Ravi Maths Tuition

6 Evolution

12th Standard

Biology

Multiple Choice Question 180 x 1 = 180

1) Which of the following walked like gorillas and chimpanzees?

(a) Dryopithecus (b) Ramapithecus (c) Both (a) and (b) (d) Australopithecus

2) The turtle and tortoise evolved from

(a) Amphibians (b) Fishes (c) Mammals (d) None of these

3) Which of the following evolved first

(a) Homo Sapiens (b) Homo habilis (c) Homo erectus (d) Tyrannosaurus

4) Which of the following walked upright?

(a) Dryopithecus (b) Ramapithecus (c) Both (a) and (b) (d) Australopithecus

5) Presence of gills in the tadpole of frog indicates that

(a) fishes evolved from frog-like ancestors (b) frogs will have gills in future

(c) frogs evolved from gilled ancestors (d) fishes were amphibious in the past

6) Which of the following is a living fossil?

(a) Moss (b) Saccharomyces (c) Spirogyra (d) Cyas

7) Diversification in plant life appeared

(a) due to abrunt mutation (b) suddenly on earth (c) by seed dispersal

(d) due to long periods of evolutionary changes

8) Age of fossils in the past was generally determined by radiocarbon method and other methods involving radioactive elements found in the rocks.More precise methods, which were used recently and led to the revision of the evolutionary periods for different groups of organisms,includes

(a) study of the conditions of fossilization (b) electron spin resonance(ESR) and fossil DNA

(c) study of carbohydrates/proteins in rocks (d) study of carbohydrates/proteins in fossils

9) A baby has been born with a small tail.It is a case exhibiting

(a) retrogressive evolution (b) mutation (c) atavism (d) mamorphosis

10) The most likely reason for the development of resistance against pesticides in insects damaging the crops is

(a) genetic recombination (b) directed mutation (c) acquired heritable changes

(d) random mutation

11) Which one of the following experiments suggest that simplest living organism could not having originated spontaneously from non-living matter?

(a) larve could appear in decaying organic matter (b) microbes did not appear in stored meat

(c) microbes appeared from unsterilized organic matter

(d) meat was not spoiled, when heated and kept sealed in a vessel

12) De Vries gave his mutation theory on organic evolution while working on

(a) pisum sativum (b) Drosophila melanogaster (c) Oenothera lamarckiana (d) Althea rosea

13) Which one of the following phenomenon supportsDarwin's concept of natural selection in organic evolution?

(a) development of transgenic animals (b) production of 'dolly',the sheep by cloning
(c) prevalence of pesticide resistant insects
(d) development of organs from 'stem cells' for orgon transplanation

14) Which of the following is the relatively most accurate method of dating of fossils?

(a) radio-carbon method (b) potassium-argon method (c) electron-spin resonance method
(d) uranium-lead method

15) The biogenetic law of Hackel is

(a) Omnis vivum-e-vivum (b) Omnis cellula-e-cellula (c) Ontogeny repeats phylogeny
(d) Phylogeny repeats ontogeny

16) Birbal Sahni Institute of Palaeobotany is located at

(a) Delhi (b) Lucknow (c) Dehradun (d) Kolkata

17) 3-5 billion years ago, which flora dominated the earth?

(a) Archaebacteria (b) Mosses (c) Lichens (d) Blue-green algae

18) Huan ancestors who left cave painting were

(a) neanderthal man (b) cromagnon man (c) Java apeman (d) pecking man

19) A connecting link between reptiles and birds is

(a) Dimetrodon (b) Dodo (c) Archaeopteryx (d) Sphenodon

20) An important evidence in favour of organic evolution is the occurrence of

(a) homologous and analogous organs (b) homologous and vestigial organs
(c) analogous and vestigial organs (d) homologous organs only

21) Evolutionary history of an organism is known as

(a) ontogeny (b) phylogeny (c) ancestry (d) paleontology

22) Ultimate source of organic variation is the process which provides raw materials for evolution is

(a) Sexual reproduction (b) meiosis (c) mutation (d) independent assortment

23) The prehistoric man which lived on earth during late Pleistocene period

(a) Neanderthal man (b) Australopithecus (c) CroMagnon (d) Atlantic man

24) According to the theory of mutation by Hugo de Vries

(a) only small mutation takes part in variation (b) only large mutation takes part in variation
(c) both small and large mutation cause variation in species (d) none of the above

25) A living connecting link which provides evidences for organic evolution is

(a) Sphenodon between reptile and bird (b) lung fishes between pisces and reptile
(c) Archaeopteryx between reptile and bird (d) duck-billed platypus between reptiles and mammals

26) Which of the following are not analogous organs?

(a) fins of fishes and flippers of whales (b) stings of honey bee and scorpion
(c) thorn of Bougainvillea and tendril of Cucurbita (d) wings of insect and wings of pterodactyl

27) On the basis of hereditary material, most closest relative of man is

(a) chimpanzee (b) gorilla (c) orangutan (d) gibbon

28) Peripatus is a connecting link between

(a) Coelenterates and Porifera (b) Ctenophora and Platyhelminthes

(c) Mollusca and Echinodermata (d) Annelida and Arthropoda

29) In the case of peppered moth (Biston betularia) the black-coloured from became dominant over the light-coloured form in England during industrial revolution. This is an example of

(a) inheritance of dark colour character acquired due to the darker environment

(b) natural selection whereby darker forms were selected

(c) appearance of the darker coloured individuals due to very poor sunlight (d) protective mimicry

30) Jurassic period of the mesozoic era is characterized by

(a) flowering plants and first dinosaurs appear

(b) gymnosperms are dominant plants and first birds appear

(c) radiation of reptiles and origin of mammal like reptiles

(d) dinosaurs become extinct and angiosperms appear

31) Which of the following provides most evident proof of evolution?

(a) fossils (b) morphology (c) embryo (d) vestigial orgons

32) The diversity in the type of beak 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 variation (c) Intraspecific competition

(d) Interspecific competition

33) The unit of natural selection is

(a) an individual (b) a species (c) a genus (d) a population

34) The age of fossils is determined by

(a) analysis of bones (b) radioactive C^{14} dating (c) electron microscopy (d) weighing the fossils

35) Which of the following was likely to have been absent in a molecule state ,in the primitive atmosphere of the earth?

(a) carbon (b) oxygen (c) hydrogen (d) nitogen

36) The concept of chemical evolution is based on

(a) interaction of water,air and clay under intense heat (b) water of solar radiation on chemicals

(c) possible origin of life by combination of chemicals under suitable environmental conditions

(d) crystalization of chemicals

37) Galapagos islands are associated with the name of

(a) Wallace (b) Malthus (c) Darwin (d) Lamarck

38) In the developmental history of mammalian heart, it is observed that it passes through a 2-chambered fish-like heart, 3-chanbered frog-like heart and finally 4-chambered stag. To which hypothesis can the above statement be approximated?

(a) Biogenetic law (b) Hardy-Weinberg law (c) Lamarck's principle (d) Mendelian principles

39) Fossils are generally found in:

(a) Sedimentary rocks (b) Igneous rocks (c) Metamorphic rocks (d) Any type of rock

40) For the MN-blood group system, the frequencies of M and N alleles are 0.7 and 0.3, respectively. The expected frequency of MN-blood group bearing organisms is likely to be

(a) 42% (b) 49% (c) 9% (d) 58%

41) Which type of selection is industrial melanism observed in moth, Biston bitularia:

(a) Stabilising (b) Directonal (c) Disruptive (d) Artificial

42) The most accepted line of descent in human evolution is:

(a) Australopithecus - > Ramapithecus - > Homo sapies - > homo habillis

(b) Homo erectus - > homo habilis - > Homo sapiens

(c) Ramapithecus - > Homo habilis - > Homo erectus - > Homo sapiens

(d) Australopithecus - > Ramapithecus - > Homo erectus - > Homo habilis - > Homo sapiens.

43) Which of the following is an example for link species?

(a) Lobe fish (b) Doda bird (c) Sea weed (d) Tyrannosaurus rex

44) Which one of the following statements is correct?

(a) there is no evidence of existence of gills during embryogenesis of mammals

(b) all plant and animal cells are totipotent (c) ontogeny repeats phylogeny

(d) stem cells are specialized cells

45) The finches of Galapagos islands provide an evidence in favour of

(a) evolution due to mutation (b) retrogressive evolution (c) biogeographical evolution

(d) special creation

46) The connecting link between Annelida and Mollusca is

(a) Neopalina (b) Glochidium larva (c) Nautilus (d) Velliger larva

47) The idea of natural selection as the fundamental process of evolutionary changes was reached

(a) By Alfred Russel Wallace in 1901

(b) Independently by Charles Darwin and Alfred Russel Wallace in 1859

(c) Independently by Charles Darwin and Alfred Russel Wallace in 1901

(d) By Charles Darwin in 1866

48) When two species of different genealogy come to resemble each other as a result of adaptation, the phenomenon is termed

(a) macroevolution (b) Co-evolution (c) Convergent evolution (d) divergent evolution

49) Evolution can be studied now in action in

(a) sphenodon (b) Archaeopteryx (c) Peppered moth (d) Paramecium

50) Among the human ancestors, the brain size was more than 100 cc in

(a) Homo erecuts (b) Ramapithecus (c) Homo habilis (d) Homo neanderhalensis

51) Genetic drift operates only in

(a) Island populations (b) Smaller populations (c) Larger populations (d) Mendelian populations

52) Species occurring in different geographical areas are called

(a) Sibling (b) Neopatric (c) Sympatric (d) Allopatric.

53) Which of the following statements is correct?

(a) Cro-Magnon man's fossil has been found in Ethiopia

(b) Australopithecus is the real ancestor of modern man (c) Homo erectus is the ancestor of man

(d) Neanderthal man is direct ancestor of homo sapiens

54) Abiogenesis occured about ..... billion years ago.

(a) $1 \cdot 2$ (b) $1 \cdot 5$ (c) $2 \cdot 5$ (d) $3 \cdot 5$

55) A bacterial cultural is treated with streptomycin and a cast is made.A few columns are able to survive due to

(a) selection (b) Adaptation (c) Induced mutation (d) Mimicry

56) Industrial melanism as observed in peppered moth proves that

(a) the melanic form of the moth has no selective advantage over lighter from in industrial area

(b) the lighter from month has no selective advantage either in polluted industrial area or non-polluted area

(c) melanism is a pollution-generated feature

(d) the true black melanic forms arise by a recurring random mutation

57) Human evolution originated in

(a) Africa (b) Jawa (c) France (d) China

58) The surprise products in the Miller's experiment were

(a) Peptides (b) Nucleotides (c) Nucleic acids (d) Amo acids.

59) Adaptive radiation refers to

(a) evolution of different species from a common ancestor

(b) migration of member of a species to different geographical areas

(c) Power of adaptation in an individual to a variety of environments

(d) adaptation due to geographical isolation

60) First mammal occurred in which Era-period?

(a) Permian-Palaeozoic (b) Triassic-Mesozoic (c) Tertiary-Coenozoic (d) None of these

61) Which one is linked to evolution?

(a) Extinction (b) Competition (c) Variation (d) Reproduction

62) Archaeopteryx is a connecting link between

(a) reptiles and birds (b) birds and mammals (c) amphibians and reptiles (d) None of these

63) Which of the following is not a concept of Lamarck?

(a) environmental pressure causes variation

(b) rate and survival of organism is different due to variation (c) inheritance of acquired character

(d) if an organ is used constantly it will continuously increase in size

64) Thorn of Bougainvillea and tendril of Cucurbita are examples of

(a) vestigial organs (b) retrogressive evolution (c) analogous organs (d) homologous organs

65) Darwin's theory states that

(a) characters are acquired through inheritance (b) Nature select species which can adapt

(c) Species changes morphologically with nature (d) Affect of environment on evolution

66) Select the correct statements from the following?

(a) Fitness is the end result of the ability to adapt and gets selected by nature

(b) All mammals except whales and camels have seven cervical vertebrae

(c) Mutations are random and directional (d) Darwinian variations are small and directionless

67) Match the scientists listed under column 'A' with ideas listed in column 'B'.

Column 1	Column 2
(i) Darwin	(M) abiogenesis
(ii) Oparin	(N) use and disuse of organs
(iii) Lamarck	(O) continental drift theory
(iv) Wagner	(P) evolution by natural selection

(a) (i)-(M) ; (ii)-(P) ; (iii)-(N) ; (iv)-(O) (b) (i)-(P) ; (ii)-(M) ; (iii)-(N) ; (iv)-(O)

(c) (i)-(N) ; (ii)-(P) ; (iii)-(O) ; (iv)-(M) (d) (i)-(P) ; (ii)-(O) ; (iii)-(N) ; (iv)-(M)

68) In 1953 S.L. Miller created primitive earth conditions in the laboratory and gave experimental evidence for origin of first form of life from pre-existing non-living organic molecules. The primitive earth conditions created include:

(a) low temperature, volcanic storms, atmosphere rich in oxygen

(b) low temperature, volcanic storms, reducing atmosphere

(c) high temperature, volcanic storms, non-reducing atmosphere

(d) high temperature, volvanic storms, reducing atmosphere containing CH_4 ,NH_3 etc.,

69) What is common to whale, seal and shark?

(a) thick subcutaneous fat (b) convergent evolution (c) homeothermy (d) seasonal migration

70) Variation during mutations of meiotic recombinations are:

(a) random and directionless (b) random sand directional (c) random and small

(d) random, small and direction

71) One of the Important consequences of geographical isolation is

(a) preventing speciation (b) speciation through reproductive isolation

(c) random creation of new species (d) no change in the isolated fauna

72) Who demonstrated existence of life in the boiled broth flask?

(a) Darwin (b) Pasteur (c) Francisco Redi (d) None of these

73) Who did an experiment to prove that the organic compounds were basis of life?

(a) Darwin (b) Melwin Calvin (c) Sydney Fox (d) Miller and Urey

74) Chemical theory of origin of life was given by

(a) Stanley Miller (b) Spallanzani (c) Oparin and Haldane (d) Louis Pasteur

75) Wings of pigeon, bat and mosquito exhibit the phenomenon called

(a) Convergent evolution (b) Divergent evolution (c) Atavism (d) All of these

76) Adaptive similarities in different animals living in the same habitat is called

(a) Retrogressive evolution (b) Parallel evolution (c) Adaptive radiation (d) Convergent evolution

77) Development of patagia in animals is..... adaptation

(a) Volant (b) Arboreal (c) Aquatic (d) Cave

78) First organism to evolve on the earth were

(a) Saprotrophs (b) Photoautotrophs (c) Chemoautotrophs (d) Chemoheterophs

79) The book Philosophie Zoologique was written by

(a) Wallace (b) Oparin (c) Lamarck (d) Darwin

80) Which evolutionary book is most accepted worldwide after bible?

(a) philosophic Zoologique,Lamarck (b) Origin of Life, Oparin (c) Origin of species,Darwin

(d) Mutation and Origin of Species,devries

81) Cranial capacity is minimum in

(a) Chimpanzee (b) Gorrilla (c) Rhesus monkey (d) Orangutan

82) Darwin's finches are an excellent example of

(a) brood parasitism (b) connecting links (c) adaptive radiation (d) seasonal migration

83) Which one of the following is incorrect about the characteristics of protobionts (coacervates and microspheres) as envisaged in the abiogenic origin of life?

(a) they were partially isolated from the surroundings

(b) they could maintain an internal environment (c) they were able to reproduce

(d) they could separate combinations of molecules from the surroundings

84) Which one of the following scientist's name is correctly matched with the theory put forth by him?

(a) De Vries-Natural selection (b) Mendel-Theory of Pangenesis

(c) Weismann-Theory of continuity of germplasm (d) Pasteur-Inheritance of acquired characters

85) Match the scientists and their contributions in the fields of evolution

Name of the Scientist	**Contributions**
(A) Charles Darwin	(1) Mutation theory
(B) Lamarck	(2) Germplasm theory
(C) Hugo De Vries	(3) Philosophie Zoologique
(D) Ernest Haeckel	(4) The origin of species
(E) August Weismann	(5) Biogenetic law
	(6) Essay on populations

(a) A-4,B-3,C-1,D-5,E-2 (b) A-4,B-3,C-5,D-1,E-6 (c) A-4,B-4,C-5,D-3,E-1 (d) A-2,B-3,C-1,D-5,E-2

(e) A-3,B-4,C-1,D-5,E-2

86) Given below are four statements (A-D) each with one or two blanks. Select the option which correctly fills up the blanks in two statements.

(A) Wings of butterfly and birds look alike and are the results of (i) evolution.

(B) Miller showed that CH_2, H_2, NH_3 and (i), When exposed to electric discharge in a flash resulted in formation of (ii)

(C) Vermiform appendix is a (i) organ and an (ii) evidence of evolution.

(D) Accordiarwin to Darwin evolution took place due to (i) and (ii) of the fittest.

(a) (D)-(i) small variations, (ii) survival, (A)-(i) convergent.

(b) (A)-(i) convergent, (B)-(i) oxygen, (ii) Nucleosides

(c) (B)-(i) water vapour, (ii) Amino acids, (C)-(i) Rudimentary, (i) Anatomical.

(d) (C)-(i) vestigial, (ii) Anatomical, (D)-(i) Mutations, (ii) Multiplication.

87) According to Darwin, evolution is

(a) a slow, sudden and discontinuous process. (b) a slow and discontinuous process.

(c) a sudden but discontinuous process (d) a slow, gradual and continuous process

88) The scientific name of Java man is

(a) Homo hibilis (b) Homo sapiens neanderthalensis (c) Homo erectus erectus

(d) Australopithecus boisei

89) The golden age of reptiles is

(a) Palaeozoic (b) Mesozoic (c) Cenozoic (d) Proterozoic

90) In the phylogeny of horse, the earliest fossil form is

(a) Eohippus (b) Merychippus (c) Mesohippus (d) Equus

91) Lamarck's theory of evolution is also called

(a) Survival of the fittest (b) Special creation theory (c) Inheritance of acquired characters (d) None of these

92) Hardy-Weinberg equilibrium is known to be affected by

(a) evolution (b) limiting factors (c) saltation (d) natural selection

93) Industrial melanism was highlighted by

(a) Mimosa pudica (b) Triticum aestivum (c) Biston betularia (d) rock python

94) This is not Darwinian concept

(a) variations (b) struggle for existence (c) natural selection (d) survival of the fittest

95) The closest primate to humans is

(a) Gorilla (b) Orangutan (c) Lemur (d) Rhesus monkey

96) SWan-necked flask experiment was done by

(a) Aristotle (b) Francisco Redi (c) Louis Pasteur (d) Robert Koch

97) Hominids originated during

(a) Pliocene (b) Palaeocene (c) Miocene (d) Oligocene

98) The theory of spontaneous generation was proposed by:

(a) Spallanzani (b) Von Helmont (c) F.Redi (d) Louis Pasteur

99) Which is the most advanced theory of origin of life?

(a) Spontaneous (b) Catastrophic (c) Oparin and Haldane (d) Non-spontaneous

100) Which of the following were first evolved organism?

(a) Chemoautotrophs (b) Chemoheterotrophs (c) Cyanobacteria (d) Bacteria

101) Postanal tail can be traced in

(a) cobra (b) Earthworm (c) Scorpion (d) Centipede

102) One of the oldest, best preserved and most complete hominid fossil commonly known as 'Lucy' belongs to the genus

(a) Oreopithecus (b) Dryopithecus (c) Pithecanthropus (d) Australopithecus

103) Which one of the following ancestors of man first time showed bipedal movement?

(a) Australopithecus (b) Cro-magnon (c) Java apeman (d) Peking man

104) Who was the first to discard the idea of fixity of species?

(a) Jean Baptist Lamarck (b) Charles Darwin (c) Robert Hooke (d) William Harvey (e) Stanley Cohen

105) Who postulated the mutation theory?

(a) G. Mendel (b) Charles Darwin (c) J.B. Weismann (d) Hugo de Vries

106) Which one of these is not a case of artificial selection?

(a) shetland pony (b) great dane dog (c) broccoli (d) peppered moth (e) Arabian race horse

107) Amphibians were dominant during

(a) Carboniferous (b) silurian (c) ordovician (d) cambrian (e) jurassic

108) The first evolved organisms were

(a) Chemoautotrophs (b) Chemoheterotrophs (c) Cyanobacteria (d) Bacteria.

109) Darwin's finches show one of the following aspects of evolution

(a) Biogeographic evidence (b) Industrial melanism (c) Biochemical evidence

(d) Embryological evidance

110) Evolutionary development of a species can be best studied by

(a) DNA analysis (b) Finding age by carbon dating (c) Studing fossils of this species

(d) All the above

111) Among the following, a structure, which is not vestigial, is

(a) Wisdom teeth (b) Plica semilunaris (c) Vermiform appendix (d) Nails

112) Cause of speciation is

(a) Random mating (b) Hybridization (c) Isolation (d) Migration

113) Sickle-cell anaemia, the best example of natural selection, is due to gene modification related to amino acid of

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

114) Which one of the following periods is largely associated with extinction of dinosaurs and the increase in flowering plants and reptiles?

(a) Jurassic (b) triassic (c) cretaceous (d) permian

115) Darwin judged the fitness of an individual by

(a) ability to defend itself (b) strategy to obtain food (c) number of offspring

(d) dominance over other individuals

116) Mass extinction at the end of mesozoic era was probably due to

(a) continental drift (b) the collision of earth with large meteorites (c) massive glaciations

(d) change in earth's orbit

117) Tachyglossus is a connecting link between

(a) reptiles and birds (b) amphibians and reptiles (c) birds and mammals

(d) reptiles and mammals

118) Darwin's theory does not include

(a) Natural selection (b) Survival of the fittest (c) Evolution through inheritance

(d) struggle for existence

119) Which one of the following describes correctly the homologous structures?

(a) organs with anatomical similarities, but performing different functions.

(b) organs with anatomical dissimilarities, but performing same function.

(c) organs that have no function now, but had important functions in ancestors.

(d) organs appearing only in embryonic stage and disappearing later in the adult.

120) An evolutionary pattern characterised by a rapid increase in the number and kinds of closely related species is called

(a) convergent evolution (b) divergent evolution (c) adaptive radiaton (d) parallel evolution

121) A common means of sympatric speciation is

(a) polyploidy (b) temporal segregation of breeding season (c) spatial segregation of mating sites

(d) imposition of geographic barrier

122) The most apparent change during the evolutionary history of Homo sapiens is traced in

(a) shorthing of the jaws (b) remarkable increase in the brain size (c) loss of body hair

(d) walking upright

123) What was the most significant trend in the evolution of modern man (Homo sapiens) from his ancestors?

(a) upright posture (b) shortening of jaws (c) binocular vision (d) increasing brain capacity

124) Sweet potato is homologous to

(a) potato (b) colocasia (c) ginger (d) turnip

125) Evolution of different species in a given area starting from a point and spreading to other geographical areas is known as:

(a) Adaptive radiation (b) Natural selection (c) Migration (d) Divergent evolution

126) Which one of the following options gives one correct example each of convergent evolution and divergent evolution?

(a)

Convergent evolution	**Divergent evolution**
Eyes of octopus and mammals	Bones of forelimbs of verebrates

(b)

Convergent evolution	**Divergent evolution**
Thorns of Bougainvillia	Wings of butterflies and birds

(c)

Convergent evolution	**Divergent evolution**
Bones of forelimbs of vertebrates	Wings of butterfly and birds

(d)

Convergent evolution	**Divergent evolution**
Thorns of Bougainvillia and tendrils of Cucurbita	Eyes of Octopus and mammals

127) There is no life on moon because of absence of

(a) Water (b) Oxygen (c) Nitrogen (d) Hydrogen

128) Which of these pairs is vestigial?

(a) Coccyx and pinna muscles (b) Coccyx and premolar (c) Facial hair in ladies

(d) Coccyx and intercostal muscles

129) According to abiogenesis life orginated from

(a) Nonliving (b) other planets (c) Preexisting life (d) spontaneously (e) chemicals

130) Convergent evolution is illustrated by

(a) Rat and Dog (b) Starfish and cuttle fish (c) Bacterium and protozoan (d) Dogfish and whale

131) Recapitulation theory was called the law of Biogenesis by

(a) Haeckel (b) Darwin (c) Lamarck (d) Hugo de Vries

132) Which of the following is a connecting link between mammals and reptiles?

(a) Peripatus (b) Balanoglossus (c) Ornithorhynchus (d) Archaeopteryx

133) Reproductive isolation between segments of a single population is termed

(a) sympatry (b) allopatry (c) population divergence (d) disruptive divergence

134) Which one of the following was not given by Darwin's theory of evolution?

(a) struggle for existence (b) over production (c) natural selection (d) genetic drift

135) Darwin's finches provide an excellent evidence in favour of evolution. The evidences come from the field of

(a) embryology (b) palaeontology (c) biogeography (d) anatomy

136) What was the most significant trend in the evolution of modern man (Homo sapiens) from his ancestors?

(a) Shortening of jaws (b) Binocular vision (c) Increasing cranial capacity (d) Upright posture

137) The extinct human who lived 1,00,000 to 40,000 years ago, in Europe, Asia and parts of Africa, with short stature, heavy eyebrows, retreating fore heads, large jaws with heavy teeth, stocky bodies, a lumbering gait and stooped posture was

(a) Homo habilis (b) Neanderthal human (c) Cro-magnan human (d) Ramapithecus

138) Miller and Urey performed an experiment to prove the origin of life. They took gases

(a) methane, ethane, ammonia, water vapour (b) methane, ammonia, hydrogen, water vapour

(c) methane, ethane, hydrogen, ammonia (d) ammonia, water vapour, butane, hydrogen

139) The origin of mammal like reptiles occurred in

(a) Triassic period (b) Permian period (c) Jurassic period (d) Tertiary period

140) Darwin in his 'Theory of Natural selection' did not believe in any role of which one of the following in organic evoluation?

(a) Survival of the fittest (b) Struggle for existence (c) Discontinuous variations

(d) Parasites and predators as natural enemies

141) Which one of the following is present today but was absent about 3-5 billion years ago?

(a) Nitrogen (b) Oxygen (c) Hydrogen (d) Methane

142) Theory of spontaneous generation was given by

(a) Louis Pasteur (b) F. Redi (c) Von Helmont (d) Spallanzani

143) Coacervates are

(a) Colloidal droplets (b) Contain nucleoprotein (c) (a) and (b) (d) Protobiont (e) Bacteria

144) 'Use and disuse' theory was proposed by

(a) Lamarck (b) Darwin (c) Hugo de Vries (d) Malthus

145) Haeckel's biogenetic law is

(a) ontogeny repeats phylogeny (b) phylogeny repeats ontogeny (c) reproductive isolation

(d) every organism is produced by its parents

146) Origin of first toothed birds and gymnosperms took place during

(a) cretaceous (b) triassic (c) Jurassic (d) permian

147) Who proposed the theory of origin of species by natural selection?

(a) August Weismann (b) De vries (c) Charles Darwin (d) Charles Darwin and Alfred Wallace

148) Which one is not a vestigial organ?

(a) Wings of Kiwi (b) Flipper of seal (c) Coccyx in man (d) Splint bone of horse

(e) Pelvic girdle of python.

149) The wings of bat and bird are

(a) Homologous but not analogous (b) Neither homologous nor analogous

(c) Analogous but not homologous (d) Vestigial (e) Both homologous and analogous

150) According to oparin,which one of the following was not in the primitive atmosphere of the earth?

(a) oxygen (b) Hydrogen (c) Water Vapour (d) Methane

151) Coacervates were experientally produced by

(a) Sidney fox and oparin (b) Fischer and Huxley (c) Jacob and Monod (d) Urey and Miller

152) The gases used in the spark-discharge apparatus were-

(a) NH_3, NH_4 and O_2 (b) O_2, CO_2 and NH_3 (c) CO_2, NH_3 and CH_4 (d) H_2,CH_4 and NH_3

153) Biogenetic law as given by Haeckel states that

(a) ontogeny recapitulates phylogeny (b) phylogeny recapitulates ontogeny

(c) ontogeny and phylogeny go together (d) there is no relationship between phylogeny and ontogeny

154) Stanley Miller had put the Oparin-Haldane theory to test in 1953 by creating in the laboratory, the probable conditions of the primitive earth. In the experiment, simple amino acids were synthesized from which of the following mixtures as observed after 18 days?

(a) H_2, O_2, N *and* H_2O (b) CH_4, CN, H_2 *and* O_2

(c) H_2, NH_3, CH_4 *and* water vapour (d) $NH_3, CH_4,$ *and* O_2

155) Darwin's finches are a good example of

(a) convergent evolution (b) industrial melanism (c) connecting link (d) adaptive radiation

156) Match the items in Column I with those in Column II.

Column I	Column II
A. Ice-age (75000 - 10000 years before)	1. Neanderthal man.
B. 1.5 mya	2. Agriculture started
C. Brain size of 1400 cc	3. Homo erectus; they probably ate meat.
D. 10000 years before	4. Modern Homo sapiens arose
	5. Homo habilis; they probably did not eat meat.

(a) A - 2, B-3, C - 1, D - 4 (b) A - 4, B-1, C - 3, D - 2 (c) A - 3, B-4, C - 1, D - 2

(d) A - 4, B-3, C - 1, D - 2

157) Match the organisms in Column I with the geological time scale of their appearance on the globe.

Column I	Column II
A. Jawless fish	1. 500 mya
B. Dryopithecus	2. 320 mya
C. Sea weeds	3. 350 mya
D. Invertebrates	4. 200 my a - dominated the earth
E. Reptiles	5. 15 mya
	6. 1.5 mya

(a) A - 3, B - 5, C - 2, D - 1, E - 4 (b) A - 5, B - 3, C - 2, D - 1, E - 4

(c) A - 3, B - 5, C - 2, D - 4, E - 1 (d) A - 3, B -2, C - 5, D - 1, E - 4

158) Appearance of antibiotic-resistant bacteria is an example of

(a) adaptive radiation (b) transduction (c) pre-existing variation in the population

(d) divergent evolution.

159) The bones of forelimbs of whale, bat, cheetah and man are similar in structure, because

(a) one organism has given rise to another (b) they share a common ancestor

(c) they perform the same function (d) they have biochemical similarities

160) Analogous organs arise due to

(a) divergent evolution (b) artificial selection (c) genetic drift (d) convergent evolution.

161) Change of frequency of alleles in a population results in evolution. This statement is proposed in

(a) Darwin's theory (b) Lamarck's theory (c) Hardy-Weinberg principle (d) de Vries theory.

162) Homologous organs indicate

(a) convergent evolution. (b) divergent evolution. (c) adaptive radiation. (d) natural selection.

163) Evolutionary convergence is characterised by

(a) development of characteristics by random mutations.

(b) development of similar characteristics in different groups of organisms of different ancestry.

(c) development of dissimilar characteristics in closely related groups of organisms.

(d) development of similar characteristics in related groups of organisms.

164) The first photosynthetic organism to appear on the earth was

(a) green algae (b) bryophytes (c) bacteria (d) non-green plants

165) According to this theory, the life originates from pre-existing life. This theory is identified as and propogated by

(a) theory of biogenesis, Louis Pasteur (b) theory of panspermia, Arrhenius

(c) theory of spontaneous generation, von Helmont (d) theory of abiogenesis, Francisco Reddi

166) SL Miller in his set up demonstrated chemical evolution by the appearance of which of the following molecules?

(a) Amino acid (b) Organic compound (c) Peptide (d) All of these

167) Lactobacillus that sets milk into curd is categorised as

(a) cyanobacteria (b) archaebacteria (c) chemosynthetic bacteria (d) heterotrophic bacteria

168) Single step large mutation leading to speciation is also called

(a) founder effect (b) saltation (c) branching descent (d) natural selection

169) The front flipper of seal and a bat's wings are

(a) homologous structures and represent divergent evolution

(b) analogous structures and represent convergent evolution

(c) vestigial structures and represent divergent evolution

(d) phylogenetic structures and represent convergent evolution

170) The phenomenon of industrial melanism in the peppered moth in England highlights that

(a) melarusm was caused by industrial pollution

(b) light coloured moths had selective advantage in polluted areas

(c) dark coloured moths arose by recurring random mutations (d) None of the above

171) Among the examples listed below, which of the following does not support the Lamarck's theory of evolution?7

(a) Giraffes with long necks for foraging on tall trees

(b) Pierced cars in mothers are not inherited by their babies

(c) Loss of vision in cave dwelling mammals (d) Loss of hindlimbs in whales

172) Match the Column I with Column Il and select the correct option from the codes given below.

Column I (Scientists)	Column II (Related to)
A. Darwin	1. Natural selection
B. Lamarck	2. Inheritaner of acquired charactet
C. Pasteur	3. Swan-necked experiment
D. de Vries	4. Mutational theory of inheritance

(a)

A	B	C	D
2	3	4	1

(b)

A	B	C	D
1	3	4	2

(c)

A	B	C	D
1	2	3	4

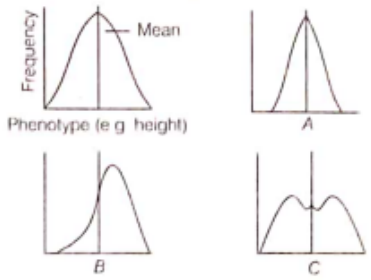
(d)

A	B	C	D
1	2	4	3

173) In the Hardy-Weinberg equilibrium equation, the frequency of homozygous dominant individuals is given by

(a) p^2 (b) 2 pq (c) q^2 (d) pq

174) Following is the digrammatic representation of the operation of natural selection on different traits. Which of the following options correctly identifies all the three graphs A, B and C?



(a)

A	B	C
Directional	Stabilising	Disruptive

(b)

A	B	C
Stabilising	Directional	Disruptive

(c)

A	B	C
Disruptive	Stabilising	Directional

(d)

A	B	C
Directional	Disruptive	Stabilising

175) Match the Column I with Column II and select the correct option from the codes given below.

Column I (Time periods in geological tinse scale)	Column II (Related to)
A. Mesozoic	1. First amphibians
B. Devonian	2. Proliferation of reptiles
C. Palarocene	3. 160 million years
D. Permian	4. Radiation of primitive mammals

(a)

A	B	C	D
1	4	3	2

(b)

A	B	C	D
3	1	4	2

(c)

A	B	C	D
4	1	2	3

(d)

A	B	C	D
2	1	4	3

176) The common ancestor of mosses and tracheophytes are

(a) Prilophyton (b) Chlorophyte ancestor (c) Ferns (d) None of the above

177) Herbaceous lycopods and arborescent lycopods evolved from

(a) Zosterophyllum of Paleozoic era (b) Zosterophyllum of Mesozoic era

(c) Prilophyton of Paleozoic era (d) Cycads of Mesozoic era

178) At which stage during evolution did human use hides to protect their bodies and buried their dead? 2023

(a) Homo habilis (b) Neanderthal man (c) Java man (d) Homo erectus

179) The sequence of human evolution is correctly depicted in

(a) Dryopithecus → Homo erectus → Homo habilis → Cro-Magnon man

(b) Australopithecus → Neanderthal man → Homoerectus → Modern man

(c) Homo sapiens → Dryopithecus → Homo erectus → Autralopithecus

(d) Australopithecus → Homo erectus → Neanderthal man → Homo sapiens

180) Match the Column I with Column II and select the correct option from the codes given below.

Column I (Primates)	Column II (Cranial capacities in cubic centimetres)
A. Chimpanzer and gorilla	1. 325-510 cc
B. Australopithecus	2. 500 cc
C. Hamo habilis	3. 700 cc
D. Java ape man	4. 800-1000 cc

(a) (b) (c) (d)

A	B	C	D
4	3	2	1

A	B	C	D
2	3	4	1

A	B	C	D
1	2	3	4

A	B	C	D
3	2	1	4

Fill up / 1 Marks 10 x 1 = 10

181) A study of fossils in different sedimentary layers indicates the _____ period in which they existed.

182) _____ evolution leads to homologous organs.

183) Placental mammal lemur in Australia shows resemblance to the marsupial mammal _____.

184) Placental mammals and marsupial mammals of Australia show _____ evolution.

185) De Vries believed that single step large mutation, called _____ caused speciation.

186) _____ evolved into the first amphibians.

187) About 65 mya, _____suddenly disappeared from the earth.

188) _____ probably lived in East African grasslands about 2 mya.

189) The brain capacities of Homo habilis was about _____ cc.

190) Fossils of _____ were discovered in Java.

True or False 6 x 1 = 6

191) Ontogeny repeats phogeny.

(a) True (b) False

192) Prehistoric cave art developed after agriculture, about 18000 years ago.

(a) True (b) False

193) The skull of baby chimpanzee is more like the adult human skull than the skull of adult chimpanzee.

(a) True (b) False

194) It is believed that 3-4 mya, man-like primates walked in Eastern Africa.

(a) True (b) False

195) Due to continental drift, pouched mammals of Australia survived due to lack of competition.

(a) True (b) False

196) Tyrannosaurus was the smallest among the dinosaurs.

(a) True (b) False

1 Marks 240 x 1 = 240

197) Identify the examples of homologous structures from the following:
(a) Vertebrate hearts.
(b) Thorns in Bougainvillea and tendrils of Cucurbita.
(c) Food storage organs in sweet potato and potato.

198) 'Sweet potato tubers and potato tubers are the result of convergent evolution'. Justify the statement.

199) What did Louis Pasteur's experiment on 'Killed yeast' demonstrate? Name the theory that got disproved on the basis of his experiment.

200) What is the basis of origin of variations in organisms as described by Hugo de Vries?

201) Write the similarity between the wing of a butterfly and the wing of a bat. What do you infer the above with reference to evolution?

202) State the significance of biochemical similarities among diverse organisms in evolution.

203) Comment on the similarity between the wing of a cockroach and the wing of a bird. What do you infer from the above with reference to evolution?

204) State the significance of Coelacanth in evolution.

205) Comment on the similarity between the flippers of dolphins and penguins, with reference to evolution.

206) Are flippers of penguin and dolphin homologous or analogous? What type of evolution has brought such a similarity in them?

207) How does a population become 'founders' of a new species?

208) When does a species become founders to cause founder effect?

209) What does Hardy-Weinberg equation $p^2+2pq+q^2=1$, convey?

210) List the two characteristics of mutation that help in explaining evolution.

211) Name the scientist who disproved spontaneous generation theory.

212) Why are the wings of a butterfly and of a bat called analogous?

213) Are the thorns of Bougainvillea and tendrils of Cucurbita homologous or analogous? What type of evolution has brought such a similarity in them?

214) Mention the type of evolution that has brought the similarities as seen in potato tuber and sweet potato.

215) Are the wing of a bird and the forelimb of a horse homologous or analogous? Name the type of evolution that explains the development of such structures.

216) According to Hardy-Weinberg's principle, the allele frequency of a population remains constant. How do you interpret the change of frequency of alleles in a population?

217) Why are lichens regarded as pollution indicators?

218) Mention what caused evolution according to de Vries.

219) Name any two vertebrate's body parts that are homologous to human forelimbs (hands).

220) What causes speciation according to Hugo de Vries?

221) Pick out the ancestral line of Angiosperms from the list given below: Conifers, Seed ferns, Cycads, Ferns.

222) Name the placental mammals corresponding to the Australian 'spotted cuscus' and 'Tasmanian tiger cat', which have evolved as a result of convergent evolution.

223) How do we compute the age of a fossil?

224) In a certain population, the frequency of three genotypes is as follows:

Genotypes	BB	Bb	bb
Frequency	22%	62%	16%

what is the likely frequency of alleles B and b?

225) Among the five factors that are known to affect Hardy-Weinberg equilibrium, three factors are gene flow, genetic drift and genetic recombination. What are the other two factors?

226) Which type or natural selection is the industrial melanism observed in moth, Biston betularia?

227) By what Latin name, is the first human-like being, the hominid known?

228) Who probably did not eat meat among Ramapithecus, Australopithecus and Homo habilis?

229) What is evolutionary biology?

230) Why is it said that when we see stars, we are apparently peeping into the past?

231) Name the unique event in the history of universe.

232) When was the earth supposed to have been formed?

233) Name the theory that describes the formation of universe.

234) Who showed that life comes only from pre-existing life?

235) Why was the theory of spontaneous generation dismissed?

236) Who disproved the theory of spontaneous generation?

237) Who proposed the theory of origin of Life?

238) Who provided experimental support for Oparin-Haldane hypothesis?

239) In which form/forms did miller supply energy in their experiment?

240) When did the first cellular form of life appear?

241) What is 'fitness' according to Darwin?

242) Name the scientist who also came to similar conclusion as Darwin. Where did he work?

243) State the biogenetic law.

244) Define biogeography.

245) Name the island where Darwin made most of his observations.

246) What are Darwin's finches?

247) Mention the two key concepts of Darwinism.

248) Name the first group of organisms that invaded land.

249) Name the ancestor of Bryophytes.

250) Name the period in the geological history when lycopods flourished.

251) Name the common ancestor of cycads and dicots.

252) What is saltation in evolution?

253) What is meant by gene pool?

254) What is meant by genetic equilibrium?

255) What is evolution according to Hardy-Weinberg?

256) What is founder effect?

257) Mention any one major source of variation in a sexually reproduced offspring and an asexually reproducing population respectively.

258) Name the type of fish that was caught in South America in 1938, that is considered as ancestor of modern amphibians.

259) What technical term is given to the fish-like reptiles?

260) What did the first mammals look like?

261) Name the forerunner of hominid evolution.

262) Give the scientific name of the first human-like ancestor.

263) Write the scientific name of the species that succeeds Homo habilis in hominid evolution.

264) Mention the grain capacities of
(a) Homo habilis, and
(b) Neanderthal man.

265) When (how many years before) were the following developed?
(a) Cave art, and
(b) Agriculture.

266) What are the characteristics of life forms that had been fossilised?

267) Did aquatic life forms got fossilized? If yes, where do we come across such fossils?

268) How do we compute the age of a living tree?

269) Give an example for convergent evolution and identify the features towards which they are converging.

270) What is more important precondition for adaptive radiation?

271) How de we compute the age of a rock?

272) When we talk of functional macro-molecules e.g. protein as enzyme, hormones, receptor, antibodies, ect., towards what are they evolving?

273) Who among the Dryopithecus and Ramapithecus was more man-like?

274) Name the following:
(a) Who conceived the idea of chemosynthetic hypothesis of origin of life on earth?
(b) Who proved that spontaneous generation does not occur?
(c) Who experimentally proved that life develops from pre-existing life only?
(d) Who gave the theory of organic evolution?

275) When did life appear on earth?

276) Give another name for origin of life.

277) Who finally proved that life cannot originate from pre-existing life?

278) Which was the earliest form of life that came on earth?

279) What was the type of atmosphere in the early stages?

280) Justify that life began in the sea.

281) Name the gas absent in primitive atmosphere.

282) What product was formed in the Miller's experiment in the direction of origin of life on earth?

283) Arrange the following substances in a proper sequence with regard to the formation of chemical constituents at the time of origin of life: Sugar, methane, nucleic acid and amino acid.

284) Whose theory formed the basis of chemical origin of life?

285) What are microspheres?

286) What is Hardy-Weinberg principle?

287) Where will you find the most ancient and recent fossil?

288) What is the cranial capacity of modern man?

289) Which chromosome in humans and chimpanzees shows an identical banding pattern?

290) Starting with the oldest form rearrange the following genera species according to their sequence of appearance on earth:
Homo erectus, Homo sapiens, Ramapithecus, Homo habilis, Australopithecus.

291) State a reason for the increased population of dark coloured moths coinciding with the loss of lichens (on tree barks/during industrialization period in England).

292) Which one of the living apes diverged first from the main line of hominid evolution and which one diverged last?

293) According to de-Vries what is saltation?

294) Name any two primitive Gymnosperms.

295) Give an example of homologous organs in insects.

296) Consider a thorn in Bougainvillea and a tendril in Cucurbita. Are these two organs homologous or analogous? Give reason.

297) What must be present in any population before selection, either artificial or natural that can bring about changes?

298) What are the two most important phenomena in nature which form the basis of Darwinism?

299) What are fossils?

300) What are meteorites?

301) Give the age of the earliest prokaryote.

302) Where did life appear first?

303) Is life still originating?

304) Is the scheme of origin of life given by Oparin and Haldane final?

305) Name the scientist who experimentally confirmed the Oparin-Haldane theory of the origin of life.

306) Name the stage that followed coacervates in the origin of life.

307) Were the first-formed organisms autotrophic or heterotrophic?

308) In what form/forms had Urey and Miller supplied energy in their experiment?

309) Was oxygen present in free state in primitive earth's atmosphere?

310) Who was the first scientist to object 'theory of abiogenesis'?

311) What is the probable period of origin of cyanobacteria?

312) Name the possible sources of energy in most accept theory of origin of life.

313) What does theory of special creation state?

314) What was sealed in the spark chamber in famous Miller and Urey simulation experiment?

315) Who obtained protenoid microspheres by heating a mixture of dry amino acids to 130 - 180^{o}C and later cooling them in water?

316) What do you mean by Panspermia?

317) Give a 3-word definition of "organic evolution".

318) Cite one example of homologous organs in plants.

319) Give two examples of connecting links.

320) Name two vestigial organs of human body.

321) Define recapitulation theory in 3 words.

322) Mention one temporary embryonic structure of no use.

323) Name three main kinds of rocks.

324) Which organs of man are homologous to the wings of birds?

325) Cite one example of dinosaurs.

326) In which era the fossils are scanty.

327) What is Archaeopteryx? What is its significance in evolution?

328) Who proposed the biogenetic theory "ontogeny repeats phylogeny"?

329) Cite two examples of analogous organs and two of atavistic structures.

330) Which period is called the 'age of reptiles'?

331) Mention the immediate ancestors of birds and mammals.

332) Name three recent eras of geological time.

333) Name the era in the geological time scale when life had not yet originated on earth.

334) Mention any species which came into existence in the recent past.

335) In which era of geological time scale mammals dominated the scene?

336) Name a living fossil.

337) Give an example of missing link

338) Name the theory of evolution given by Lamarck.

339) Evolution is a discontinuous process. Is it correct?

340) Give the three key factors of the modern concept of evolution.

341) In which areas does the dark melanic species of the peppered moth abound?

342) What is the cause of sickle-cell anemia?

343) In what respect did Darwin agree with Lamarck?

344) Cite one example of natural mutation producing a new species.

345) What are sympatric species?

346) How do genes mutate?

347) List 3 mechanism by which variant genotype can be produced in nature.

348) Which source of variations denied to the asexually reproducing organisms and self-fertilising hermaphrodites? Which phenomenon needs to occur to bring about variation in such forms?

349) What is the significance of the Lederberg experiment?

350) Name any two breeds of wild rock pigeon that have been developed through artificial selection.

351) Should man be regarded a "special creation" or "just another animal"?

352) Which is the common ancestor of old world monkeys, apes and humans?

353) Name the ancestors of primates.

354) Name the common ancestor of great apes and man.

355) "Man descended from monkeys". Do you agree?

356) Which is the earliest fossil of prehistoric man?

357) Name the apes which are most primitive.

358) What is the cranial capacity of man?

359) Where have the fossils of Sivapithecus found?

360) Name the extinct representative of modern man.

361) Which place in India is famous for human fossils?

362) Which is opposable in man, pollex or hallux?

363) Name the primate family in which the humans have been placed.

364) What is the diploid number of chromosomes in the great apes and in the humans?

365) Who is a palaeoanthropologist?

366) Write about the theory of spontaneous generation.

367) Name the naturalist who had also come to similar conclusion around the same time what Darwin worked out?

368) Atmosphere of the primitive earth was highly……while that of present earth is highly…..

369) State the significance of study of fossils in evolution.

370) What is the way to compute the age of a fossil?

371) Explain the meaning of 'survival of the fittest'.

372) Identify the examples of convergent evloution from the following.
(i) Flippers of penguins and dolphins
(ii) Eyes of Octopus and mammals.
(iii) Vertebrte's brain.

373) Why are analogous structures a result of convergent evolution ?

374) State the reason for the increased population of dark coloured moths coinciding with the loss of lichens(on tree barks) during industrialisation period in England.

375) Coelacanth that was caught in 1938 in south Africa,was very significant in the evolutionary history of vertebrates.Why?

376) State the significant of biochemical similarities among diverse organisms in evolutions.

377) What is 'Saltation' according to De vries?

378) What are the end products of the experiment of Miller?

379) Write the probable differences in eating habits of Homo habilis and Homo erectus.

380) Write hypothetical proposals put forth by Oparin & Haldane.

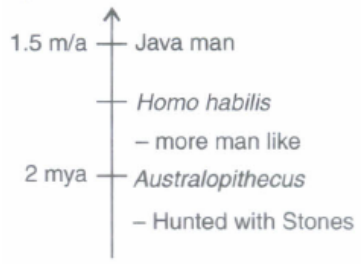
381) Name the type of evolution that has resulted in the development of structures like wings of butterfly and bird. What are such structures called.

382) Write the basis of origin of variations in organisms as described by Hugo de Vries

383) Write the term used for resemblance of varieties of placental mammals to corresponding marsupials in Australia.

384) If the frequency of one allele is 'p' and for another, it is 'q' for one gene, what will be the formula to calculate allele frequency in future generations according to Hardy-Weinberggenetice equilibrium?

385)



Study the ladder of human evolution given above and answer the following questions.
(a) Where did Australopithecus evolve?
(b) Write scientific name of Java man.

386) Who was the direct ancestor of living modem man.

387) Rearrange the following statements to explain the formation of atmosphere on earth
i) The lighter hydrogen gas escaped from the surface while oxygen combined with methane, ammonia etc to form water and carbondioxide etc.
ii) Earth cooled and water vapour fell as rain
iii) Water vapour, methane, ammonia and carbondaioxide were released from molten mass.
iv) UV rays from the sun broke up water into hydrogen and oxygen.

388) Name the theory of origin based on the following statement;
i) The supernatural being created the earth, light, plants, animals
ii) Unit of life called spores transferred to different planets including earth.
iii) Life arose from decaying matter like straw.
iv) First form of life could have come from pre-existing non-living organic molecules.
v) The first form of life arose slowly from non-living molecules involving evolutionary forces.

389) Stanley Miller & Urey experimentally proved the chemical evolution of life by creating condition similar to the primitive atmosphere, in the laboratory. Name the gases filled by them in the flask .In what form was the energy supplied for the chemical reaction to occur? For how long the experiments run continuously?

390) Charles Darwin during a Sea voyage round the world in a sail ship (H.M.S Beagle), concluded that there has been gradual evolution of life forms . What is his theory practically known as? Write the main points of his theory . Name a scientist who arrived to similar conclusion like that of Charles Darwin?

391) What is indicated by a cross section of earth's crust? Name the evolutionary evidence in which different aged rock sediments containing fossil of life form are examined?

392) Whales, bats, cheetah & humans shares similarities in the pattern of bones of forelimbs what do we call these structures. How these structures are pointing towards divergent evolution? Give an example from plants which represent the same pattern?

393) The structures which are not anatomatically similar but are performing similar function are called analogous structure. Give any two example of analogy.
Why analogous structure are said to be a result of convergent evolution?

394) Evolution is the stochastic process based on chance events in nature & chance mutation in the organism. Explain it with the help of a suitable example (industrial melanism). State any other example from every day experience.

395) Why small black birds later called Darwin Finches found in Galapagos Islands amazed Darwin.Which evolutionary phenomenon is represented by Darwin finches.
Give any other example of this phenomenon. When is this phenomenon indicative of convergent evolution?

396) Is evolution a process or the result of a process? Name the two key concepts of Darwinian Theory of evolution.

397) "Giraffes who in an attempt to forage leave on tall trees had to adopt by elongation of their necks." Make use of this statement to enumerate the main points of Lamark 's theory and Darwin's theory of Natural selection.

398) “Allele frequencies in a population are stable and are constant from generation to generations”. Who proposed this principle .State the factors that are known to affect it .What do you understand by founder effect. How these five factors mentioned can cause a change in a frequency of alleles of a population?

399) Depending upon the trait favoured natural selection can bring about three different effects. Depict the effects with the help of diagram.

400) Complete the following statement by filling blanks 1 to 5.
i) The first circular form of life → multi cellular organisms → (1) around 500 million years ago
→ jawless fish around 350 million years ago
ii) (2)were the ancestors of the modern day frogs and salamanders
iii) Land reptiles i.e. __(3)__ suddenly disappeared from the earth about 65 million years ago. This called(4).
iv) Some of the land reptiles moved back into water to evolve into (5).

401) Rearrange the following to depict the correct sequence of the evolutionary record of man. Homo habilis , Ramapithecus, Homosapiens, Australopithecus, Homo erectus. Differentiate between Homo habilis and Homo erectus.

402) Classify the following as examples of homology and analogy:
i) Hearts of fish and crocodile.
ii) Eyes of octopus and mammals.
iii) Thorns of bougainvillea and spines of Opuntia.
iv) Thorns of bougainvillea and tendrils of cucurbits

403) ·What is Big Bang theory?

404) Theory of special creation was promoted by which scientist?

405) The first cellular life form originated when and where?

406) State two postulates of Oparin and Haldane's theory with reference to the origin of life.

407) Complete the statement given below by filling the blank.
_____ is considered as a connecting link between the reptiles and birds.

408) Apart from homologous and analogous organs, which other organs can be used as evidences for organic evolution?

409) What role does an individual organism play as per Darwin's theory of natural selection ?

410) What is 'fitness of an individual' according to Darwin?

411) According to Hugo de Vries what is saltation?

412) Define gene migration.

413) How many years back were the following developed in human evolution?
(i) Cave art (ii) Agriculture

414) Identify the period which is called age of reptiles.

415) What was the unique event in the history of universe?

416) The theory of spentaneous generation was dismissed by whom and why?

417) When did bryophytes appeared on the earth?

418) Hugo de Vries gave the mutation theory. Name the plant he worked on.

419) How can you say lobefins were ancestors of evolution?

420) Write down the consequence of absence of genetic variations among individual of a population.

421) The 'origin of species' was given by which scientist?

422) What did the first mammal look like.

423) Mention the conditions on earth that favoured origin of life.

424) Name any two extinct forms of life.

425) When did the jawless fish evolve?

426) When was the earth supposed to have been formed and when did life appear on the earth?

427) What was the idea of early Greek thinkers about origin of life?

428) What is Theory of Panspermia?

429) State the two principal outcomes ofthe experiments conducted by Louis Pasteur on origin of life.

430) How did Charles Darwin express 'fitness'?

431) Name two animals that have evolved along with Tasmanian wolf in the Australian continent.

432) What is saltation according to De-Vries?

433) Coelacanth was caught in South Africa. State the significance of discovery of Coelacanth in the evolutionary history of vertebrates.

434) Write the names of the following:
(a) A 15 mya primate that was ape-like.
(b) A 2 mya primate that lived in East African grasslands.

435) Rearrange the human activities mentioned below as per the order in which they developed after the modern Homo sapiens came into existence during ice age:
(i) Human settlement
(ii) Prehistoric cave art
(iii) Agriculture.

436) Attempt giving a clear definition of the term species.

Find the odd one 4 x 1 = 4

437) Carboniferous, Triassic, Devonian, Permian

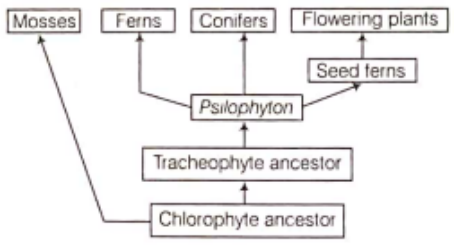
438) Bobcat, Wolf, Ant eater, Spotted cuscus.

439) Human hands, Wings of butterfly, Wings of bat, Wings of birds.

440) Lamarckism, Darwinism, Branching descent, Natural selection.

Assertion and reason 12 x 1 = 12

441)



Assertion (A) : Common ancestor of ferns, conifers and seed ferns in Psilophyton.
Reason (B) : The common ancestor of Psilophyton and seed fern is chlorophyte
(a) lf both A and R are true and R is the correct explanation of A
(b) If both A and R are true, but R is not the correct explanation of A
(c) If A is true, but R is false
(d) If A is false, but R is true

442) 

Assertion (A) : He is also called handy man.
Reason (R) : Heaps of tools found with these fossils included sharpened stones.
(a) lf both A and R are true and R is the correct explanation of A
(b) If both A and R are true, but R is not the correct explanation of A
(c) If A is true, but R is false
(d) If A is false, but R is true

443) Assertion (A) : Roth living and non-living objects were formed simultaneously.
Reason (R) : Richter proposed the theory of rosmozone origin in 1865
(a) lf both A and R are true and R is the correct explanation of A
(b) If both A and R are true, but R is not the correct explanation of A
(c) If A is true, but R is false
(d) If A is false, but R is true

444) Assertion (A) : The first form of life arose gradually through evolutionary forces from non-living molecules
Reason (B) : This is called as alnogenesis
(a) lf both A and R are true and R is the correct explanation of A
(b) If both A and R are true, but R is not the correct explanation of A
(c) If A is true, but R is false
(d) If A is false, but R is true

445) Assertion (A) :The theory of special creation states that God created life by his divine act of creation.
Reason (R) : Louis Fasteur rejected the theory of spontaneous generation.
(a) lf both A and R are true and R is the correct explanation of A
(b) If both A and R are true, but R is not the correct explanation of A
(c) If A is true, but R is false
(d) If A is false, but R is true

446) Assertion (A) : Microspheres were aggregates of organır biomolecules surrounded by film of water molecule.
Reason (R) : Coacervates lack definite membrane, but exhibit some life like characters
(a) lf both A and R are true and R is the correct explanation of A
(b) If both A and R are true, but R is not the correct explanation of A
(c) If A is true, but R is false
(d) If A is false, but R is true

447) Assertion (A) : Whales, bats, cheetah and humans, share similarities in the pattern of bone of forelimbs, although they perform different functions in them
Reason (R) : The same structures developed along different directions dur to adaptations to different needs.
(a) lf both A and R are true and R is the correct explanation of A
(b) If both A and R are true, but R is not the correct explanation of A
(c) If A is true, but R is false
(d) If A is false, but R is true

448) Assertion (A) : Ernst Haeckel supported the embryological similarities as an evidence of evolution
Reason (R) : The embryos of all vertebrates including humans develop a row of vestigial gill slits which are absent in adult vertebrates
(a) lf both A and R are true and R is the correct explanation of A
(b) If both A and R are true, but R is not the correct explanation of A
(c) If A is true, but R is false
(d) If A is false, but R is true

449) Assertion (A) : Whales and mammals share similarities in the pattern of bones of forelimbs.
Reason (R) : These organisma suggest occurrence of divergent evolution.
(a) lf both A and R are true and R is the correct explanation of A
(b) If both A and R are true, but R is not the correct explanation of A
(c) If A is true, but R is false
(d) If A is false, but R is true

450) Assertion (A) : Nature selects for fitness.
Reason (R) : The organism with better adaptive mechanisms and reproductive capacity get selected by nature.
(a) lf both A and R are true and R is the correct explanation of A
(b) If both A and R are true, but R is not the correct explanation of A
(c) If A is true, but R is false
(d) If A is false, but R is true

451) Assertion (A) : Variation due to mutation. recombination or gene flow results in changed frequency of genes and alleles in progeny
Reason (R) : This would results in speciation
(a) lf both A and R are true and R is the correct explanation of A
(b) If both A and R are true, but R is not the correct explanation of A
(c) If A is true, but R is false
(d) If A is false, but R is true

452) Assertion (A) : Hugo de Vries said mutations cause speciation
Reason (R) : Mutations are slow directional changes
(a) lf both A and R are true and R is the correct explanation of A
(b) If both A and R are true, but R is not the correct explanation of A
(c) If A is true, but R is false
(d) If A is false, but R is true

2 Marks 148 x 2 = 296

453) Attempt giving a clear definition of the term species.

454) Find out through internet and popular science articles whether animals other than man has self-consciousness.

455) List the two main propositions of Oparin and Haldane.

456) Write about the ancestry and evolution of bat, horse and human on the basis of a comparative study of their forelimbs. What are these limbs categorised as?

457) How does palaeontological evidence support evolution of organisms on Earth?

458) Write the technical term that describes each one of the following statements with reference to their evolution:
(a) Microbes developing resistance to antibodies in a much lesser time scale.
(b) Resemblance of varieties of placental mammals to corresponding marsupials in Australia.

459) What does the comparison between the eyes of Octopus and those of mammals say about their ancestry and evolution?

460) Name the ancestors of man based on the features given below:
(a) Human-like meat eater with 900 cc brain, lived in java.
(b) More human with brain size 1400 cc, lived in Central Asia, used hides and buried their dead.
(c) Human-like, vegetarian, with brain capacity between 650 cc and 800 cc.
(d) Man-like primate, that existed about 15 mya. Fossils found in Tanzania.

461) Choose two pairs of homologous structures from the following and mention why they are so called?
(a) Hearts of humans and monkeys.
(b) Eyes of Octopus and mammals.
(c) Thorns of Bougainvillea and tendrils of Cucurbits.
(d) Flippers of penguins and dolphins.

462) Categories the following pairs of examples as convergent or divergent evolutions:
(a) Eyes of Octopus and mammals.
(b) Wings of butterfly and birds.
(c) Tuber of sweet potatoes and potato.
(d) Thorns in Bougainvillea and tendrils in Cucurbits.

463) Divergent evolution leads to homologous structures. Explain with the help of an example.

464) Convergent evolution leads to analogous structures. Explain with the help of an example.

465) What is divergent evolution? Explain taking an example of plants.

466) Why are the wings of butterfly and birds said to be analogous organs? Name the type of evolution, the analogous organs are a result of.

467) How is Darwin's concept of evolution different from that of de Vries?

468) How do Darwin's finches illustrate adaptive radiation?

469) How is 'mutation' explained by Hugo de Vries different from the Darwinian variations?

470) What is adaptive radiation? How did Darwin explain this process of evolution?

471) How do Darwin and de Vries differ in their views on the mechanism of evolution of life on earth?

472) Give the sum total of all the allelic frequencies in a stable population. List any two factors which disturb the stability of a population. How does this disturbance affect the population?

473) State Hardy-Weinberg principle of genetic equilibrium. Knowing that genetic drift disturbs this equilibrium, mention what this disturbance in genetic equilibrium leads to.

474) How does 'fitness' of a population help in evolution?

475) How is genetic drift different from gene migration? Explain.

476) When we say 'survival of the fittest', does it mean that:
(a) those whose are fit only survive or
(b) those that survive are called fit? Comment.

477) 'Migration may enhance or blur the effects of selection. Comment.

478) Why is nascent oxygen supposed to be toxic to aerobic forms?

479) Explain the origin of universe.

480) How was the earth's atmosphere formed?

481) How did Louis Pasteur demonstrate that life comes only from pre-existing life?

482) Life originated from the earth's inorganic atmosphere in the past, but this no longer happens today. Give two reasons

483) What must have provided energy for the warmth for life to originate on primitive earth? Name the group of organisms first to release oxygen into the atmosphere.

484) Enumerate the conclusion made by A. Wallace from his studies on life forms.

485) Write the names of two dinosaurs that lived early in the history of earth and two others that lived little later.

486) Who proposed the biogenetic law? Who disapproved it? Why?

487) All vertebrate embryos show some similarities an early stage. Mention two such similarities. What do they indicate? Explain.

488) A chimpanzee can hold objects by its hands and an elephant by its trunk. Are these organs analogous or homologous? Give reasons in support of your answer.

489) Amongst pea tendrils, Opuntia spines, lemon thorn and Cucurbita tendrils, which ones are homologous structures? Why do you call them homologous?

490) What is artificial selection in terms of evolution? Name one plant that has been produced as a result of artificial selection.

491) Evolution is not a direct process, but a stochastive process, based on chance event(s) in nature. Justify.

492) Discuss, is evolution a process or the end result of a process.

493) What is the role of variation in evolution?

494) Describe Lamarck's theory of evolution.

495) Who discovered mutations? Name the plant he worked on.

496) Name the largest of the dinosaurs and mention two of its features.

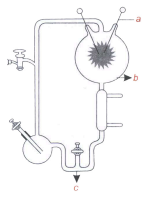
497) Mention two evolutionary features of mammals.

498) Name any four mammals that lived in South America before continental drift.

499) When and where did Australopithecus live? Mention their characteristics.

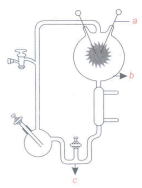
500) Discovery of lobefins is considered very significant by evolutionary biologists. Explain.

501) Name the scientist who had used the set-up shown below:



Write the purpose of 'a' in the set-up and the conclusion, the scientist arrived at.

502) The figure given below represents Miller's apparatus used for his experiment.



Name the chemicals found in the sample drawn from 'c'. How did this experiment support evolution?

503) When did earth and life appear? Give their sources.

504) Mention essential conditions for origin of life.

505) How did the original reducing atmosphere of primitive earth change?

506) In what ways the coacervates were inferior to eobionts?

507) What is a progenote?

508) Who was J.B.S. Haldane?

509) Explain the term biogenesis.

510) Miller performed an experiment by recreating in the laboratory the probable conditions of the atmosphere of primitive earth.
(i) What was the purpose of the experiment?
(ii) In what forms was energy supplied for chemical reactions to occur?
(iii) For how long the experiment was run continuously?

511) What were the sources of energy during chemical evolution on primitive earth?

512) What was S.W. Fox's contribution to the chemical theory of the origin of life?

513) Why are scientists searching for existence of life on other planets?

514) How do the movements of living and nonliving objects differ?

515) What is homoeostasis?

516) Adaptation and mutation are interlinked. which occurs first?

517) How can you explain the existence of analogous organs?

518) Why does the tadpole of frog resemble a fish?

519) Give an example of a fossil that shows an unaltered animal.

520) Mention any four details that can be inferred about organisms from their fossils.

521) What are metamorphic rocks? Give an example.

522) what was pangaea? When did it exist?

523) What are the two striking observations when different stages of embryos of different classes of vertebrates are studied comparatively? How does this study support evolution?

524) What is individual's role in the evolutionary process?

525) What is the source of variation in monoparental (asexual) reproduction?

526) Expalin the statement "natural selection really means differential reproduction".

527) What is a deme?

528) What is antibiotic resistance?

529) How does reproduction isolation arise?

530) Differentiate between aneuploidy and polyploidy.

531) Which variation form raw material of organic evolution?

532) How do natural selection and artificial selection differ.

533) Explain why D.D.T has now become ineffective against mosquitoes.

534) What do the terms prosimians and simians mean?

535) What is brachiation?

536) Who gave man the scientific name Homo sapiens? What does it mean? Which animals are regarded man's nearest relatives?

537) Give the position of man in mammals.

538) When and from which source the mammals and the primates originated?

539) Write down 4 important resemblances between apes and humans.

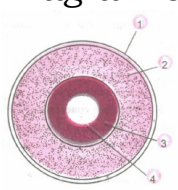
540) Name the fossil modern man and living modern man. How do they differ in cranial capacity.

541) Name the main stages in human evolution in order of their appearance.

542) What advantages man got over other primates by having erect posture and large brain.

543) Name the curvature in the human spine. Give their advantage.

544) Diagram of Earth (in section) is given. Answer the questions:



(a) Label the region marked as 1, 2, 3 and 4.
(b) Give thickness of the above four regions.
(c) Name important elements present in these region
(d) Give alternative name of central (core) part of the earth and that of mantle.
(e) Name the galaxy to which our solar system belongs.

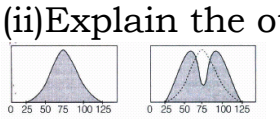
545) What are we referring to when we say 'simple organisms' or 'complex organisms'?

546) When was the earth formed? What were its conditions at that time?

547) How do fitness of population help in evolution?

548) How does analogous organ support the theory of organic evolution?

549) Refer the graph and answer the questions that follow.
(i)The graph depicts which type of natural selection?
(ii)Explain the other two effects/ types of natural selection.



550) (i) Select the homologous structures from the combinations given below :
(a) Forelimbs of whales and bats
(b) Tuber of potato and sweet potato
(c) Eyes of octopus and mammals
(d) Thorns of Bougainvillea and tendrils of Cucurbitta
(ii) State the kind of evolution they represent.

551) Rearrange the following in increasing order of evolution:Gnetales;Ferns;Zosterophyllum;Ginkgo.

552) Name any two forms of extinct reptiles that evolved from synapsids.

553) Is sweet potato analogous or homologous to potato tuber ? Give reasons to support your answer.

554) Explairf with the help of an example the type of evolution homology is based on ?

555) What is chance mutation ? Explain this phenomenon using application of D.D.T. as an example.

556) State the evolutionary relationship giving reasons between the thorn of Bougainvillea and tendril of cucurbit

557) Mention the contribution of S.L. Miller's experiments on Origin of Life

558) Write the Oparin and Haldane's hypothesis about the origin of life on earth. How does meteorite analysisfavour this hypothesis?

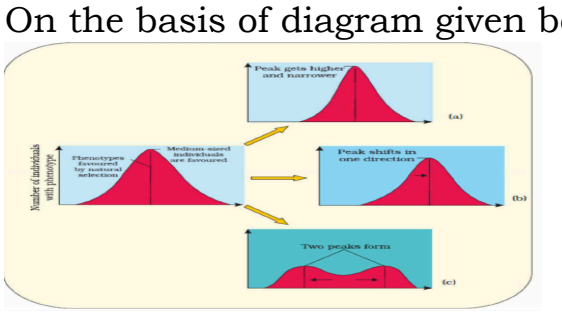
559) Name the first human like hominid. Mention his food habit and brain eapacity

560) Select two pairs from the following which exhibit divergent evolution. Give reasons for your answers.
(i) Forelimbs of cheetah and mammals
(ii) Flippers of dolphins and penguins.
(iii) Wings of butterflies and birds.
(iv) Forelimbs of whale and mammals.

561) Describe the mechanism of evolution as explained by Huge de vries.

562) What do these pictures (a) and (b) illustrate with reference to evolution?

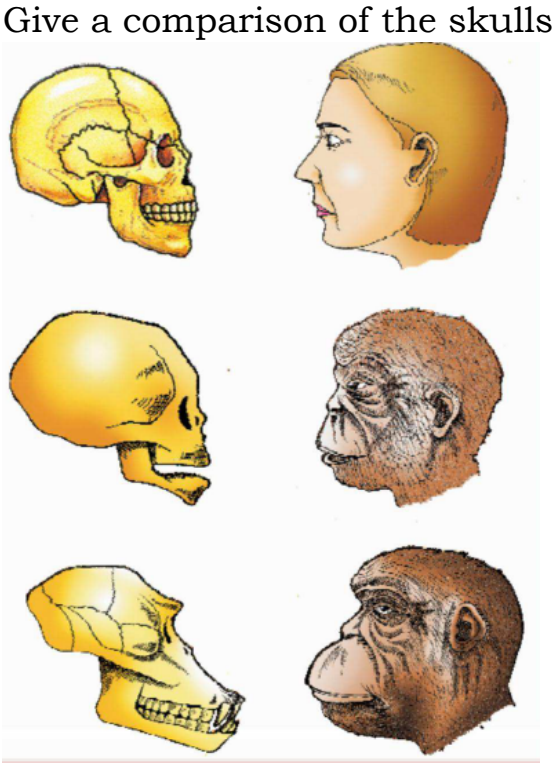
563) On the basis of diagram given below explain the different ways of natural selection.



564) Define the terms
1.Germplasm
2.Branching descent.

565) Write the formula to calculate allele frequency in future generations according to Hardy- Weinberg equilibrium

566) Give a comparison of the skulls of adult modern human being, baby chimpanzee and adult chimpanzee.



567) Sometimes Gene flow or Gene migration is harmful for a population why?

568) Penicillin was once called wonder drug as it could heal most of the bacterial infections. It is no longer used now. Suggest the possible reasons for this.

569) Explain fitness of a species as mentioned by Drawin?

570) Why Hardy-Weinberg equilibrium is not applicable for large population size.

571) Mention the evolutionary significance of the following organisms .
(i) Shrews
(ii) Lobefins
(iii) Homo habilis
(iv) Homo erectus

572) Mention one significant difference between ontogeny and phylogeny.

573) In a population which has achieved Hardy- Weinberg equilibrium, which two process will not occur.

574) Disruptive selection is rarest form of selection. Give reason.

575) Have you heard of modern synthetic theory of evolution. What are the drawbacks of mutation theory that could lead to formation of a new theory?

576) Give difference between gene frequency and gene pool.

577) Mention any three evolutionary features of mammals.

578) Name the gases that covered the early/primitive earth surface.

579) Evidences that evolution of life forms has indeed taken place come from many quarters. Name any four branches of biology that support or provide evidence for organic evolution.

580) Who was more man-like, between Dryopithecus and Ramapithecus?

581) Name the gases Miller used in his experiment on origin of life.

582) What do the forelimbs of whales, bats and cheetah with respect to evolution signify? Provide one such example from plants.

583) Describe convergent evolution, taking an example from plants.

584) How would the gene flow or genetic drift affect the population in which either of them happens to take place?

585) Name the four periods in the Palaeozoic era.

586) What was the important feature of the early atmosphere on earth?

587) 'The earliest organisms that appeared on the earth were non-green and presumably anaerobes' . Is the above statement correct? Give reason

588) Palaeontological evidence support the theory of organic evolution. Explain with an example.

589) Identify the following pairs as homologous or analogous organs.
(a) Sweet potato and potato.
(b) Eye of Octopus and mammals.
(c) Thorns of Bougainvillea and tendrils of Cucurbita.
(d) Forelimbs of bat and whale.

590) What are vestigial organs and how they support the theory of evolution?

591) Describe one example of adaptive radiation.

592) What do you understand by the concept of inheritance of acquired characters as proposed by Lamarck?

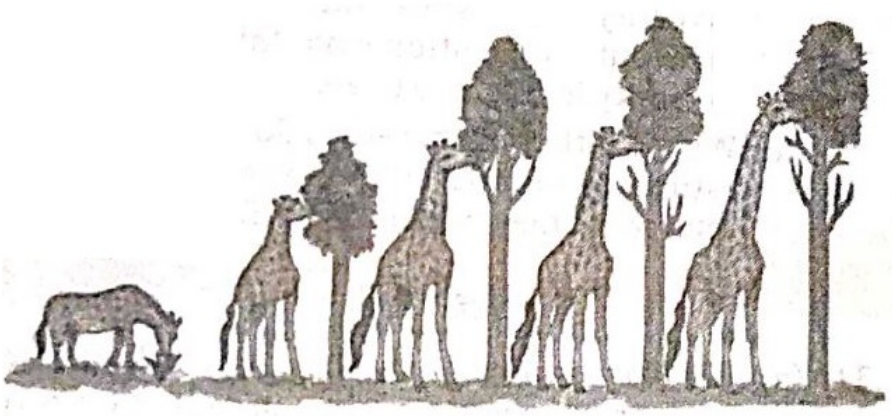
593) With the help of an algebraic equation, how did Hardy-Weinberg explain that in a given population the frequency of occurrence of alleles of a gene is supposed to remain the same through generations?

594) Who among the Dryopithecus and Ramapithecus was more man-like?

595) Try to trace the various components of human evolution (hint: brain size and function, skeletal structure, dictary preference, ctc.).

596) Writc the probable differences in eating habits of Homo habilis and Homo erectus.

597) Observe the picture given below. Name the naturalist and write the explanation given by him that evolution of life forms had occurred on the basis of this example.



598) The first living organism which appeared on the earth would have adopted which mode of nutrition?

599) A frog can arise from the moist soil. The above example can be related to which theory of origin of life?

600) About 65 mya, the dinosaurs suddenly disappeared from the earth. What is the most likely reason for this disappearance?

3 Marks 200 x 3 = 600

601) Explain antibiotic resistance observed in bacteria in light of Darwinian selection theory.

602) Describe one example of adaptive radiation.

603) Using various resources such as your school library or the internet and discussions with your teacher, trace the evolutionary stages of any one animal, say horse.

604) Find out from newspapers and popular science articles any new fossil discoveries or controversies about evolution.

605) Can we call human evolution as adaptive radiation?

606) With the help of any two suitable examples, explain the effect of anthropogenic actions on organic evolution.

607) State the theory of abiogenesis. How does Miller's experiment support this theory?

608) Anthropogenic action can hasten evolution. Explain with the help of a suitable example.

609) State the views of Oparin and Haldane on evolution. How does S.L. Miller's experiment Support their views?

610) (a) Explain the theory of abiogenesis.
(b) How did Miller demonstrate experimentally the chemical evolution that happened three billion years ago?

611) Branching descent and natural selection are the two key concepts of Darwinian theory of evolution. Explain each concept with the help of a suitable example.

612) Convergent evolution and divergent evolution are the two concepts explaining organic evolution. Explain each one with the help of an example.

613) Name and explain the principle, the given equation represents:
$p^2+2pq+q^2=1$

614) Explain convergent and divergent evolution with the help of one example of each.

615) (a) How does the Hardy Weinberg's expression ($p^2+2pq+q^2=1$) explain that genetic equilibrium is maintained in a population?
(b) List any two factors that can disturb the genetic equilibrium.

616) Explain adaptive radiation and convergent evolution by taking examples of some Australian marsupials and Australian placental mammals.

617) (a) How did Hardy-Weinberg explain that allelic frequencies in a population are stable and constant from generation to generation?
(b) Why does genetic equilibrium get disturbed in a population? Give reasons.

618) Australian marsupials and placental mammals are suitable examples of adaptive radiation and convergent evolution. Explain giving reasons.

619) (a) What is adaptive radiation?
(b) Explain with the help of a suitable example, where adaptive radiation has occurred to represent convergent evolution.

620) (a) Rearrange the following in an ascending order of evolutionary tree: reptiles, salamander, lobefins, frogs.
(b) Name two reproductive characters that make reptiles more successful than amphibians.

621) How did Darwin's theory of natural selection explain the appearance of new forms of life on earth?

622) The study of
(i) fossils of dinosaurs
(ii) forelimbs of Cheeta, bat and human
(ii) thorns of Bougainvillea and tendril of Cucurbita shows that evolution of life forms has indeed taken place on earth. Explain.

623) What is specification? Explain the role of natural selection in speciation.

624) Mention the three connotations of the theory of special creation.What did Miller-Urey'experiment represent?

625) Name the bones of the forelimbs that are common among whales, cheetah and human.

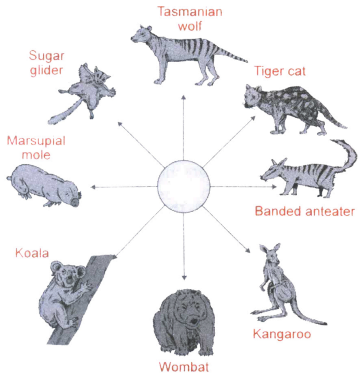
626) When did the following appear on the geological history?
(i) Invertebrates
(ii) Jawless fish
(iii) Sea weeds.

627) What are the periods in Palaeozoic era and name the plant group that appeared in each of them,

628) Mention the names of six groups of plants for which Psilophyton is the ancestor.

629) (i) When and where did Neanderthal man live?
(ii) What was his brain capacity?
(iii) Mention the advancements he showed over Homo erectus.

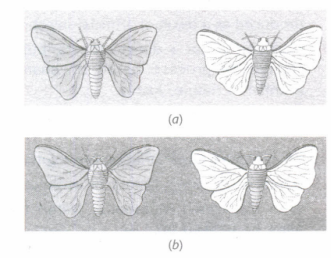
630)



(a) Mention the specific geographical region where these organisms are found.
(b) Name and explain the phenomenon that has resulted in the evolution of such diverse species in the region.
(c) Explain giving reasons the existence of placental wolf and Tasmanian wolf sharing the same habitat.

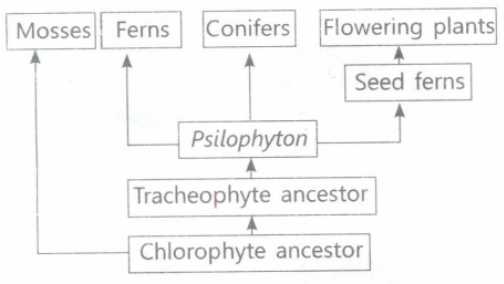
631) Draw observed a variety of beaks in the small black birds inhabiting Galapagos Islands. Explain what conclusions did he draw and how.

632) Explain the increase in the numbers of melanic (dark-winged) moths in the urban areas of post-industrialisation period in England.



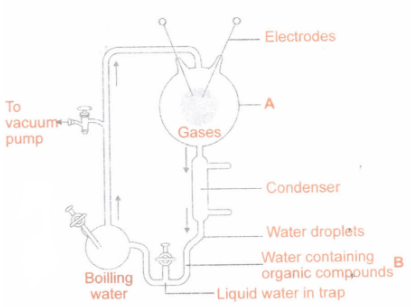
What do these picture 'a' and 'b' illustrate with reference to evolution?Explain.

633) Study the schematic representation of evolutionary history of plant forms given below and mention:



(a) The plant form ferns and conifers are most related to.
(b) The nearest ancestors of flowering plants.
(c) The most primitive group of plants.
(d) Common ancestry of psilophyton provides to.
(e) The common ancestry of psilophyton and seed ferns.
(f) The common ancestors of mosses and trachephytes.

634) Given below is a diagrammatic representation of the experimental set-up used by S.L. Miller for his experiment:



(a) Write the names of different gases contained and the conditions set for the reaction in the flask 'A'.
(b) State the type of organic molecule he collected in the water at 'B'.
(c) Write the conclusion he arrived at.

635) Darwin observed a variety of beaks in the small black birds inhabiting Galapagos Islands. Explain what conclusions did he draw and how.

636) List a few modern day animals and from internet like to corresponding ancient fossil. Name both.

637) The evolutionary story of moths in England during industrialization reveals, that "evolution is apparently reversible". Clarify this statement.

638) Comment on the statement that "evolution and natural selection are end result of consequences of some other processes but themselves are not processes.

639) State and explain any three factors affecting allele frequency in populations.

640) Gene flow occurs through generations. Gene flow can occur across language barriers in humans. If we have a technique of measuring specific allele frequencies in different population of the world, can we not predict human migratory patterns in pre-history and history? Do you agree or disagree? Provide explanation to your answer.

641) How do you express the meaning of worlds like race, breed cultivars or variety?

642) Enumerate three characteristic criteria for designating a Mendelian population.

643) Why are theories of special creation and spontaneous generation not accepted?

644) How were galaxies formed?

645) How many galaxies are present in the universe? Do all the stars that we can see with naked eye belong to our galaxy? Does earth is a part of solar system?

646) Where did life originate? Explain.

647) Write the composition of primitive atmosphere according to the prevailing two views.

648) Differentiate primitive atmosphere and present day atmosphere.

649) State the role of sun in the origin of life.

650) What was experimental model of S.W.Fox?

651) What are coacervates?

652) List characteristics of coacervates.

653) Differentiate coacervate droplets and protenoid microsphere.

654) Briefly describe formation of first living cell.

655) Write the contribution of Urey and Miller.

656) Differentiate between chemical evolution and organic evolution.

657) Which are primitive heterotrophs or autotrophs? Give reasons.

658) What is evolution?

659) What are analogous organs? Give examples.

660) Define molecular homology.

661) What are vestigial organs? Give examples.

662) Write significance of vestigial organs.

663) Write short note on atavism. Give examples of atavism.

664) Define connecting link and give its one example from vertebrates.

665) Give a few examples of connecting links.

666) What is the significance of connecting links?

667) How does taxonomy support the evolution?

668) What is the physical method of determining of age of fossils?

669) Differentiate fossil and living fossil.

670) Point out reptilian and avian features of Archaeopteryx.

671) If you discover a fossil of a bird with scales on the body and teeth in the beak, what would you conclude about its position in the animal kingdom?

672) Why is Archaeopteryx called a connecting link between reptiles and birds?

673) Differentiate connecting link and missing link.

674) How has the study of fossils helped in convincing scientists that organisms have come into existence through evolution?

675) "Mammals and birds have evolved from reptiles." In what way does a comparative study of their embryology establish the validity of this statement?

676) (i) Give any two striking similarities in the structure of embryos of all the vertebrates.
(ii) What is the significance of such similarities in the significance of such similarities in the concept of organic evolution?

677) How do temporary embryonic structures support evolution?

678) What is mass extinction?

679) What are the factors for mass extinction?

680) On which concept the Hypothesis of continental drift is based?

681) What is plate tectonics?

682) What is continental drift? What is its significance?

683) What do you mean by Neo-Lamarckism?

684) Distinguish between Lamarck Theory and Darwin Theory.

685) Bring out the common point in the Lamarckism and Darwinism.

686) Who reached at the same ideas about evolution as Darwin?

687) Describe De Vries Mutation theory.

688) List the main drawbacks of De Vries theory of mutation.

689) What is the main difference between Darwin's theory of natural selection and De Vries mutation theory?

690) Where did Darwin err in his theory of the "Origin of Species" through natural selection?

691) What is new about Neo-Darwinism?

692) Why is the frequency of sickle cell anaemia more in the malaria prone areas?

693) What is differential reproduction?

694) What are the differences between Darwinism and Neo-Darwinism?

695) How is artifical selection different from natural selection?

696) Discuss the importance of artificial selection in the derivation of the concept of natural selection.

697) What are variations?

698) Name different types of variations.

699) Discuss the role of variations in evolution.

700) What is reproductive isolation?

701) Select the homologous structures from the combinations given below:
(a) Fore limbs of whale and bats
(b) Tuber of potato and sweet potato
(c) Eyes of Octopus and Mammals
(d) Thron of Bougainvillea and Tendril of Cucitrbits .

702) How did Darwin explain the existence of different varieties of finches on Glapagos Islands?

703) "A population has been exhibiting genetic equilibrium? Answer the following with regard to the above statement.
(i) Explain the above statements.
(ii) Name the underlying principle.
(iii) List any two factors which would upset the genetic equilibrium of the population.
(iv) Take up any one such factor and explain the gene pool will change due to that factor.

704) Study the figure showing artificial breeding of plants from Brassia oleracea and label the parts A-F.

705) Kishore and Satish went to see a picture "Jurassic Park" in a local cinema hall. The picture deals with gaint extinct reptiles of that era with large dagger like teeth, some were carnivorous while the other few were herbivorous and a few omnivorous.
They had some questions and discussed with their friends.
(i) Name the giant extinct reptiles?
(ii) In which era and period of geological time scale, they deminated the earth?
(iii) Name the phenomenon of extinction of these reptiles on large scale.
(iv) What are the reasons of large scale deaths and distruction of these reptiles?

706) List the condition found on the primitive earth.

707) What is exobiology? Do you think life is present on other planets?

708) Make a list of the theories put forward for the origin of life?

709) What is palaeontology?

710) What is atavism?

711) **Fill in the blanks.**
(a) Atmosphere of the primitive earth was highly ..... while that of the present earth is highly .....
(b) Free ..... gas was ..... in the primitive earth's atmosphere.
(c) The first organism were presumably ... and ... some of which might have evolved into anaerobic autotrophs.
(d) About 4-6 billion years ago, the Earth consisted of a solid ..... and a gaseous .....
(e) In the primaeval Earth, the organic molecules accumulated in ..... because their .....was extremely slow in the absence of any life or enzymatic catalysis.

712) Match the items in column I with appropriate items (one or more) of column II.

Column I	**Column II**
(i) Connecting link between annelids and arthropods	(a) Impression or imprints of past animals and plants in the sedimentary rocks.
(ii) Vestigial organ in man.	(b) Peripatus
(iii) Fossils	(c) Auricular muscles
(iv) Extinct bird	(d) Seymouria
(v) Missing link between amphibian and reptiles.	(e) Coccyx (tail bone)
	(f) Archaeopteryx
	(g) Vermiform appendix

713) View the figure and fill in the following blanks :

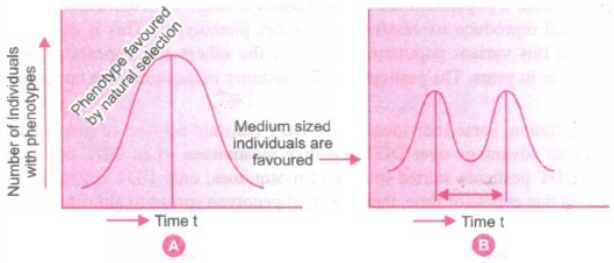
(i) About …… years ago, present day continents formed a single large, irregular land mass called ……
(ii) As the continents drifted away, the …… separated them forming …… to free intercontinental movements of organisms.
(iii) The earth has been divided into ……. biogeographical realm namely, Australian, Neotropical, ……., Oriental, palearctic and Nearctic.
(iv) Biogeographical realms were first proposed by P.L. Sclater for specific group of animals called …… and were later recognized by A.R. Wallace for …….
(v) ……. had a voyage to Galapagos group of islands and later gave concept of ……..

714) **Fill in the blanks :**
(i) Genetic basis of adaptation was demonstrated by …… in bacteria with help of …… experiment.
(ii) ……. speciation takes place with geographic isolation while ……. speciation occurs without geographic isolation but by ecological or other isolations.
(iii) Multiplication speciation and phyletic speciation are also called …… and ……. respectively.
(iv) Chance elimination of the genes of certain traits in the event of migration or death of section of population by natural calamity is called …….
(v) Seperation of groups of related organisms by physical barriers (e.g. seas, mountain, desert, river etc.) is called …… isolation while failure of two species to interbreed because they breed at different times (seasons) of the year is called ……. isolation.

715) Match the items given in Column I with appropriate items (one or more) of column II.

Column I	**Column II**
(i) Interspecific sterility	(a) Peppered moth
(ii) Separation of group of related organism by physical barriers	(b) Allopatric speciation
(iii) Differences in size or structure of genitalia between species	(c) Genetic isolation
(iv) Natural selection	(d) sympatric speciation
(v) Gradual speciation	(e) Sickel cell anaemia
	(f) Geographical isolation
	(g) Mechanical isolation

716) Study the given figures (a) and (b) and answer the questions given below:



(i) Under the influence of which type of natural selection would graph (a) becomes like graph (b)?
(ii) What could be the likely reasons of new variations arising in the population?
(iii) Who suggested natural selection as a mechanism of evolution?

717) How did Louis Paster successfully demolish the popular theory of spontaneous generation?

718) In 1950s, there were hardly any mosquitoes in Delhi. The use of the pesticide DDT on standing water killed their larvae. It is believed that now there are mosquitoes because they evolved DDT resistance through the interaction of mutation and natural selection. Pointwise state in a sequence how that could have happened?

719) State in what ways Stanely Miller simulated the conditions of:
(i) primitive atmosphere on earth.
(ii) energy source at the time of origin of life, and
(iii) formation of organic molecules of life to prove the theory of chemical evolution?

720) Can the host-parasite relationship provide evidence for evolution? Explain.

721) Australia has egg-laying and pouched mammals that occur nowhere else. How can it be explained by evolutionists?

722) How do closely related species of alligators, at present, occur only in South-eastern United States and Eastern China? Explain.

723) Name the specific term being used for the following statements:
(a) The chance elimination of the genes of certain traits when a section of population migrates or dies of natural calamity is referred to as _____.
(b) Change in the morphology and number of chromosomes at times is referred to as_____.
(c) A small group of human being leave their homes to find a new settlement. This results in the formation of a different genotype in the settlement. It is called_____.

724) Give reasons for the following statements:
(a) Placental wolf and Tasmanian wolf exist sharing the same habitat.
(b) Special kind of evolution has brought the similarity as seen in fins of fishes and flippers of dolphins Name the kind of evolution also.
(c) Study of fossils provide us direct and most reliable evidences of evolution.

725) What kind of evolution has brought similarity in the following:
(i) Placental cat and a marsupial cat
(ii) Fishes and whales
(iii) Darwin's finches

726) We sometimes find the existence of following structures in human beings:
(i) Occurrence of short tail in some babies.
(ii) Presence of additional mammae in two rows down the front of the body of some persons
(iii) Power of moving pinna, or
(iv) Presence of very long and dense hair on the body.
Why does this happen in such persons? Also, name the phenomenon involved.

727) If origin of life is in progress in any other planet, what would be the condition there ?

728) Explain adaptive radiation with the help of a suitable example.

729) (i) Explain adaptive radiation with the help of suitable example.
(ii) Give an example where more than one adaptive radiations heve occurred in an isolated geographical area. Name the type of evolution your example depicts and state why it is so named.

730) Explain the antibiotic resistance observed in bacteria in light of Darwinian selection theory

731) While creating and the presence of variation is directionless, natural selection is directional as it is in the context of adaptation.comment

732) A population is exhibiting genetic equilibrium answer the following with regard to this statements.
(i)Explain the above statements
(ii)Name the underlying principle.
(iii)Name any two factors which could upset the genetic equilibrium(i.e allele frequency) of the population.

733) Explain artificial selection in terms of evolution.

734) The scientists believe that evolution is geadual.But extinction part of evolutionary story are sudden,abrupt and group specific comment whether a natural disaster can be the cause for extinction of species.

735) Trace the evolutionary stages of horse

736) Differentiate between homology and analogy. Give one example of each.

737) Differentiate between divergent and convergent evolution. Give one example of each.

738) How do homologous organs represent divergent evolution? Explain with the help of a suitable example

739) Describe the experiment that helped Louis Pasteur to dismiss the theory of spontaneous generation of life

740) Explain parasitism and co-evolution with the help of one example each.

741) "Post-industrilization, the population of melanised moth increased in England at the expense of white-winged months." Provide explanations.

742) (a) State Oparin-Haldane's hypothesis.
(b) How does S.L. Miller's experiment supports it?

743) (a) A parasite has toadapt to be able to live in a host. Write the various parasite adaptations
(b) Mention an adaptive feature exhibited in brood parasitism in Koel and Crow.

744) Co-evolution is a spectacular example of mutualism between an animal and a plant. Describe co-evolution with the help of an example.

745) (a) What are fossils? How are they an evidence for evolution?
(b) 'Anthropogenic action can lead to evolution." Explain with the help of an example.

746) How can evolution by natural selection be explained by melanised moths before and after industrialisation in England?

747) Refer to the figure given below and answer the questions that follow:

Wolf

Tasmanian Wolf

(a) Recognize and explain the process by which Tasmanian wolf evolved.
(b) Give one example of an animal that has evolved along with Tasmanian wolf.
(c) Compare and contrast the two animals shown.

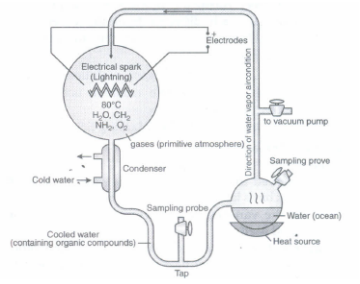
748) How did industrialization playa role in Natural selection of light and dark coloured moth in England?

749) What do you infer from the resemblance between flying squirrel and flying phalanges with reference to their evolution.

750) How does the study of fossile support evolution? Explain.

751) Explain co-evolution with reference to parasites and their hosts. Mention any four special adaptive features evolved in parasites for their parasitic mode life.

752) A student was simulating Urey and Millers experiment to prove the origin of life. The set up used by the student is given



(a) Find out the reasons why he could not get desired results?
(b) What conclusion was drawn by Urey and Miller through this experiment?
(c) Compare the conclusion drawn with the theory of spontaneous generation.

753) (a) Explain adaptive radiation with the help of a suitable example.
(b) Cite an example where more than one adaptive radiation have occurred in an isolated geographical area. Name the type of evolution your example depicts and state why it is so named.

754) Name the scientist who influenced Darwin and how?

755) Evolution is a change in gene frequencies in a population in response to changes in the environment in a time scale of years and not centuries. Justify this statement with references to DDT. How does the theory of Hugo de Vries support this?

756) If the origin of life is improcess in any planet other than the earth, what would be the conditions prevailing over there?

757) (i) Give two examples of evolution assisted by activities of man.
(ii) What is such evolution called as?

758) Krishna had an acute pain in his last molar tooth. He went to his family Doctor for check up. The doctor advised him to get it extracted. But his younger sister objected to it saying that it is wisdom tooth which seems to be responsible for his IQ. However Krishna followed the doctor's advise and asked the doctor to remove it so that he may get rid of the dental pain.
Answer the following questions based on the above information.
(i) Will Krishna not be able to pass in the examination?
(ii) Why do we have organs which are of no use to us?
(iii) What values are exhibited by Krishna?

759) Neha, along with her classmates escorted by her class biology teacher visited a zoo where on watching cheetah she wondered as to how he uses his forelimbs for running, while the same forelimbs in bats are used for flying and in whales for swimming. She wanted to know more about it & therefore asked her teacher about it. Her teacher explained her in details as to how the forelimbs got modified in different groups of organisms in relation to their different functions.
Answer the following questions on the basis of above information:
(i) What are such organs called?
(ii) Cite an example of such organs in plants.
(iii) What led to the origin of such organs?
(iv) What are the values exhibited by Neha?

760) The science students visited the museum along with their Biology teacher where they saw a number of fossils of plants and animals. Their teacher told the students that the fossils are Significant in that they provide good evidences of evolution.
Answer the following questions:
(i) What are fossils?
(ii) How do they provide evidences of evolution?
(iii) What values are exhibited by teacher?

761) What does Hardy-Weinderg principle of equilibrium indicate? List any two factors that could alter the alteration. What would such an attestation lead to?

762) Explain the interpretation of Charles Darwin when he observed a variety of small black birds on Galapagos Island.

763) What does the following equation represent? Explain. $p^2 + 2pq + q^2 = 1$

764) What is adaptive radiation? When an adaptive radiation be referred to as convergent evolution? Give an example?

765) Describe the three different ways by which Natural selection can affect the frequency of a heritable traits in population.

766) (a) State Hardy-Weinberg principle. Name any two factors which affect it.
(b) Draw a graph to show that natural selection leads to directional change.

767) How does industrial melanism support Darwin's theory of Natural Selection? Explain.

768) Name and explain the evolutionary concept represented in the illustration given below:

769) According to Darwinian theory the rate of appearance of new forms is linked to their life cycles. Explain

770) In a certain population the frequency of three genotypes is as follows:

Genotype:	BB	Bb	bb
Frequency:	36%	48%	16%

What would be the likely frequency of the Allele B & b.

771) Differentiate between gene frequency and gene pool.

772) What do you understand by missing links? Explain giving examples.

773) When and where did Neanderthal man live? What was his brain capacity? Mention the advancements he showed over Homo erectus?

774) Mention the three connotations of the theory of special creation. What did Miller-Urey experiment represents?

775) Refer to the figure given below and answer the following questions

(i) Identify the process by which Tasmanian wolf came into evolution.
(ii) Define the process identify in (i).
(iii) Apart from marsupials this process was also observed in which other organism?

776) $p^2 + 2pq + q^2 = 1$ Explain this algebraic equation on the basis of Hardy- Weinberg's principle.

777) Write the characteristics of Ramapithecus, Dryopithecus and Neanderthal man.

778) Vicky's mother was using the same mosquito repellent cream from last six years. She was regularly complaining that this cream has no effects on mosquitoes now, Hearing this, Vicky advised his mother to change the cream as regular usage has led the mosquitoes to develop resistance against it. His mother changed the cream and could notice its effect on mosquitoes.
(i) Explain how mosquitoes were not affected by the previous cream?
(ii) On what factors, Darwin's theory was based?
(iii) Can you relate this incident to Darwin's concept? How?
(iv) Identify the values shown by Vicky.

779) Complete the following sentences given below:
(i) The first mammals arose along with _____.
(ii) The direct ancestor of modern man is _____.
(iii) Primitive man who used stones to produce fire is _____.

780) State the contribution of Louis Pasteur in understanding the origin of life on earth. Explain the procedure he followed to arrive at his conclusion.

781) State the hypothesis proposed by Oparin and Haldane. How was it experimentally proved by S.L. Miller? Explain.

782) Write in what context did Darwin use the terms 'fitness', 'survival' and 'selection', while elaborating on the mechanism of evolution.

783) Explain divergent evolution with two examples.

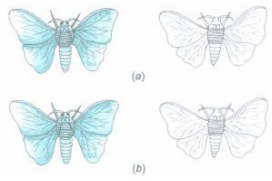
784) Explain convergent evolution with the help of two examples.

785) (a) Differentiate between analogous and homologous structures.
(b) Select and write the analogous structures from the list given below:
(i) Wings of butterfly and birds.
(ii) Vertebrate hearts.
(iii) Tendrils of Bougainvillea and Cucurbita.
(iv) Tubers of sweet potato and potato.

786) Taking the example of white-winged moths and dark-winged moths of England in pre and postindustrialised era, explain evolution by natural selection.

787) How did industrialisation playa role in natural Selection of light and dark-coloured moth in England?

788) In England, during the post-industrialised period, the count of melanic moths increased in urban areas, but remained low in rural areas. Explain.

789) 

What do these pictures (a) and (b) illustrate with reference to evolution? Explain.

790) Excessive and continuous use of pesticides has resulted in evolution of some new species of pests. Explain wItat must have led to this. What is this type of evolution called ?

791) How can Hardy-Weinberg equilibrium be affected? Explain giving three reasons.

792) What is disturbance in Hardy-Weinberg genetic equilibrium indicative of? Explain how it is caused

793) (i) Write two differences between Homo erectus and Homo habilis.
(ii) Rearrange the following from early to late geologic periods: Carboniferous, Silurian, Jurassic.

794) Rearrange Ramapithecus, Australopithecus and Homo habilis in the order of their evolution on the Earth. Comment on their evolutionary characteristics.

795) (a) Explain the significance of the experiment carried out by SL Miller. Name the scientists whose hypothesis prompted him to carry out this experiment
(b) How does meteorite analysis favour this hypothesis?

796) Give a brief account of origin of earth.

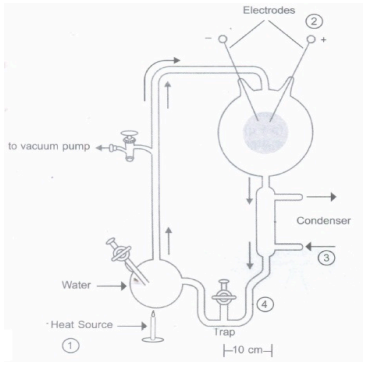
797) Analogous organs are a result of convergent evolution whereas homologous organs are a result of divergent evolution. Justify with the help of suitable example for each

798) Industrial melanism in England after 1850 is an excellent example of natural selection. Explain how?

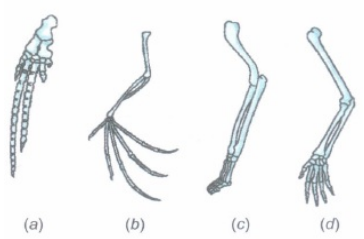
799) How do new species arise according to de Vries mutation theory of organic evolution?

800) Mention Darwin's observations made on finches during his visit to Galapagos Islands. Write the explanation given by Darwin on his observations.

Case Study Questions 17 x 4 = 68

801) 

(a) State the hypothesis which S.L. Miller tried to prove in the laboratory with the help of the set up given above.
(b) Name the organic compound observed by him in the liquid water after running the above experiment.
(c) A scientist simulated a similar set up and added CH_4, NH_3 and water vapour at 800°C.
Which important component is missing in his experiment?

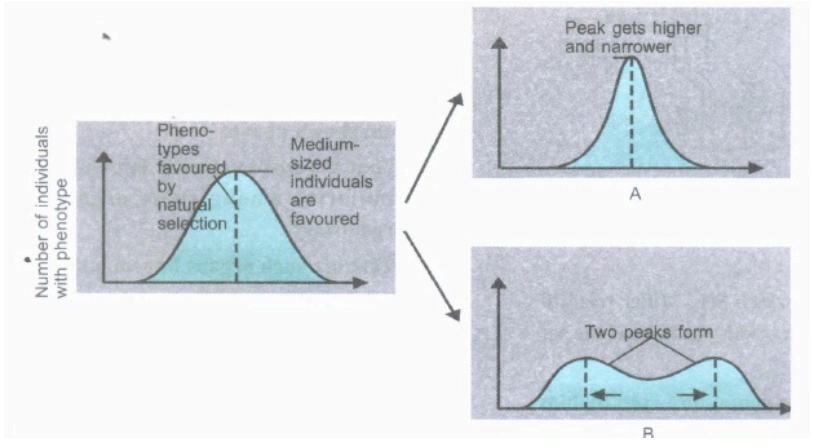
802) 

The forelimbs of four vertebrates are shown in the diagram shown above.
(a) What type of evolution is exhibited by the similarity among these organs in those organisms?
(b) What are such organs known as?
(c) What do they indicate?

803) In 1950s, there were hardly any mosquitoes in Delhi. The use of the pesticide, DDT on standing water killed their larvae. But, now there are mosquitoes because they have evolved DDT-resistance through the interaction of mutation and Natural selection. State in a sequences, how that could have happened.

804) When the reptiles came down, mammals took over the earth. There were mammals in South America, which resembled some of the modern day mammals. But due to continental drift, they disappeared whereas the pouched mammals of Australia flourished and evolved into the various forms of pouched mammals that we see today.
(a) Mention two characteristic features that were the reasons for the successful existence of mammals on earth.
(b) Why did the continental drift affect the mammals of South America and Australia, differently.

805) According to Hardy-Weinberg principle, the allele frequencies in a population are stable and remain constant through generations. When the frequency differs from the expected values, the difference indicates the extent (direction) of evolutionary change. Disturbance in the genetic equilibrium or Hardy-Weinberg equilibrium in a population can be interpreted as resulting in evolution.
(a) Write the algebraic equation representing Hardy-Weinberg equilibrium.
(b) List the five factors that affect the genetic equilibrium.

806) 

Identify and describe the type of Natural selection operating in A and B, respectively.

807) Fill in the blanks in the following statements, with the time period [as million years ago (mya)] of evolution of various life forms on the earth.
(a) The first non-cellular forms of life, i.e., giant organic molecules like RNA, proteins, etc. could have originated _____.
(b) About _____ the first cellular forms of life appeared on the earth; slowly single-celled forms became multicellular forms.
(c) By the time of _____ invertebrates were formed.
(d) Jawless fish probably ev-olved around _____.
(e) Sea weeds and a few plant species existed probably around_____ ; the first organisms that invaded land were plants.
(f) About _____ fish with stout and strong fins that could move on land and go back to water were present; they were called lobefins.

808) Read the passage and answer the questions that follow:

(i) Fish with stout and strong fins existed about 350 mya; they could move on land and go back into water.

(ii) Reptiles dominated the earth for about 200 million years.

(iii) Some land reptiles went back into water and evolved into fish-like reptiles.

(iv) The land reptiles of that period were dinosaurs; they disagpeared suddenly from the earth.

(a) Name the fish that could move on land and go back into water. What did they evolve into?

(b) Give an example-ofthe fish-like reptiles. Mention the time period when they were evolved.

(c) Name the largest of the dinosaurs. When did the dinosaurs suddenly disappeared?

809) A few stages and their respective time period in the evolutionary history of human beings are mentioned in the flow-chart given below. Answer the questions that follow, as asked.

15 mya – Primates walking like gorillas and chimpanzees existed. (a)

↓

3-4 mya – Man like primates walked in East Africa. Fossils of their bones were discovered. (b)

↓

2 mya – This ancestor lived in East African grasslands; they essentially ate fruits (c)

↓

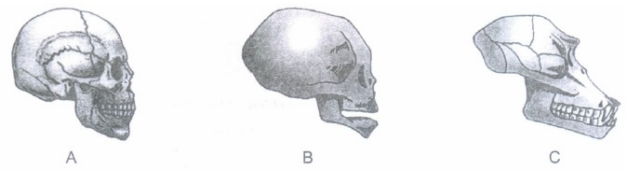
1.5 mya – This hominid had a brain size of about 900 cc; he probaly ate meat. (d)

(a) Name the two primates.

(b) Name two places where the fossils were discovered.

(c) Name the ancestor.

(d) Name the hominid.

810) 

(a) Identify the respective animal to which each of the following skulls, A, Band C belongs. Which two among them resemble more closely?

(b) Name the (I) ape-like and (ii) man-like primates that existed 15 million years ago.

811) Read the following passage and answer the questions given below.

Oparin and Haldane in their theory of chemical evolution suggests that the first life form of life came from pre-existing, non-living organic molecules such as proteins, RNA, etc. Further, Stanley Miller and Harold Urey in 1953 performed an experiment to demonstrate that UV radiations or electrical discharges can produce organic compounds.

(i) The ratio in which CH_3, NH_2, and H_2 were taken in a closed flask was

(a) **(b)**

2:2:1 **1:2:2**

(c) **(d)**

2:1:2 **2:1:1**

(ii) What did they observe in the flask in their experiment as a result?

(a) Formation ofsugar

(b) Formation of amino acids

(c) Formation of hormones

(d) Formation of nitrogen bases

(iii) The Miller-Urey experiment supports which theory out of these?

(a) Theory of special creation

(b) Theory of panspermia

(c) Theory of abiogenesis

(d) Both (a) and (c)

(iv) The mixture of CH_4, NH_3, H_2 and water vapour in a flask were kept at a temperture of

(a) **(b)**

600°C **800°C**

(c) **(d)**

850°C **1000°C**

(v) The conditions in the flask were set similar to that of

(a) present atmosphere

(b) environment temperature

(c) primitive atmosphere

(d) None of the above

812) Read the following passage and answer the questions given below.
Archaeopteryx (ancient wing) lived around 151 million to 149 million years ago during the late stages of Jurassic era. The first Archaeopteryx skeleton, its head and neck was unearthed near Langenaltheim, Germany. The evolutionary studies revealed that Archaeopteryx was most notable for its well developed asymmetrical flight-feathers, it had jaws with sharp teeth, three-fingered claws, a long bony tail and hyper extensible second toes. It is often known as the transitional fossil between dinosaurs and modern birds due to its blend of avian and reptilian features.
(i) The remains of hard parts of life forms found in rocks, deep sediments, ocean beds, which help in the study of evolutionary progress are

(a) connecting links **(b) fossils**

(c) sedimentary rocks **(d) coprolites**

(ii) A reptilian character of Archaeopteryx could be

(a) presence of beak

(b) scales on outer body

(c) forelimbs modified to wings

(d) feathers on bod

(iii) Identify the incorrect statement w.r.t. Archaeopteryx.

(a) It is a connecting link between amphibians and fishes

(b) They existed during the late stages of Mesozoic era

(c) Bones in Archaeopteryx were pneumatic

(d) All ofthe above

(iv) What is the benefit ofstudying connecting links?
(v) Archaeopteryx is considered as a missing link because

(a) it has feathers

(b) a tail is present

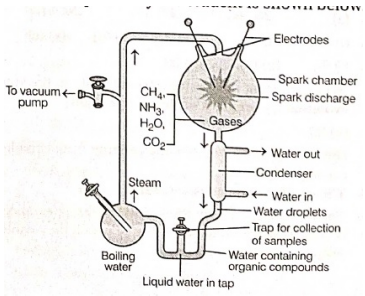
(c) it is a fossil found in rocks

(d) homnodont teeth were found in jaws

813) Read the following passage and answer the questions given below.
On a visit to museum, Riya was stunned to see that forelimbs of humans and whale possess same structure. She also found that wings of butterfly and birds are not anatomically similar. Being confused, Riya asked the museum guide to comprehend this unusual fact to her.
(i) What type of structure does forelimbs of human and whale called? How they are developed?
(ii) Why wings of butterfly and birds are not similar?
(iii) Give an example of structures in plants, similar to wings of butterfly and birds.
(iv) Do plants contain structures similar to forelimbs of human and whale? If yes, give example.
(v) How does the Linnaean system of classification group organisms into the same category?

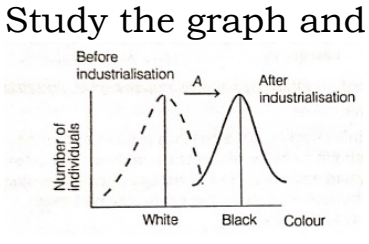
814) Read the following passage and answer the questions given below.
While studying an article on human evolution, Ram got to know about the common ancestors of human and apes. He found that during the course of human evolution, the brain size had been increased constantly.
(i) Name the earliest man-like and ape-like fossils.
(ii) Name the first ape man and the first hominid of humnan evolution.
(iii) What was the brain capacities of first hominid and Homo erectus?
(iv) When did the Cro-Magnon man appeared in human evolution?
(v) What pattern is evident in cranial capacity of modern man as compared to that of Homo sapiens fossilis?

815) A student was simulating Miller and Urey's experiment to prove the origin of life. The set up used by the student is shown below.



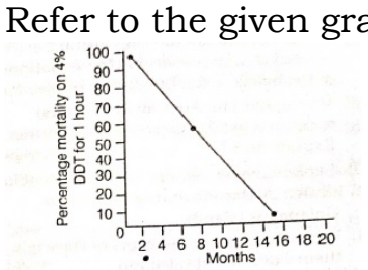
(i)Find out the reasons why he could not get desired results ?
(ii) What conclusion was drawn by Urey and Miller experiment?
(iii) What was the conclusion drawn by the theory of spontaneous generation?
or
(iii) Stanley Miller and Harold C Urey performed an experiment by recreating in the laboratory the probable conditions of the atmosphere of the primitive earth. For how long the experiment was run continuously?

816) Study the graph and answer the questions that follows.



(i) What does A represents in the above graph. When this type of condition occurs?
(ii) Describe the phenomenon showing in the above graph.
(iii) What proves the above process as observed in pepper moths.
or
(iii) How would you link the above study with natural selection?

817) Refer to the given graph and answer the following questions.



(i) What does the above graph shows?
(ii) Why DDT has now become almost ineffective against mosquitoes?
(iii) How do insects develop resistance to pesticides in terms of natural selection?
or
(iii) Why is the evolution of pest resistance an example of natural selection caused by humans?

5 Marks 59 x 5 = 295

818) Try to trace the various components of human evolution. (Hint: brain size and function, skeletal structure, dietary preference, etc.)

819) List 10 modern-day animals and using the internet resources link it to a corresponding ancient fossil. Name both of them

820) Practise drawing various animals and plants.

821) (a) List the various causes of variations in the progeny of a population.
(b) Describe the three different ways in which natural selection operates in nature, with regard to organic evolution.

822) Write and explain the conclusion Darwin arrived at, after observing the variations seen in the beaks of finches during his sea voyage.
(b) Marsupials and Australian placental mammals exhibit convergent evolution. explain how.

823) (a) How does Hardy-Weinberg equation explain genetic equilibrium?
(b) Describe how this equilibrium gets distributed which may lead to founder effect.

824) (a) Name the primates that lived about 15 million years ago. List their characteristic features.
(b) (i) Where was the first man-like animal found?
(ii) Write the order in which Neanderthals, Homo habilis and Homo erectus appeared on the earth. State the brain capacity of each one of them.
(iii) When did modern Homo sapiens appear on this planet?

825) (a) Natural selection operates when nature selects for fitness. Explain.
(b) The rate of appearance of new forms is linked to the life span of an organism. Explain with the help of a suitable example.

826) (a) Explain taking one example of vertebrate anatomy, that evolution of life has occurred on earth.
(b) 'Nature selects for fitness'. Explain with suitable example.

827) Explain in detail the different theories of origin of life.

828) Show that Darwin's natural selection is based on factual observations, with an example for each.

829) Name the law that states that the sum of allelic frequencies in a population remains constant. What are the five factors that influence these values?

830) Explain divergent evolution in detail. What is driving force behind it?

831) You have studied the story of Pepper moths in England. Had the industries been removed, what impact would it have on the moth population? Discuss.

832) Two organisms occupying particular geographical area show similar adaptive strategies. Taking examples, describe the phenomenon.

833) We are told that evolution is a continuing phenomenon for all living things. Are humans also evolving? Justify your answer.

834) Had Darwin been aware of Mendel's work would have been able to explain the origin of variations. Discuss.

835) State the hypothesis of Oparin and Haldane about the primeval Earth condition. What do you understand by Haldane's hot, dilute soup? State its significance.

836) How did Louis Pasteur successfully demolish the popular theory of spontaneous generation? What were his conclusions?

837) Describe the steps by which simple inorganic substancess may have undergone chemical evolution to yield complex organic molecules that could eventually from matter.

838) Distinguish between microevolution and macroevolution. Narrate the significance of population genetics in evolution.

839) What is natural selection in modern terms? Elucidate the three different effects of natural selection on variation.

840) Define the following:
(i) Gene flow
(ii) Industrial melanism
(iii) Allopatric speciation
(iv) Sympatric speciation
(v) Balancing selection
(vi) Hybride sterility
(vii) Biological species concept
(viii) Evolutionary species concept.

841) What is biogeography? How Darwin succeeded to use the evidence from biogeography in favour of evolution?

842) Write short notes on:
(i) Recombination.
(ii) Convergent Evolution

843) Name the three kinds of selection. Show the three kinds with the help of figure.

844) (a) How did Darwin explain adaptive radiation. Give another example exhibiting adaptive radiation.
(b) Name the scientist who influenced Darwin and how?

845) (a) What is culture? What types of evidence suggest that Homo erectus had a culture?
(b) In what respect did the culture of Neanderthal man represent advancement over Homo erectus?

846) One day, father complained of severe pain in the abdomen. Naresh took him to doctor for examination. Doctor diagnosed it to be a case appendicitis and advised immediate surgical removal of vermiform appendix.
Read the above passage and answer the following questions:
(i) What is appendicitis?
(ii) What is vermiform appendix?
(iii) What value was displayed by Naresh?

847) One day, while returning home from school, Anil saw a crowd gathering front of Mr. Sharma's house. He asked his mother about it. She told that Mrs. Sharma gave birth to a child with small tail. Many people gathered just for curiosity and some whispered that it is a bad omen.
Read the above passage and answer the following questions:
(i) What is your opinion about child?
(ii) What is atavism?
(iii) What will be your role as a good citizen and student of biology?

848) Ramu was spraying white powder in the street near the stagnant water. Anil enquired about this substance and Ramu told him that it was DDT powder which is used to kill mosquitoes. He further said that earlier this powder was very effective in controlling mosquitoes growth but now it is not so effective.
Read the above passage and answer the following questions:
(i) What is the possible reason for ineffectiveness of DDT led to the development of resistance in the mosquitoes.
(ii) What message would you like to give to the society?

849) Doctor are worried about antibiotics resistance in disease causing bacteria such as Mycobacterium and are using DNA fingerprinting technique for screening of resistance bacteria.
Read the above passage and answer the following questions:
(i) What is antibiotics?
(ii) What are the possible reasons for development of resistance in bacteria to antibiotics?
(iii) How can DNA fingerprinting be helpful in controlling growth of such bacteria?

850) State the modifications of forelimb in animals as an example of homology.

851) (i)Explain Darwinian theory of evolution with the help of one suitable example.State the two key concepts of the theory.
(ii)Mention any three characteristics of Neanderthal man that lived in near East and Central Asia.

852) Samya visited a zoo with her mother on watching the cheetah she wondered how he uses his forelimbs for running.While the same forelimbs in bats are used for flying.she want to know about it ask her mother about it.Her mother explains different animal groups for different functions.
(i)What are such organs called?
(ii)Give an example of such organs from the plant world
(iii)What led to the origin of such organs?
(iv)What are the values shown by samya?

853) ranjana and shilpi had a hot argument whether or not life is still originating on the earth today.Their neighbour Mr kamal mishra to the girl called them and explained the matter in details.
(i)As a student of biology,what is your answer to the question ? why?
(ii)Recall the experiment of Miller,which simulated the primitive atmosphere
(a)What were the products obtain his experiment
(b)How aws energy provide in experiment?
(iii)What would have energy source for orgin of life on the earth?
(iv)Indicate the value shown by Mr.kamal mishra?

854) During the biology class on theories of evolution the teacher was telling about Lamarckism.
Katy was confused after listen to it and went to her teacher to clear her doubts.She generations then why should she does not have tatoo that her moher has on her arms.
The teacher smiled and told katy that reason why Lamarck theory was rejected.The teacher explained her the other theories as well.
(i)Name the book in which Lamarckism was explained
(ii)What are the three factors of this theory?
(iii)What are the other theories of evoluation
(iv)What are the values shown by teacher?

855) (i) List any four evidences of evolution.
(ii) Explain any one of the evidences that helps to understand the concept of evolution.

856) (a) How does the study of fossils help to understand evolution.
(b) How did S.L. Miller provide an experimental evidence in favour of Oparin and Haldane's hypothesis? Explain.

857) How did Darwin explain adaptive radiation ? Give another example of animals exhibiting adaptive radiation.

858) (a) Explain the observations and the conclusion drawn by Darwin during his visit to Galapagos islands.
(b) Write the two key concepts of Darwin's theory of natural selection.

859) (a) What was proposed by Oparin and Haldane on origin of life? How did S.L. Miller's experiment support their proposal?
(b) Which human chromosome has (1) maximum number of genes, and which one has (2) fewest genes?
(c) Write the scientific importance of single nucleotide polymorphism identified in human genome.

860) Fitness is the end result of the ability to adapt and get selected by Nature. Explain with suitable example.

861) How they are considered as an evidence of evolution.

862) (a) Describe Hardy - Weinberg Principle.
(b) List any four factors which affect genetic equilibrium.
(c) Describe founder effect.

863) How does the process of natural selection affect Hardy-Weinberg equilibrium? Explain. List the other four factors that disturb the equilibrium.

864) (a) Write Hardy-Weinberg principle.
(b) Explain the three different ways the natural selection can affect the frequency of a heritable trait in a population shown in the graph given below.