (c) 10 (d) 1.2
232. First vertebrates were appeared in a period of palaeozoic era, called
 (a) Silurian (b) Ordovician (c) Devonian (d) Mississippian
233. The first mammals arose
 (a) After the extinction of dinosaurs (b) Before the origin of dinosaurs
 (c) Along with the dinosaurs (d) From the dinosaurs
234. Ancestral amphibians were tetrapods that evolved during
 (a) Jurassic period (b) Cretaceous period (c) Devonian period (d) Carboniferous period
235. The age of the fossil of *Dryopithecus* on the geological time scale is
 (a) 75×10^6 years back (b) 25×10^6 years back (c) 2.5×10^6 years back (d) 50×10^6 years back
236. Present day mammals have their predecessor in
 (a) Therapsids (b) Diapsids (c) Synapsids (d) Anapsids
237. Trilobites were evolved during which of the following period
 (a) Silurian (b) Cambrian (c) Ordovician (d) Pre-cambrian
238. Which epoch is of human civilization
 (a) Pliocene (b) Holocene (c) Palaeocene (d) Pleistocene
239. "The evolution and origin of human is similar to other animals". It was said by
 (a) Wallace (b) Lamarck (c) Darwin (d) Shapiro
240. Rise of invertebrate was in the era
 (a) Proterozoic (b) Archaeozoic (c) Palaeozoic (d) Mesozoic
241. Which of the following dominated in palaeozoic era
 (a) Reptiles (b) Fishes (c) Birds (d) Mammals
242. Which one of the following is the age of amphibians, fishes and invertebrates
 (a) Archaeozoic era (b) Proterozoic era (c) Palaeozoic era (d) Mesozoic era

243. Earliest reptiles evolved in the period
 (a) Ordovician (b) Silurian (c) Devonian (d) Carboniferous
244. First mammals appeared in the period
 (a) Triassic (b) Jurassic (c) Cretaceous (d) Tertiary
245. Origin of first mammals occurred
 (a) 500 million yrs (b) 220 million yrs
 (c) 1600 million yrs (d) Over 1600 million yrs ago
246. Carboniferous period of coal deposition was
 (a) 50 million years ago (b) 500 million years ago
 (c) 300 million years ago (d) 2000 million years ago
247. Origin of life occurred in
 (a) Carboniferous (b) Cambrian (c) Pre-cambrian (d) Ordovician
248. Modern birds rose in
 (a) Palaeozoic (b) Coenozoic (c) Mesozoic (d) Archaeozoic
249. Hoofed animals like horse originated in the epoch
 (a) Eocene (b) Oligocene (c) Miocene (d) Pleistocene
250. Fossils of Archaeopteryx reveal that
 (a) Reptiles were most evolved during triassic
 (b) Toothed birds originated from flying reptiles during triassic
 (c) Toothed birds originated during jurassic
 (d) Toothed birds gave rise to primitive mammals
251. Mammalian characteristics appeared first in
 (a) Peripatus (b) Protista (c) Pelicosaurus (d) None of these

THEORIES OF EVOLUTION

Basic Level

252. The material for organic evolution is
 (a) Effect of hormones (b) Nutritive value (c) Mutation (d) Asexual reproduction
253. Goldschmidt has classified evolution into micro, macro and mega evolution. Which one of the following is referred to as micro evolution
 (a) Evolution at variety level (b) Evolution at sub species level
 (c) Evolution at species and genus level (d) Evolution at family level
254. The most accepted theory of organic evolution
 (a) Natural selection theory (b) Phase theory
 (c) Synthetic theory (d) Mutation theory
255. In nature, the occurrence of mutations are
 (a) Mostly harmful (b) Mostly useful
 (c) Mostly neutral (d) Mostly neutral or harmful

- 256.** A species is produced by loss or disappearance of a few characters found in parents it is termed as
 (a) Progressive species (b) Retrogressive species (c) Successive species (d) Digressive species
- 257.** Which one of the following scientists is not related with organic evolution
 (a) Erasmus Darwin (b) Charles Darwin (c) Darlington (d) T.R. Malthus
- 258.** Modern theory of organic evolution is based on
 (a) Population (b) Mutation (c) Isolation (d) All of the above
- 259.** To be evolution of successful, a mutation must occur in
 (a) Germplasm DNA (b) Somatoplasm DNA (c) RNA (d) Cytoplasm
- 260.** The gene which increases the frequency of mutation in other genes is called as
 (a) Regulatory gene (b) Polygene (c) Mutagene (d) Hypostatic gene
- 261.** Mutations are mainly responsible for controlling
 (a) Increasing population rate (b) Maintaining genetic continuity
 (c) Variation in organisms (d) Extinction of organisms
- 262.** Birds are adapted to aerial life due to
 (a) Presence of wings (b) Light weight of their body
 (c) Presence of air marrow (d) All the above
- 263.** Persons who do hard manual work with their hands, are likely to develop
 (a) Thick subcutaneous fat in their palms
 (b) Thick epidermis on their palms
 (c) Greater number of sweat pores in their hands
 (d) Greater quantity of melanin all over the body
- 264.** Haeckel's biogenetic law states that
 (a) Course of evolution of race is repeated in the life history of an individual
 (b) Life originates from pre-existing life
 (c) Life originates from lifeless things
 (d) None of these
- 265.** Lamarck's acquired characters are not inherited and have no evolutionary value. This statement was given by
 (a) Hugo de Vries (b) Charles Darwin (c) Weismann (d) T.H. Morgan
- 266.** Darwin's theory of natural selection to explain organic evolution was based on
 (a) Modifications in organs through use and disuse
 (b) Prodigality of reproduction, struggle of existence and survival of fittest
 (c) Inheritance of acquired characters
 (d) Appearance of sudden large variations, their inheritance and survival of those having these variations
- 267.** Key point to Lamarck's view about organic evolution is that every offspring
 (a) Is similar to its parents (b) Inherits characters acquired by the parental generation
 (c) Shows struggle for existence (d) Repeats phylogeny in its ontogeny

268. The evolution of species is based upon sum total of the species adaptive changes preserved by
(a) Man conservation (b) Speciation (c) Natural selection (d) Isolation
269. The evolution of higher taxonomic groups such as new classes, new orders etc. is known as
(a) Micro evolution (b) Mega or macro evolution (c) Sympatric evolution (d) None of these
270. Darwin gave the theory of evolution was based on
(a) Survival of the fittest (b) Natural selection
(c) Mutation (d) Descent with modifications
271. Which one of the following was the contribution of de Vries
(a) Theory of natural selection (b) Law of segregation
(c) Theory of mutation (d) Law of dominance
272. According to the Neo-Darwinian theory, which of the following is responsible for the origin of new species
(a) Mutations (b) Useful variations
(c) Mutations together with natural selection (d) Hybridization
273. Evolution in which the animals of two different gene ecology show too much similarity with one another, is called
(a) Parallel evolution (b) Retrogressive evolution
(c) Progressive evolution (d) Convergent evolution
274. When an organ is used it will develop and if it is not used, it weakens to become vestigial. Who could have said their theory
(a) Darwin (b) de Vries (c) Lamarck (d) Mendel
275. The principle of organic evolution envisages
(a) No change in complexity (b) Decreasing complexity
(c) Increasing complexity (d) Drastic changes
276. Lamarck's theory of evolution is also called
(a) Theory of special creation (b) Inheritance of acquired characters
(c) Survival of the fittest (d) None of these
277. Most popular example of Lamarck is
(a) African Giraffe (b) Snakes (c) (a) and (b) both (d) Primose
278. One of the revolutionary concepts in Biology was projected by Charles Darwin in the '*Origin of Species*' and has been discussed in
(a) Germplasm theory (b) Use and disuse of organs
(c) Natural selection leading to the survival of the fittest (d) Gene mutation
279. Which one of the following pairs is correctly matched
(a) Streamlined body-Aquatic adaptation (b) Excessive perspiration-Xeric adaptation
(c) Parasitism-Intra specific relationship (d) Uricotelism-Aquatic habitat
280. There is more competition for survival between
(a) Same animals of same niche (b) Different animals of same niche
(c) Same animals of different niche (d) Different animals of different niche

281. Germplasm theory against Lamarck's principle, was given by
 (a) Weismann (b) Darwin (c) Lamarck (d) Hugo do Vries
282. Doctrine of evolution is concerned with
 (a) Special creation theory (b) Gradual changes
 (c) Abiogenesis (d) Biogenesis
283. Genetic flow between two species does not occur. This is a
 (a) Genetic barrier (b) Special barrier (c) Reproductive barrier (d) None of the above
284. Recapitulation theory (Biogenetic law) explains "*Ontogeny repeats Phylogeny*". It was given by
 (a) Lamarck (b) Haeckel (c) Darwin (d) Robert Hooke
285. "*Origin of Species*" was published in
 (a) 1809 (b) 1858 (c) 1956 (d) 1859
286. Author of "*Philosophique Zoologique*" is
 (a) Mendel (b) Darwin and Wallace (c) Lamarck (d) Darwin
287. Most convincing in Darwin's theory is
 (a) Malthus essay (b) Population
 (c) Survival of the fittest (d) Formation of species
288. Who gave the 'Theory of pangenesis'
 (a) Lamarck (b) Wallace (c) Haeckel (d) Darwin
289. Darwinism does not explain
 (a) Progression (b) Usefulness of all organs
 (c) Retrogression (d) Presence of vestigial organs
290. The ultimate source of organic evolution is
 (a) Natural selection (b) Sexual reproduction (c) Hormonal action (d) Mutations
291. The pangenesis of an animals are accumulated in
 (a) Zygote (b) Gametes (c) Blood (d) Gene pool
292. The concept of sudden genetic change which breeds true in a species is represented as
 (a) Inheritance of acquired characters (b) Natural selection
 (c) Law of inheritance (d) Mutation
293. Who wrote the "*Origin of Species*"
 (a) G.J. Mendel (b) Lamarck (c) De Vries (d) Charles Darwin
294. Which of the following concepts in attributed to Charles Darwin
 (a) Inheritance of acquired characters (b) Use and disuse of organs
 (c) Law of paired units (d) Struggle for existence
295. Struggle for existence is
 (a) Intraspecific (b) Interspecific (c) Environmental (d) All of the above

296. As per modern synthetic theory organic evolution depends upon
(a) Mutation, reproductive isolation and natural selection
(b) Gene recombination and natural selection
(c) Mutation and natural selection (d) All of these
297. Darwin proposed the theory of origin of species through
(a) Natural selection (b) Mutation (c) Hybridization (d) Acquired characters
298. Basic principles of embryonic development were stated by
(a) Von Baer (b) Haeckel (c) Darwin (d) Weismann
299. Mutation theory explaining organic evolution was proposed by Hugo de Vries. He worked on
(a) *Pisum sativum* (b) *Drosophila melanogaster*
(c) *Oenothera lamarckiana* (d) *Althea rosea*
300. Similarity developed in distantly related groups as an adaptation to the same function is called
(a) Convergent evolution (b) Connecting link (c) Missing link (d) Divergent evolution
301. Which are immortal
(a) Germ cells (b) Somatic cells (c) Pituitary cells (d) Glomerular cells
302. Unit of natural selection or survival of the fittest is
(a) Species (b) Population (c) Family (d) Individual
303. Biogenetic law was propounded by
(a) Von Baer and Haeckel (b) Von Baer and Aristotle
(c) Haeckel and Mendel (d) Mendel and Griffith
304. Interacting populations are
(a) Symbiotic (b) Mutualistic (c) Parasitic (d) Coevolved
305. Frequency of a gene in a population will increase if the gene is
(a) Lethal (b) Dominant (c) Recessive (d) Favourably selected
306. Darwin's theory of pangenesis proposes
(a) Some physical basis of inheritance
(b) Development of useful organs and degeneration of useless organs
(c) Increase in organ size with age
(d) Development of organs due to will power
307. What is true for Lamarck
(a) American botanist who later became zoologist
(b) English naturalist who propounded theory of evolution
(c) Polish scientist who gave law of inheritance
(d) French scientist who gave "Inheritance of acquired characters"

308. Natural selection means

- (a) Better adaptability (b) Elimination of less adapted
(c) Better survival (d) All of the above

309. Improved race of Pigeon developed due to

- (a) Environmental selection (b) Natural selection
(c) Artificial selection (d) Protective selection

310. Evolution will not occur if

- (a) There is no environmental influence (b) Genes are without effect
(c) Somatic variations are not heritable
(d) There is no genetic variations in individuals of a populations

311. Match the following columns and find correct combination

	Column I		Column II
<i>a</i>	Darwin	<i>p</i>	Mutation Theory
<i>b</i>	De Vries	<i>q</i>	Protobiosis
<i>c</i>	Pasteur	<i>r</i>	Origin of Species
<i>d</i>	Fox	<i>s</i>	Special Creation
		<i>t</i>	Swan-Necked Flask Experiment

- (a) $a = r, b = p, c = t, d = q$ (b) $a = p, b = q, c = r, d = s$
(c) $a = t, b = r, c = q, d = p$ (d) $a = r, b = t, c = p, d = q$

312. Tigon is

- (a) Natural hybrid between Lion and tigress
(b) Natural hybrid between Tiger and lioness
(c) Fertile hybrid between captive tiger and lioness
(d) Fertile hybrid between captive lion and tigress

313. Hinny is

- (a) Fertile hybrid between stallion and female donkey
(b) Sterile hybrid between stallion and female donkey
(c) Sterile hybrid between mare and male donkey
(d) Fertile hybrid between mare and male donkey

314. T.R. Malthus is famous for his book on

- (a) Population (b) Mathematics (c) Geography (d) Genetics

315. Weismann cut off tails of mice generation after generation but tails neither disappeared nor shortened showing that
(a) Darwin was correct (b) Tail is an essential organ
(c) Mutation theory is wrong (d) Lamarckism was wrong in inheritance of acquired character
316. Genetic drift is change of
(a) Gene frequency in same generation (b) Appearance of recessive genes
(c) Gene frequency from one generation to next (d) None of the above
317. Sum total of genes in a population is
(a) Genotype (b) Karyotype (c) Genetic constitution (d) Gene pool
318. Who gave the principle that population tends to multiply more rapidly than food supply
(a) Darwin (b) Malthus (c) Lamarck (d) Haldane
319. Major defect of Darwinism was
(a) Nondescription of survival of fittest (b) Nondescription of inheritance of fittest
(c) Nondescription of overproduction of young ones (d) Nondescription of reason for variations
320. In our modern understanding of Natural selection, the fittest individuals are those who
(a) Produce many offsprings, but a few survive upto sexual maturity
(b) Leave very many living descendents
(c) Are best adapted to the environment
(d) Are best equipped to cope with the special environmental conditions
321. Theory of Mutations or Discontinuous Variations was first proposed by
(a) Correns (b) Tschermak (c) Hugo de Vries (d) Erasmus Darwin
322. The possibilities for hereditary and evolutionary changes are greater in species that reproduce by
(a) Fission (b) Sexual means (c) Budding (d) Spore-formation
323. Mutations may be caused by X-ray due to changes in
(a) Chromosomes (b) Genes (c) DNA (d) All of these
324. The concept of “organic evolution” was hatched by
(a) Darwin (b) Wallace (c) None of these (d) Both of these
325. Polyploidy leads to rapid formation of new species, because of
(a) Genetic recombination (b) Mutation therapy
(c) Isolation behaviour (d) Development of multiple sets of chromosomes
326. Birds and mammals evolved from reptiles in mesozoic era this is
(a) Micro evolution (b) Mega evolution (c) Divergent evolution (d) Macro evolution
327. Adaptation of a species is its
(a) Metamorphosis (b) Ecdysis (c) Acquired character (d) Hereditary character
328. Whose theory of evolution believes that every organism has an internal vital force
(a) Darwinism (b) Lamarckism (c) De Vries theory (d) All above
329. The synthetic theory of evolution recognize the following process
(a) Natural Selection (b) Genetic recombination (c) Gene mutation (d) All above

330. Darwin's theory does not include
(a) Natural selection (b) Survival of the fittest
(c) Evolution through inheritance (d) Struggle for existence
331. Who wrote the book "Genetics and the Origin of Species"
(a) Devis (b) Dobzhansky (c) Julian Huxley (d) Fisher
332. By performing the replica plating experiment, Lederberg supported the
(a) Gene mutation theory (b) Natural selection theory
(c) Lamarck theory (d) Darwinian theory
333. In case of evolution which of the following statement is not correct
(a) Fossilized animals provides important information to trace evolution
(b) Wing of birds and forelimbs of cows are homologous
(c) In higher animals early development stages are similar
(d) Variation among individuals are not important in natural selection
334. The pioneers in the field of 'organic evolution' are
(a) Karl landsteiner, Hugo de Vries, Malthus
(b) Darwin, Hugo de Vries, Lamarck, Huxley
(c) Lamarck, Karl landsteiner, Malthus, DeVries
(d) Darwin, Lamarck, Karl landsteiner, DeVries
335. The rate of evolution is zero
(a) If gene frequency changes (b) If gene frequency does not change
(c) If the population is large (d) If population remains stationary
336. In forming the theory of evolution by natural selection, Darwin was greatly influenced by
(a) Mutations of Hugo de Vries (b) Malthus idea of population control
(c) Environmental factors (d) Lamarck acquired characters
337. Natural Selection Theory of Darwin is objected to, because it
(a) Stresses upon slow and small variations
(b) Stresses upon interspecific competition
(c) Explains that natural calamities take a heavy annular toll of lives
(d) Explains, adaptation of certain inherited characters
338. Organic evolution would have not been taken place
(a) If individuals in a population did not show genetic variations
(b) If individuals did not inherit character acquired during their life to their offsprings
(c) If somatic variations did not inherit
(d) If somatic variations were not transferred to genetic variations
339. Replica plating experiment was performed to prove that
(a) Pre-adaptive mutation (b) Variations
(c) Isolations (d) Reproductive mutation

340. Name of the ship in which Charles Darwin went for his expedition
(a) Siboga (b) Beagle (c) Sea gull (d) Atlantic
341. Which one of the following sequences was proposed by Darwin and Wallace for organic evolution
(a) Variations, natural selection, overproduction, constancy of population size
(b) Overproduction, variations, constancy of population size, natural selection
(c) Variations, constancy of population size, overproduction, natural selection
(d) Overproduction, constancy of population size, variations, natural selection
342. Industrial melanism is an example of
(a) Defensive adaptation of skin against ultraviolet radiations
(b) Drug resistance
(c) Darkening of skin due to smoke from industries
(d) Protective resemblance with the surroundings
343. Parallelism is
(a) Adaptive divergence in evolution
(b) Adaptive convergence of widely different species in evolution
(c) Adaptive convergence of closely related species in evolution (d) None of these
344. Master plate in replica plating experiment contained the
(a) Drug resistant bacteria (b) Sterile colony of bacteria
(c) Different colonies of fertile bacteria (d) None of the above
345. Darwinian theory was unable to explain
(a) The significance of minute variations (b) Presence of vestigial or useless organs
(c) The presence of over specialized organs (d) All of the above
346. Neo-Darwinism or synthetic theory of evolution is based upon
(a) Variation appeared in the structure and physiology of organism due to haphazard mutations
(b) High death rate and formation of sub-species
(c) Mutation and gene combination
(d) All the above
347. The basic unit of animal population which is communal interbreeding, in a species is known as
(a) Cline (b) Sub-species (c) Sibling species (d) Deme
348. The example of recapitulation theory is
(a) Embryonic membranes of reptiles (b) Tadpole larva of frog
(c) Placenta of mammals (d) Canine teeth of dog
349. The importance of random accumulation of small genetic changes sufficient to explain evolution
(a) Haeckel (b) Mayr (c) Darwin (d) Lamarck

350. Evolutionary convergence is characterized by
- (a) Development of characteristics by random mating
 - (b) Replacement of common characteristics in different group
 - (c) Development of dissimilar characteristics in closely related groups
 - (d) Development of a common set of characteristics in group of different ancestry
351. There are several ways of looking at living thing, one which is at the molecular level and analytical level with regard to life could vary nearly come to
- (a) Result of Newtonian laws
 - (b) Matter energy interaction
 - (c) Matter velocity relationship
 - (d) Physical expression of moment of mass
352. Indicate the completely correct statement about human races
- (a) All human races can interbreed but most will produce infertile young ones
 - (b) Different human races cannot interbreed
 - (c) Some human races can interbreed
 - (d) All human races can interbreed and produce fertile offspring
353. The term '*phyletic evolution*' was proposed by
- (a) Lamarck
 - (b) Mayer
 - (c) Darwin
 - (d) None of these
354. Species diversity generally increase as one proceeds from
- (a) Low altitude to high altitude, and from low latitudes to high latitudes
 - (b) High altitude to low altitude, and from low latitudes
 - (c) High altitude to low altitude, and from high latitudes to low latitudes
 - (d) Low altitude to high altitude, and from high latitudes to low latitudes
355. In the developmental history of mammalian heart, it is observed that it passes through a two-chambered fish-like heart, three-chambered frog-like heart and finally four-chambered stage. To which hypothesis can this above cited statement be approximated
- (a) Biogenetic law
 - (b) Hardy Weinberg law
 - (c) Lamarck's principle
 - (d) Mendelian principle
356. "Darwin's finches" refers to
- (a) Fossil of birds collected by Darwin at Galapagos islands
 - (b) A type of birds present on Galapagos islands
 - (c) Migratory birds collected by Darwin at Galapagos islands
 - (d) Fossils of reptiles collected by Darwin at Galapagos island
357. The scientists regarded as Neo-Lamarckist are
- (a) August Weismann and T.H. Morgan
 - (b) Hardy Weinberg
 - (c) Correns, Tshermak and Hugo do Vries
 - (d) Kammerer and Mc Dougall
358. A species is taxonomically
- (a) A group of evolutionary related populations
 - (b) A population with common characteristics as evolutionary base of variation
 - (c) A fundamental unit in the phylogenetic history of organisms
 - (d) A basic category to which most taxonomic information is attached

359. Most modern breeds of the domestic dog have evolved as a result of
(a) Natural selection (b) Artificial selection
(c) Sexual selection (d) Reproductive isolation
360. If mating is random, population is large and mutation does not occur: then gene frequencies of population from generation to generation remain constant. This was put forward by
(a) Lederberg-Lederberg (b) Wallace (c) Hardy Weinberg (d) Haeckel
361. The precipitation method of blood tests for finding out the inter-relationship among different animals was given by
(a) Haeckel (b) Foxon (c) L. de Vinci (d) H.F. Nuttall
362. A scientist kept 72 generations of *Drosophila* in darkness. Even after that the first flies had normal eyes. This disapproves the theory of
(a) Natural selection (b) Acquired characters (c) Use and disuse (d) Synthetic theory
363. The idea of natural selection as the fundamental process of evolutionary change was reached
(a) Independently by Charles Darwin and Alfred Russel Wallace in 1900
(b) By Charles Darwin 1866
(c) By Alfred Russel Wallace in 1901
(d) Independently by Charles Darwin and Alfred Russel Wallace in 1859
364. Two zoogeographical regions separated by high mountain ranges are
(a) Palaearctic and Oriental (b) Oriental and Australian
(c) Nearctic and Palaearctic (d) Neotropical and Ethiopian
365. The diversity in the type of beaks of finches adapted of different feeding habits on the Galapagos islands as observed by Darwin provides evidence for
(a) Origin of species by natural selection (b) Intraspecific variations
(c) Intraspecific competition (d) Interspecific competition
366. Co-worker of Darwin was
(a) Wallace (b) Mendel (c) Bateson (d) Lamarck
367. Phenomenon of 'industrial melanism' demonstrates
(a) Natural selection (b) Induced mutation
(c) Geographical isolation (d) Reproductive isolation
368. Convergent evolution is illustrated by
(a) Dogfish and whale (b) Rat and dog
(c) Bacterium and protozoan (d) Starfish and cuttle fish
369. A scientist who gave a theory very similar to that given by Darwin was
(a) Malthus (b) Wallace (c) Goldstein (d) Mendel
370. A mutation from the wild to a new type is called
(a) Reverse mutation (b) Frame-shift mutation (c) Gibberish mutation (d) Forward mutation
371. The idea of "*survival of the fittest*" was given by
(a) Darwin (b) Herbert Spencer (c) Malthus (d) Lyell

372. Darwin's theory of pangenesis says that passage of factors through generation occurs by production in each cell of the body of
 (a) Nuclei (b) Germs (c) Gemmules (d) DNA molecules
373. H.J. Muller was awarded Nobel Prize for
 (a) Discovering that ionising radiations can cause mutation
 (b) Gene mapping in *Drosophila*
 (c) Reduction in nuclear weapons
 (d) Discovered that chemicals can cause gene mutation
374. The existence of marsupials in Australia and New Zealand prove
 (a) Genetic drift (b) Geological period (c) Continental drift (d) Both (b) and (c)
375. Occurrence of higher number of endemic species in South America and Australia is due to
 (a) Retrogressive evolution (b) Continental separation
 (c) These species have become extinct from other regions
 (d) Absence of terrestrial links between these places
376. The statement "nothing in biology makes sense except in the light of evolution" was given by
 (a) Dobzhansky (b) Darwin (c) Oparin (d) Hooker
377. Darwin's finches provide evidence of evolution from
 (a) Anatomy (b) Morphology (c) Biogeography (d) All the above
378. Coevolution does not occur in case of
 (a) Parasitism (b) Mutualism (c) Both A and B (d) Commensalism
379. Presence of vestigial organs supports
 (a) Natural selection (b) Germplasm theory
 (c) Evolution but not Lamarck's theory (d) Synthetic theory
380. De Vries theory of mutation is
 (a) Opposed to natural selection theory (b) Not opposed to natural selection theory
 (c) Opposed to germplasm theory (d) Opposed to Lamarck's theory
381. Industrial melanism is an example of
 (a) Drug resistance
 (b) Darkening of skin due to smoke from industries
 (c) Protective resemblance with the surroundings
 (d) Defensive adaptation of skin against ultraviolet radiations
382. Light coloured Peppered Moth/*Biston betularia* gets changed to its darker carbonaria variety due to
 (a) Translocation of block of genes in response to heavy carbons
 (b) Deletion of gene segment due to industrial pollution
 (c) Mutation of single mendelian gene for survival in smoke laden Industrial environment
 (d) Industrial carbon deposited on wings

- 383.** Some bacteria can grow in streptomycin containing medium due to
(a) Induced mutation (b) Natural selection (c) Reproductive isolation (d) Mimicry
- 384.** Concept of genetic drift was introduced by
(a) Sewal Wright (b) Hardy Weinberg (c) Julian Huxley (d) G.G. Simpon
- 385.** Natural Selection theory of Darwin states that
(a) Environment does not play any role in evolution
(b) Heritable variations arise through changes in gene complex of a species
(c) Natural selection acts on favourable variations which appear among individuals of a species
(d) Characters acquired during the life of an individual are inherited by its offspring
- 386.** Some organism escape detection from enemies by resembling other organisms. The phenomenon is
(a) Homology (b) Mimicry (c) Artificial selection (d) Natural selection
- 387.** Genetic drift is found in
(a) Small population with or without mutated genes (b) Large population with random mating
(c) Animal population (d) Plant population
- 388.** Which statement is true about gene mutations in organisms
(a) A mutation that is detrimental in one environment may prove to be beneficial in another environment
(b) Mutations arise only when needed by the species
(c) Process of mutation is not affected by low intensities of X-rays
(d) Mutations are always disadvantageous to the species
- 389.** A child has a single kidney since birth. This variation is
(a) Positive meristic (b) Negative meristic (c) Substantive (d) Blastogenic
- 390.** Weisman formulated his "Theory of Continuity of Germplasm" in
(a) 1986 (b) 1859 (c) 1863 (d) 1959
- 391.** Hybrid breakdown is failure of
(a) Hybrid zygote to develop into offspring (b) Hybrid adult to reproduce
(c) Fusion of ova and sperms of two species (d) None of the above
- 392.** Evolutionary convergence is development of
(a) Common set of characters in group of different ancestry
(b) Dissimilar characters in closely related groups
(c) Common set of characters in closely related groups
(d) Development of characters by random mating

393. Match list-I with list-II and answer the correct one from codes given below in lists

List I

- A. A.I. Oparin
- B. Charles Darwin
- C. Lamarck
- D. Carl Linnaeus

List II

- I. *philosophic Zoologique*
- II. *Origin of Life*
- III. *Species Plantarum*
- IV. *Origin of Species*

A B C D

- (a) I III II IV
- (b) II IV I III
- (c) III II IV I
- (d) IV I III II

394. Given : 1 = natural selection; 2 = variations and their inheritance; 3 = survival of the fittest; 4 = struggle for existence. According to Darwinism, which of the following represents the correct sequences of events in the origin of new species

- (a) 1, 2, 3, 4 (b) 2, 3, 1, 4 (c) 3, 4, 1, 2 (d) 4, 2, 3, 1

395. Long snouts, small eyes and backward curved claws are exceptional to

- (a) Volants (b) Unguligrades (c) Cursorial (d) Fossorial

396. Natural selection of *Biston betularia* was explained by

- (a) H.B.D. Kettlewell (b) Darwin (c) Hugo de Vries (d) Lederberg

397. According to Lederberg's replica experiments of natural selection if we want to grow a colony resistance to streptomycin which of the following media would be most suitable

- (a) Minimal media free from Streptomycin (b) Maximal media + Streptomycin
- (c) Selective media + Streptomycin (d) Complete media free from streptomycin

398. Sickle cell anaemia, the best example of natural selection is due to gene modification related to acid of

- (a) First β chain (b) Amino second α chain (c) Second β chain (d) First α chain

399. Elephant is slowest breeder becoming sexually mature at the age of 30 and have large gestation period. A single female reproduces on an average 6 young ones during its lifetime. If all the young ones of a pair survive, there would be 19 million descendants at the end of 750 years. This is an example for

- (a) Inheritance of acquired characters (b) Mutation
- (c) Part of Darwin's theory-over-production (d) Mendelian theory inheritance

400. Adaptations of animals is their

- (a) Shedding of skin (b) Genetic trait (c) Acquired trait (d) Metamorphosis

401. Two or more species occupying identical or over lapping areas are known as

- (a) Sympatric species (b) Allopatric species (c) Sibling species (d) Polytypic species

402. Main basis of Neo-Darwinism is

- (a) Struggle for existence (b) Variation (c) Survival of the fittest (d) Gene theory

- 403.** What is the most important factor for the success of animal population
 (a) Natalty (b) Unlimited food (c) Adaptability (d) Interspecies activity
- 404.** Which of the following is related with reproductive isolation
 (a) Genetic isolation (b) Temporal isolation (c) Behavioural isolation (d) All of these
- 405.** A species that contains two or more sub-species are called
 (a) Sibling species (b) Sub-species pool (c) Polytypic species (d) Biological races
- 406.** Sibling species are also known as
 (a) Sub-species (b) Genus (c) Subline species (d) Biological races
- 407.** The ultimate source of continuous variations is
 (a) Natural selection (b) Sexual reproduction (c) Hormonal action (d) Mutations
- 408.** Multiplication of species is also known as
 (a) Over production (b) Speciation (c) Sub-species (d) Sibling species
- 409.** Species occurring in different geographical area are called as
 (a) Sibling (b) Neopatric (c) Sympatric (d) Allopatric
- 410.** Possession of venom in animals is an attribute to.....Adaptation
 (a) Fossorial (b) Desert (c) Arboreal (d) Aquatic
- 411.** Role of isolation in evolution is
 (a) Differentiation of species (b) Maintenance of species
 (c) Evolution of species (d) Extermination of species
- 412.** Humming birds and Hawk illustrate
 (a) Convergent evolution (b) Homology (c) Adaptive radiation (d) Parallel evolution
- 413.** It is not a volant adaptation
 (a) Pneumatic bones (b) Stream-lined body (c) Fusion of certain bones (d) Hygroscopic skin
- 414.** 'Variations are the raw material on which natural selection operates' this concept was put forward by
 (a) Bonnet (b) Weismann (c) Darwin (d) Cuvier
- 415.** Frequency of a character increases when it is
 (a) Recessive (b) Dominant (c) Inheritable (d) Adaptable
- 416.** Environment eliminates
 (a) Cells and tissues (b) Non-advantageous variations
 (c) Advantageous variations (d) None of these
- 417.** Closely related, morphologically similar reproductively isolated sympatric populations are designated as
 (a) Clones (b) Clines (c) Demes (d) Sibling species
- 418.** Mammals occur on land, air and water. It is
 (a) Convergent evolution (b) Micro evolution (c) Adaptation (d) Adaptive radiation
- 419.** Speciation leads to
 (a) Increase in number of species (b) Decrease in number of species
 (c) Maintenance of number of species (d) All these results

420. Speciation in two adjacent populations refers to
 (a) Sympatry (b) Allopatry (c) Population isolation (d) Parapatric speciation
421. The theory of origin of isolation which stresses that nature is not in favour of hybridization was given by
 (a) De Vries theory (b) Darwin (c) Dobzhansky (d) Lamarck
422. Same group of ancestors have formed the mammals adapted to running, flying and swimming. This proves
 (a) Speciation (b) Genetic drift (c) Adaptive convergence (d) Adaptive radiation
423. Biological species concept emphasizes on
 (a) Geographical isolation (b) Reproductive isolation (c) Physiological isolation
424. Analogous organs have arisen in the evolutionary process through
 (a) Recombination (b) Mutation (c) Hybridisation (d) Adaptation
425. Darwin in his Natural Selection Theory did not believe in any role of which one of the following in organic evolution
 (a) Discontinuous variations (b) Parasites, predators and natural enemies
 (c) Survival of the fittest (d) Struggle for existence
426. Development of patagia in animals is an
 (a) Cave adaptation (b) Volant adaptation (c) Aquatic adaptation (d) Arboreal adaptation
427. Role of isolation in evolution is
 (a) Differentiation of species (b) Maintenance of species
 (c) Evolutionary divergence (d) Extermination of species
428. A star fish with six arms may be a case of
 (a) Variation (b) Evolution (c) Autotomy (d) Mutation
429. Adaptation of a species is its
 (a) Ecdysis (b) Metamorphosis (c) Acquired character (d) Hereditary character
430. Animals living in colder region have shorter tail and ears as compared to the animals living in warmer regions. This phenomenon is called
 (a) Bergman's law (b) Gloger's law (c) Allen's law (d) Jordan's law
431. Allopatric speciation is due to
 (a) Mutation (b) Geographical separation of populations
 (c) Migration of member of species from one to other populations
 (d) Hybridization between closely related species
432. Sympatric speciation is also known as
 (a) Polyploidy (b) Hybridization (c) Allopatric species (d) Isolation
433. The origin of species from pre-existing species is
 (a) Isolation (b) Speciation (c) Polyploidy (d) Biogeography
434. Radiations with successful adaptations in case of insects is a result of
 (a) Genetic divergence (b) Micro-evolution (c) Macro-evolution (d) Mega-evolution

435. Development of unrelated groups of animals along parallel lines in adaptation to a similar environment is called
 (a) Adaptive convergence (b) Adaptive radiation (c) Adaptive divergence (d) Adaptive induction
436. Genetic species concept was given by
 (a) Lamarck (b) Lotsy (c) Ernst Mayer (d) Linnaeus
437.isolation refers to the barriers to mating amongst the individuals of different species in their courtship behaviour
 (a) Ethological (b) Mechanical (c) Ecological (d) Seasonal
438. The diversity in the type of beaks of finches adapted to different feeding habits on the Galapagos Islands, as observed by Darwin, provides evidence for
 (a) Origin of species by natural selection (b) Intraspecific variations
 (c) Interspecific variations (d) Interspecific competition
439. Evolution of new species (speciation) occurs when different populations of same species
 (a) Are geographically separated (b) Are reproductively isolated
 (c) Some populations become extinct (d) Populations spread far and wide

HUMAN EVOLUTION

Basic Level

440. Common origin of man and chimpanzee is best shown by
 (a) Dental formula (b) Cranial capacity (c) Binocular vision (d) Chromosome number
441. Evolution of man is possible because our ape like ancestors had
 (a) Migration instinct (b) Binocular vision (c) Developed brain (d) Large cranial cavity
442. Which one of the following statements is correct
 (a) *Homo erectus* is the ancestor of man
 (b) Cro-magnon man's fossil has been found in Ethiopia
 (c) Australopithecus is the real ancestor of modern man
 (d) Neanderthal man is the direct ancestor of *Homo sapiens*
443. Neanderthal man lived in
 (a) Desert (b) Deep forest (c) Mountains (d) Cave
444. In human evolution which is most recent
 (a) Middle Paleolithic (b) Upper Paleolithic (c) Neolithic (d) Mesolithic
445. The closest relative of modern day man is considered to be
 (a) Chimpanzee (b) Orangutan (c) Apes (d) Gibbon
446. Which one of the following is direct ancestor of modern man
 (a) *Australopithecus* (b) *Ramapithecus* (c) *Homo erectus* (d) *Homo habilis*
447. Ancestor of man who first exhibited bipedal gait
 (a) *Australopithecus* (b) Cro-Magnon man (c) Java ape man (d) Peking man
448. Which primitive man resembles with modern man
 (a) Peking man (b) African man (c) Java ape man (d) Cro-magnon man

449. Earliest evidences of social life are attributed to
 (a) Cro-Magnon man (b) Neanderthal man (c) Peking man (d) Java man
450. Geological evidence for most primitive mammal is found in
 (a) Central Africa (b) China (c) India (Shivalik hills)(d) Australia
451. Evolution of man took place in
 (a) Central Africa (b) Central Asia (c) Australia (d) America
452. First evidences of ceremonial burial of dead have been found with fossils of
 (a) Cro-magnon man (b) Java ape man (c) Neanderthal man (d) Peking man
453. Neanderthal man was followed by
 (a) Cro-Magnon man (b) *Homo sapiens sapiens* (c) *Homo erectus* (d) *Homo neanderthalae*
454. In *Homo habilis*, 'habilis' refers to
 (a) Wandering species (b) Ancient man (c) Modern man (d) Tool maker
455. Which of the following stood erect first
 (a) Java man (b) Peking man (c) Australopithecus (d) Cro-Magnon man
456. The modern man evolved
 (a) 10,000 years ago (b) 25, 000 years ago (c) 2,50,000 years ago (d) 5,00,000 years ago
457. Who first discovered fossils of '*Ramapithecus*'
 (a) Dubois (b) R. Dart (c) G.E. Lewis (d) J.K. Fuhlort
458. There are how many total races of man
 (a) 6 (b) 4 (c) 8 (d) 16
459. The most recent and direct prehistoric ancestor of present man is
 (a) Cro-Magnon (b) Pre Neanderthal (c) Neanderthal (d) None of the above
460. Which of the following was expect in making tools, weapons, paintings etc. **Or**
 Who drew excellent pictures of animals in caves, made tools, carved ornaments from ivory stone arrows etc.
 (a) Java ape man (b) Peking man (c) Cro-Magnon man (d) Rhodesian man
461. By the discovery of banding pattern in chromosome technique of gorilla and man, what was easy to predict
 (a) Showed the evolutionary trend (b) Had almost similar structures
 (c) Had same gene pool (d) Common origin of ancestor
462. Oldest tool maker is
 (a) African man (b) Java man (c) Proconsul (d) China man
463. Which of the following fossil men had religious feelings of worship and used burial customs
 (a) Neanderthal man (b) Peking men (c) Java men (d) African ape men
464. Island (continent) where largest number of human fossils have been discovered
 (a) Europe (b) Africa (c) America (d) Asia

465. Palaeolithic evidences of coloured rock painting was of
(a) Neanderthal man (b) Cro-Magnon man (c) Java ape man (d) Peking man
466. Bipedal locomotion is advantages because it
(a) Releases fore limbs to performs the important functions
(b) Increases the speed
(c) Reduces body weight (d) Provides better support to the body
467. Which of the fossil man is most recent
(a) Cro-Magnon (b) Neanderthal (c) Zinjanthropus (d) Sinanthropus
468. The cranial capacity of Java ape man was about
(a) 560 c.c. (b) 900 c.c. (c) 1,300 c.c. (d) 1,000 c.c.
469. Australopithecus had a cranial capacity
(a) 800 c.c. (b) 500 c.c. (c) 600 c.c. (d) 700 c.c.
470. The lowest capacity of cranium was found in the
(a) Neanderthal man (b) Australopithecus (c) Cro-Magnon man (d) Java man
471. Branch of science dealing with the study of cultural evolution of mankind is
(a) Archaeology (b) Anthropology (c) Palaeontology (d) Euthenics
472. In the evolution from *Homo erectus* to *Homo sapiens*, one of the following has played a significant role
(a) Binocular vision (b) Cultural evolution
(c) Evolution of expression (d) Evolution of brain
473. Which of the following is true for '*Homo sapiens*'
(a) Protruded mouth (b) Cranial capacity of 1450 c.c.
(c) Omnivorous (d) Developed chin
474. The earliest fossil of human ancestors from India is
(a) Australopithecus (b) Ramapithecus (c) Oreopithecus (d) None of these
475. '*Homo erectus*' is the zoological name of
(a) Cro-Magnon man (b) Peking man (c) Nut cracker man (d) Neanderthal man
476. Which has played an important and significant role in the evolution of human
(a) Banding pattern (b) Communicable language
(c) Cultural evolution (d) Decrease in one pair of chromosome
477. The specific characters of human are
(a) Intelligence (b) Erect body (c) Sensibility (d) All of the above
478. The ancestors of ape and human both are
(a) Australopithecus (b) Dryopithecus (c) *Homo habilis* (d) Ramapithecus
479. Name of Pie is associated with
(a) Java man (b) Cro-Magnon man (c) Peking man (d) Ape man
480. Biological name of the Java man is
(a) *Homo erectus* (b) *Homo sapiens*
(c) *Homo habilis* (d) *Pithecanthropus erectus*

481. Cranial capacity of modern man is
 (a) 350-400 cm^3 (b) 500-1000 cm^3 (c) 1350-1700 cm^3 (d) 1350-1500 cm^3
482. Cranial capacity of Neanderthal man is
 (a) 1350-1500 cm^3 (b) 1400-1450 cm^3 (c) 915-1250 cm^3 (d) 750-900 cm^3
483. Who succeeded the Neanderthal man about 50,000 years ago and became extinct about 20,000 years ago
 (a) Atlantic man (b) *Homo habilis* (c) Cro-Magnon man (d) *Homo erectus*
484. The fossils of Cro-Magnon were found in
 (a) Algeria-In ternifine deposits (b) Germany-In avines
 (c) France-Rock shelters (d) Africa-Olduvi
485. Cranial capacity of Cro-Magnon was
 (a) 1600 c.c. (b) 1350 c.c. (c) 1075 c.c. (d) 1450 c.c.
486. The recent ancestors of modern man were
 (a) Java ape man and Peking man (b) Peking man and Rhodesian man
 (c) Rhodesian man and Cro-Magnon man (d) Cro-Magnon man and Neanderthal man
487. The theory of evolution indicates that
 (a) Man evolved from monkeys (b) Monkey evolved from man
 (c) Man evolved from dinosaurs (d) Man and apes had a common ancestors
488. Which amongst the following is nearest to modern man
 (a) Java Ape man (b) *Australopithecus* (c) Neanderthal Man (d) *Homo habilis*
489. Man (*Homo*) originated in
 (a) Palaeocene (b) Miocene (c) Oligocene (d) Pleistocene
490. Which is the most primitive ancestor of man
 (a) *Ramapithecus* (b) *Australopithecus neanderthalensis* (c) *Homo habilis* (d) *Homo*
491. Peking Man was known as
 (a) *Australopithecus* (b) *Pithecantropus* (c) *Homo sapiens* (d) *Sinanthropus*
492. Which of the following is closest relative of man
 (a) *Sinanthropus* (b) OrangUtan (c) *Gorilla* (d) Gibbon
493. Cranial capacity is minimum in
 (a) Chimpanzee (b) Gorilla (c) Rhesus monkey (d) Orangutan
494. The closest primate to humans is
 (a) Gorilla (b) Orangutan (c) Lemur (d) Rhesus monkey
495. Modern Man differs from apes in
 (a) Protruding eyes (b) Sparse body hair (c) Arms shorter than legs (d) Wearing of clothes
496. Proconsuls are ancestors of
 (a) Apes only (b) Man only (c) Both A and B (d) All primates

497. *Homo erectus erectus* is scientific name of
(a) Java Ape Man (b) Peking Man (c) Cro-Magnon Man (d) Neanderthal Man
498. Hominids originated during
(a) Pliocene (b) Palaeocene (c) Miocene (d) Oligocene
499. Evolution of man was possible perhaps because our ape-like ancestors
(a) Had no food problems (b) Adopted group hunting
(c) Used fire (d) Adopted bipedal locomotion upon open ground
500. Name given to the fossil hominid of Shivalik Hills in India
(a) *Ramapithecus* (b) *Australopithecus* (c) *Pithecanthropus* (d) *Sinanthropus*
501. Characteristic which was not in the direction of evolution of man is
(a) Binocular vision (b) Browridges (c) Shortening of jaws (d) Prehensile tail
502. The first probable fossil man (*Homo*) was
(a) *Australopithecus* (b) *Pithecanthropus* (c) *Homo habilis* (d) *Ramapithecus*
503. Neanderthal man
(a) Resembled modern man
(b) Often had a somewhat larger brain than modern man
(c) Was culturally more advanced than modern man
(d) Had a much smaller brain than that of modern man
504. Which of the following word is related to *Homo sapiens*
(a) Herbivorous (b) Carnivorous (c) Autotroph (d) Omnivorous
505. The main diet of *Australopithecus* was
(a) Banana (b) Apple (c) Rice (d) Meat and vegetables
506. Speech developed in
(a) Java man (b) Neanderthal man (c) Cro-Magnon man (d) None of these
507. *Homo sapiens* is included under the order
(a) Primates (b) Rodents (c) Carnivora (d) Ungulata
508. Which of these presumably possessed a cranial capacity almost equal to or even a bit larger than that of today's man
(a) Peking man (b) *Australopithecus* (c) Java ape man (d) None of these
509. Study of human race is called
(a) Eugenics (b) Entomology (c) Ecology (d) Pathology
510. Primates originated about
(a) 100 million years ago (b) 65 million years ago
(c) 10 million years ago (d) 30 million years ago
511. Peking man (*Homo erectus pekinensis*) was
(a) 1.2 to 1.5 meters tall (b) 1.65 to 1.75 meters tall
(c) 1.55 to 1.65 meters tall (d) None of the above

512. During evolution of man many changes have taken place in his ancestral characters. Which one of the following is an insignificant change
- Change of diet from hard tough fruits and roots into soft food
 - Qualitative improvement in the structure of hand skills for making tools
 - Disappearance of tail
 - Improvement in speech for communication and social behaviour
513. Which one of the following statements is correct regarding evolution of mankind
- Neanderthal man and Cro-Magnon man were living at the same time
 - Australopithecus was living in Australia
 - Homo erectus* is preceded by *Homo habilis*
 - None of these
514. The earliest site where human civilization and crop cultivation started was presumably
- Around Caspian and Mediterranean seas
 - Around river Nile
 - Chinese river valley
 - All of these
515. Modern palaeontologists have renamed Java man as
- Homo habilis*
 - Homo erectus modjokertensis*
 - Homo erectus mauritanicus*
 - Homo sapiens*
516. Which one of the following sets represents the correct sequence of the evolution of man
- Kenyapithecus*-*Australopithecus*-*Homo habilis*-*Pithecanthropus*-*Homo sapiens*
 - Kenyapithecus*-*Australopithecus*-*Pithecanthropus*-*Homo habilis*-*Homo sapiens*
 - Australopithecus*-*Kenyapithecus*-*Homo habilis*-*Pithecanthropus*-*Homo sapiens*
 - Pithecanthropus*-*Australopithecus*-*Kenyapithecus*-*Homo habilis*-*Homo sapiens*
517. In recent years, DNA sequences (nucleotide sequence) of *mt*-DNA and *Y* chromosomes were considered for the study of human evolution, because
- They can be studied from the samples of fossil remains
 - They are small, and therefore, easy to study
 - They are uniparental in origin and do not take part in recombination
 - Their structure is known in greater detail
518. Correct sequence of stages in the evolution of the modern man. (*Homo sapiens*), is
- Neanderthal man*, *Australopithecus*, *Cro-magnon*, *Homo erectus*, *Neanderthal man*, *Cro-magnon modern man*
 - Australopithecus*, *Homo erectus*, *Neanderthal man*, *Cro-magnon man*, *modern man*
 - Homo erectus*, *Australopithecus*, *Neanderthal man*, *Cro-magnon man*, *modern man*
 - Australopithecus*, *Neanderthal man*, *Cro-magnon man*, *Homo erectus*, *modern man*
519. Which of the following was the transitional stage between apes and humans
- Homo habilis*
 - Homo erectus*
 - Australopithecus ramidus*
 - Australopithecus africanus*

520. Which one of the following character differentiate man from other mammals
 (a) Superior intelligence (b) Power of speech
 (c) Social life (d) Greater cranial capacity
521. Which of the following is the correct order of evolutionary history of man
 (a) *Peking man, heidelberg man, neanderthal, cro-magnon*
 (b) *Peking man, homosapiens, cro-magnon, neanderthal*
 (c) *Peking man, neanderthal, homosapiens, heidelberg*
 (d) *Peking man, cro-magnon, homosapiens, neanderthal*
522. *Homo sapiens* originated how many years ago
 (a) About $1\frac{1}{2}$ lakh years ago (b) About 2 lakh years ago
 (c) About $2\frac{1}{2}$ lakh years ago (d) About 3 lakh years ago
523. Which of the following has the lowest cranial capacity
 (a) Gorilla (b) Chimpanzee (c) Modern man (d) Java ape man
524. Most primitive living mammals which provide an evidence of organic evolution from geographical distribution are found in
 (a) China (b) India (c) Australia (d) Africa
525. The first probable fossil of man is
 (a) *Australopithecus* (b) *Zizanthropus* (c) *Pithecanthropus* (d) *Pleasianthropus*
526. Dubois in 1891 found the fossil of Java ape man It is
 (a) *Sinanthropus pekinensis* (b) *Homo erectus* (c) *Homo rhodesiensis* (d)
527. Simian shelf is a characteristic of apes, which connects the
 (a) Limbs with girdle (b) Brain
 (c) Posterior part of the mandibles (d) Anterior part of the mandibles
528. Dart in 1925 found the skull of a body whom he named
 (a) Neanderthal man (b) *Australopithecus* (c) *Zinzanthropus* (d) *Parapithecus*
529. *Oligopithecus* possessed
 (a) 36 teeth (b) 34 teeth (c) 32 teeth (d) 20 teeth
530. Which primitive man lived on earth at the end of pleistocene era
 (a) *Australopithecus* (b) *Zinzanthropus* (c) Neanderthal man (d) Atlantic man
531. *Pithecanthropus erectus* fossil was found in
 (a) China (b) Japan (c) Java (d) Texas
532. When the entire sole rests on the ground during walking as in case of a man, it is known as
 (a) Plantigrade (b) Digitigrade (c) Perikaryon (d) Hallux
533. Arched palate uniform sized teeth were found in which of the following ancestor
 (a) *Limmopithicus* (b) *Kenypithicus* (c) *Ramapithecus* (d) *Oriopithicus*

534. Java ape man is considered to have existed in
 (a) Java only (b) China only
 (c) Africa only (d) Java, China and Africa
535. Cro-Magnon man was
 (a) Herbivorous (b) Frugivorous (c) Sanguivorous (d) Carnivorous
536. The prehistoric ancestor of man which existed during late pleistocene, is
 (a) Australopithecus (b) Zinjanthropus (c) Neanderthal man (d) Atlantic man
537. Neanderthal man differs from modern man in
 (a) Receding jaws (b) Protruding jaws
 (c) Could make good tools (d) Could make good pictures
538. Evolution of man is possible because our apelike ancestors has
 (a) Migratory instinct (b) Developed brain (c) Binocular vision (d) Large cranial capacity
539. "In different races, there may be difference in culture and ways of living but capacity in all the same". It was the opinion of
 (a) Darwin (b) Wallace (c) Lamarck (d) Shapiro
540. Which one is related to the cultural evolution of human
 (a) Binocular vision (b) Evolution of expression
 (c) Development of hands (d) Development of canines
541. Fore runners of 'Hominids' are
 (a) Java ape man and Peking man (b) Neanderthal and Ramapithecus
 (c) Ramapithecus and Peking man (d) Ramapithecus and Sivapithecus
542. Which one of the following is highly evolved
 (a) *Homo habilis* (b) *Homo erectus* (c) *Ramapithecus* (d) *Australopithecus*
543. Which one of the following ape is not seen in modern period
 (a) Java ape man (b) Gibbon (c) Orangutan (d) Gorilla
544. The ancestors of ape and man began to evolve in
 (a) 10 to 15 million years ago (b) 15 to 20 million years ago
 (c) 25 to 30 million years ago (d) 20 to 25 million years ago
545. Which of the following was not in the direction of evolution of human species
 (a) Raised orbital ridges (b) Binocular vision (c) Developed brain (d) Opposable thumb
546. Fire was first used for protection and cooking by
 (a) Java man (b) Neanderthal man (c) Peking man (d) Cro-Magnon man
547. Which of the primate is the closest relative of man
 (a) Orangutan (b) Gorilla (c) Sinanthropus (d) Gibbon

548. What is the correct chronological sequence of human evolution
 (a) Ramapithecus → Australopithecus → *Homo erectus* → Neanderthal → *Homo sapiens sapiens*
 (b) Ramapithecus → *Homo habilis* → *Homo sapiens sapiens* → *Homo erectus*
 (c) Australopithecus → Ramapithecus → *Homo habilis* → *Homo sapiens sapiens*
 (d) *Homo habilis* → Australopithecus → *Homo erectus* → *Homo sapiens sapiens*
549. Which primitive man used stones to produce fire
 (a) Java ape man (b) Neanderthal man (c) Cro-Magnon man (d) All the above
550. The fossils of *Sinanthropus pekinensis* have been discovered in which epoch
 (a) Pleistocene (b) Pliocene (c) Eocene (d) Palaeocene
551. Largest cranial capacity was found in
 (a) Neanderthal man (b) Cro-Magnon man (c) Java ape man (d) Peking man
552. Receding fore head, prominent eye brow ridge, heavy jaws and almost no chin was found in
 (a) Java man (b) Peking man (c) *Homo habilis* (d) Australopithecus
553. Thick skull, cranial capacity about 1075 c.c. low fore head, absence of chin and large canine were present in
 (a) Java man (b) Peking man (c) *Homo habilis* (d) Australopithecus
554. Low and slopping fore head, skull with thick bones, deep lower jaw and absence of chin were present in
 (a) Java man (b) Neanderthal man (c) Cro-Magnon man (d) *Homo habilis*
555. Cradle of human evolution is
 (a) Grassland of South Africa (b) Savannah of Central Africa
 (c) Subarctic Europe (d) Arabia
556. *Dryopithecus* occurred about
 (a) 2.5×10^6 years back (b) 25×10^6 years back (c) 50×10^6 years back (d) 75×10^6 years back
557. Prosimian found only on the island of Madagascar is
 (a) *Galagos* (b) *Loris* (c) *Lemur* (d) Bush Baby
558. Which one is connected with human evolution
 (a) Binocular vision (b) Flat nails (c) Loss of tail (d) Shortening of jaws
559. Apes share.....blood groups with man
 (a) A, B, AB (b) A, B, O (c) AB, O (d) A and B only
560. Solo man belongs to
 (a) Java only (b) Africa (c) China (d) China and Africa
561. *Dryopithecus* had which of the following characteristics
 (a) Broadened jaws (b) Semierect gait (c) Large canines (d) All of these

562. The fossils of *Homo habilis* was discovered by Leaky *et al.* (1964) in
(a) Zambia (b) Europe (c) Australia (d) Tanzania
563. One of the following event was favourable during evolution of man
(a) Loss of chin (b) Receeding jaws (c) Raised orbitals (d) Binocular vision
564. Fossils of neanderthal were first obtained from Neander valley in
(a) Germany (b) Italy (c) America (d) France
565. Which of the following monkey has prehensile tail
(a) Loris (b) Tarsiers (c) Spider monkey (d) Rhesus monkey
566. The first domesticated animal by primitive man was
(a) Dog (b) Horse (c) Cat (d) Cow
567. Neanderthal man was replaced by which of the man in Europe
(a) Cro-magnon man (b) *Homo sapiens sapiens* (c) Rhesus monkey (d) New World monkey
568. The scientific name of Indian ape is
(a) *Presbytis* (b) *Macaca* (c) *Hylobates* (d) *Gorilla*
569. Immortality of soul hypothesis has given rise to the discovery of
(a) *Heidelberg* man (b) Ternifier man (c) Neanderthal man (d) *Homo sapiens*

ANSWER

ASSIGNMENT (BASIC & ADVANCE LEVEL)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
c	c	b	a	b	b	b	b	d	b	d	c	d	a	a	a	a	d	b	c
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
b	c	d	a	a	b	b	b	a	c	c	a	d	c	c	b	b	d	c	c
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
a	b	c	a	c	d	b	c	a	b	a	a	a	a	a	b	d	a	c	b
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
a	a	c	b	d	b	b	b	a	d	c	b	d	a	c	a	a	a	d	d
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
c	a	a	c	c	b	d	b	d	b	c	c	c	b	c	a	a	b	b	d
101	102	103	104	105	106	107	108	109	110	111	112	113	114	115	116	117	118	119	120
a	d	d	c	a	a	c	b	b	a	b	c	d	b	b	c	b	c	b	d
121	122	123	124	125	126	127	128	129	130	131	132	133	134	135	136	137	138	139	140
c	d	b	b	c	d	d	b	a	a	d	d	b	b	a	a	b	c	b	c
141	142	143	144	145	146	147	148	149	150	151	152	153	154	155	156	157	158	159	160
a	b	a	b	d	c	b	c	c	a	c	c	b	c	a	a	a	a	d	d
161	162	163	164	165	166	167	168	169	170	171	172	173	174	175	176	177	178	179	180
a	b	a	d	c	a	a	b	b	c	c	b	c	b	b	a	b	c	d	a
181	182	183	184	185	186	187	188	189	190	191	192	193	194	195	196	197	198	199	200
b	a	b	a	b	b	c	b	d	b	b	c	a	b	d	d	b	d	b	c
201	202	203	204	205	206	207	208	209	210	211	212	213	214	215	216	217	218	219	220
a	c	a	d	c	c	a	d	a	a	a	a	c	c	b	a	c	a	d	d
221	222	223	224	225	226	227	228	229	230	231	232	233	234	235	236	237	238	239	240
c	b	a	a	b	b	a	c	c	c	a	b	c	c	c	a	b	b	d	a
241	242	243	244	245	246	247	248	249	250	251	252	253	254	255	256	257	258	259	260
b	c	d	a	b	c	c	b	a	c	c	c	b	c	a	b	c	d	a	c
261	262	263	264	265	266	267	268	269	270	271	272	273	274	275	276	277	278	279	280
c	a	b	a	c	b	b	c	b	b	c	c	d	c	c	b	c	c	a	a
281	282	283	284	285	286	287	288	289	290	291	292	293	294	295	296	297	298	299	300
a	b	c	b	d	c	d	d	d	d	b	d	d	d	d	d	a	a	c	a
301	302	303	304	305	306	307	308	309	310	311	312	313	314	315	316	317	318	319	320
a	d	a	d	d	a	d	a	b	d	a	c	b	a	d	c	d	b	d	c
321	322	323	324	325	326	327	328	329	330	331	332	333	334	335	336	337	338	339	340
c	b	d	d	d	b	c	b	d	c	b	b	d	b	d	b	a	a	b	b
341	342	343	344	345	346	347	348	349	350	351	352	353	354	355	356	357	358	359	360

d	d	c	c	d	c	d	b	b	d	b	d	c	c	a	b	d	c	c	c
361	362	363	364	365	366	367	368	369	370	371	372	373	374	375	376	377	378	379	380
d	b	d	a	a	a	b	a	b	d	b	c	a	d	b	a	c	d	c	b
381	382	383	384	385	386	387	388	389	390	391	392	393	394	395	396	397	398	399	400
c	c	b	a	c	b	a	a	b	a	b	a	b	d	d	a	c	c	c	c
401	402	403	404	405	406	407	408	409	410	411	412	413	414	415	416	417	418	419	420
a	b	c	d	c	d	b	b	d	b	c	c	d	c	d	b	d	d	d	d
421	422	423	424	425	426	427	428	429	430	431	432	433	434	435	436	437	438	439	440
c	d	b	d	a	b	c	a	d	a	b	d	b	c	a	b	a	b	b	d
441	442	443	444	445	446	447	448	449	450	451	452	453	454	455	456	457	458	459	460
a	d	d	c	c	c	a	d	b	a	a	c	a	d	c	b	c	b	a	c
461	462	463	464	465	466	467	468	469	470	471	472	473	474	475	476	477	478	479	480
b	b	a	b	b	a	a	b	b	b	b	d	c	b	b	c	d	b	c	a
481	482	483	484	485	486	487	488	489	490	491	492	493	494	495	496	497	498	499	500
d	b	c	c	a	d	d	c	d	b	d	a	c	a	c	c	a	a	d	a
501	502	503	504	505	506	507	508	509	510	511	512	513	514	515	516	517	518	519	520
d	c	b	d	d	b	a	d	a	b	c	c	c	a	b	a	c	b	c	d
521	522	523	524	525	526	527	528	529	530	531	532	533	534	535	536	537	538	539	540
a	a	b	a	c	b	d	b	c	c	c	a	c	d	d	c	b	d	b	b
541	542	543	544	545	546	547	548	549	550	551	552	553	554	555	556	557	558	559	560
d	b	a	c	a	a	c	a	a	a	b	a	b	b	b	b	c	d	d	a
561	562	563	564	565	566	567	568	569											
b	d	b	a	c	a	a	c	c											
