



Evolution Important Questions With Answers

NEET Biology 2023

1. Which is not a vestigial organ in man?

- a) Nictitating membrane b) Tail vertebrae c) Vermiform appendix **d) Nails**

Solution : -

Vestigial organs are those organs which are present in reduced form and do not perform any function in the body but correspond to the fully developed functional organs of related animals. These organs are believed to be remnants of organs which were complete and functional in the ancestors. In man, nails are not vestigial organs.

2. Which one of the following experiments suggests that simplest living organisms could not have originated spontaneously from non-living matter?

- a) Larvae could appear in decaying organic matter. b) Microbes can appear on bread kept at a moist place.
c) Microbes appear on unsterilised organic matter.

d) Meat was not spoiled, when heated and kept sealed in a vessel.

Solution : -

Francesco Redi, an Italian physician, took the flesh and cooked it so that no organisms were left alive. Then he placed flesh in three jars, of which, one was uncovered, the second was covered with parchment and the third one was covered with fine muslin. He kept these jars for a few days and observed that maggots developed only in the uncovered jar though the flies also visited other jars.

3. Match the hominids with their correct brain size _____

- (A) Homo habilis - (i) 900 cc
(B) Homo - (ii) 1350cc neanderthalensis
(C) Homo erectus - (iii) 650-800 cc
(D) Homo sapiens - (iv) 1400cc

Select the correct option.

- a) (iii),(ii),(i),(iv)** b) (iii),(iv),(i),(ii) c) (iv),(iii),(i),(ii) d) (iii),(i),(iv),(ii)

Solution : -

The correct match of hominids and their brain sizes are:

Homo habilis - 650 - 800 cc

Homo neanderthalensis - 1400 cc

Homo erectus - 900 cc

Homo sapiens - 1350 cc

4. Which one does not favour Lamarckian concept of inheritance of acquired characters?

- a) Lack of pigment in cave dwellers b) Absence of limbs in snakes
c) Presence of webbed toes in aquatic birds **d) Melanization of peppered moth in industrial areas**

Solution : -

Lamarck believed in direct influence of environment on the individual. Lamarckian postulate of use and disuse of organs is supported by rudimentary eyes of cave dwellers, webbed feet of swimming bird, elongated limbless body of snake, vestigial organs of living animals, etc. Biston betularia (peppered moth) shows industrial melanism

and demonstrates natural selection.

5. Which one of the following are analogous structures?

- a) Wings of Bat and Wings of Pigeon **b) Gills of Prawn and Lungs of Man**
c) Thorns of Bougainvillea and Tendrils of Cucurbita d) Flippers of Dolphin and Legs of Horse

Solution : -

Analogous organs are those organs which have similar function but different structure and origin. They do not have same evolutionary origin. Gills of prawn and lungs of man. These organs have similar function i.e., respiration but different in origin. Hence they are called analogous organ.

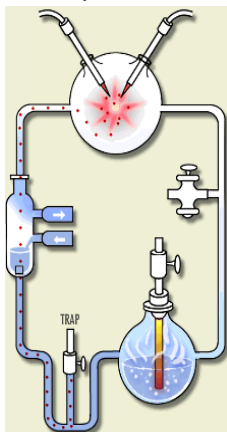
6. The finches of Galapagos islands provide an evidence in favour of _____

- a) evolution due to mutation b) retrogressive evolution **c) biogeographical evolution** d) special creation

Solution : -

They provide an evidence in favour of biogeographical evolution.

7. In the experiment in given diagram which of the following groups of gases were used to simulate primitive atmosphere?



- a) N_2 , H_2 , CH_4 , C_2H_6 **b) NH_3 , H_2O , CH_4 , H_2** c) N_2O , H_2O , NO_2 , SO_2 d) CH_4 , H_2 , NO_2 , SO_2

Solution : -

Stanley Miller in 1953 took an air tight apparatus and circulated four gases - CH_4 , NH_3 , H_2 and water vapour through it. He passed electrical discharges from electrodes at $800^\circ e$. Then he passed the mixture through a condenser. He performed this experiment continuously in this way for a week and analysed the composition of the liquid inside the apparatus. He found a large number of simple organic compounds including some amino acids such as alanine, glycine and aspartic acid. Miller, thus, proved that organic compounds were basis of life.

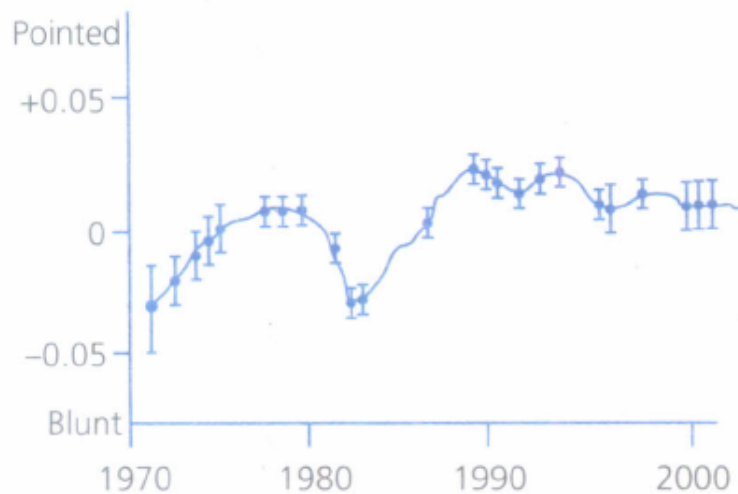
8. From his experiments, S.L. Miller produced amino acids by mixing the following in a closed flask _____

- a) CH_4 , H_2 , NH_3 and water vapor at $600^\circ C$ b) CH_3 , H_2 , NH_3 and water vapor at $600^\circ C$
c) CH_4 , H_2 , NH_3 and water vapor at $800^\circ C$ d) CH_3 , H_2 , NH_4 and water vapor at $800^\circ C$

Solution : -

S.L. Miller conducted an experiment to prove the theory of chemical origin. In their experiment, the conditions of primitive earth were created in the laboratory. The electric discharge was stimulated into a closed flask containing CH_4 , H_2 , NH_3 , and water vapour at $800^\circ C$. This proved that life originates from non-living components.

9. In order to build a longitudinal dataset, data of adult finches *Geospiza fortis* living on one of the Galapagos islands were collected. The beak shape data collected between 1971-2001 are shown in the graph.



Study the graph and select the correct statement.

a) **The fluctuating direction in the beak shape is most probably due to change in the environment.**

b)

The graph as a whole does not indicate evolutionary change in the beak shape as the time interval is too small and evolution requires thousands of years to occur.

c)

The graph indicates that the beak shape may lead to convergent evolution in the finches of Galapagos islands.

d)

The change in any phenotypic character requires selection to alter the expression of large number of genes in coordinated fashion. Hence, it is unlikely that change in the beak shape depicted in the graph is a result of evolution.

Solution : -

The diversity in beak shape is most probably due to changes in environment which lead to natural selection and gene flow among species. The graph does indicate evolutionary change. It has been shown that evolution can occur with surprising speed; as fast as those resulting from artificial selection. The selection in case of finches was strong and the populations evolved in a matter of generations. The Galapagos finches afford an excellent example of adaptive radiation. It is assumed that a stock of ancestral finches reached the islands from the mainland and then in the absence of much competition, evolved to fill many of the empty ecological niches. There a change in a phenotypic character can be attributed to alteration in the expression of one to several genes. Thus, the change in beak shape can be attributed to evolution.

10. Given below are the three statements each with one or two blanks. Select the option which correctly fills up the blanks in any two statements.

(A) For a long time it was also believed that life came out of decaying and rotting matter like straw, mud, etc. This was the theory of ___(i)___

(B) During post-industrialisation period, the tree trunks became dark due to industrial smoke and soots. Under this condition the ___(i)___ did not survive due to predators, while ___(ii)___ survived.

(C) Lamarck said that evolution of life forms had occurred but driven by ___(i)___ of organs.

a) (A) - (i) panspermia, (C) - (i) natural selection

b) (B) - (i) white-winged moth, (ii) dark-winged moth (C) - (i) use and disuse

c) (A) - (i) spontaneous generation (B) - (i) dark-winged moth, (ii) white-winged moth

d) (A) - (i) eternity of life (C) - (i) use and disuse

11. Appearance of antibiotic-resistant bacteria is an example of

- a) adaptive radiation b) transduction **c) pre-existing variation in the population** d) divergent evolution

Solution : -

When a bacterial population encounters a particular antibiotic, those sensitive to it die. But some bacteria having mutations become resistant to the antibiotic. Such resistant bacteria survive and multiply quickly as the competing bacteria have died. Soon the resistance providing genes become widespread and entire bacterial population becomes resistant.

12. The correct sequence for the manufacture of the compounds on the primitive earth is
a) NH₃, CH₄, protein and carbohydrate b) protein, carbohydrate, water and nucleic acid
c) NH₃, CH₄, carbohydrate and nucleic acid **d) NH₃, carbohydrate, protein and nucleic acid.**
13. According to fossils discovered up to present time origin and evolution of man was started from _____
a) France b) Java **c) Africa** d) China

Solution : -

Africa is importantly known as the Cradle of Human kind.

14. Age of fossils in the past was generally determined by radio-carbon 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 carbohydrates/proteins in fossils b) study of the conditions of fossilisation
c) electron spin resonance (ESR) and fossil DNA d) study of carbohydrates/proteins in rocks

Solution : -

Electron Spin Resonance is a spectroscopic technique which detects species that have unpaired electrons that the molecule in questions is a free radical if it is an organic molecule, or that it has transition metal ions if it is an inorganic complex. Because most stable molecules have a closed shell configuration without a suitable unpaired spin, the technique is less widely used than nuclear magnetic resonance (NMR).

15. Amphibians were dominant during _____ period.
a) Carboniferous b) Silurian c) Ordovician d) Cambrian
16. 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

Solution : -

Speciation takes place via reproductive isolation which is the most important consequence of geographical isolation.

17. Stabilising selection favours
a) both extreme forms of a trait **b) intermediate forms of a trait** c) environmental differences
d) one extreme form over the other extreme form and over intermediate forms of a trait.
18. Which of the following are homologous organs?
a) Wings of birds and locust **b) Wings of birds (sparrow) and pectoral fins of fish**
c) Wings of bat and butterfly d) Legs of frog and cockroach

Solution : -

Homologous organs are same in basic structure and origin but they differ in their external appearance and function.

19. The character that proves that frogs have evolved from fishes is
a) their ability to swim in water **b) tadpole larva in frogs** c) similarity in the shape of the head
d) their feeding on aquatic plants.

20. An isolated population of humans with approximately equal numbers of blue-eyed and brown-eyed individuals was decimated by an earthquake. Only a few brown-eyed people remained to form the next generation. This kind of change in the gene pool is called a
- a) **bottle-neck effect** b) gene migration c) Hardy-Weinberg equilibrium d) blocked gene flow

Solution : -

When the population is at decline, the number of individuals may reduce to a extent that the small group of population constituting the population becomes isolated and restricted in distribution. These are then exposed to random genetic drift resulting in the fixation of certain genes. Thus, the population re-establishes its former richness. Such reduction in allele frequencies is called a genetic bottle-neck effect which often prevents the species from extinction.

21. Which of the following statements is correct regarding evolution of mankind?

a) **Homo erectus is preceded by Homo habilis**

b) Neanderthal man and Cro-Magnon man were living at the same time.

c) Australopithecus was living in Australia d) None of these

Solution : -

Neanderthal man lived in Pleistocene epoch whereas Cro-Magnon man lived in Holocene epoch. Australopithecus or African ape man lived in Africa.

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

a) de Vries - Theory of natural selection b) Darwin - Theory of pangenesis

c) **Weismann - Theory of continuity of germ plasm**

d) Pasteur -Theory of inheritance of acquired characters

Solution : -

August Weismann opposed the Lamarck's theory of inheritance of acquired characters. He put forward the theory of continuity of germplasm. According to this theory, the characters influencing only the germ cells are inherited. There is a continuity of germplasm (protoplasm of germ cells) but the somatoplasm (protoplasm of somatic cell) is not transmitted to the next generation, therefore, it does not carry characters to next generation.

23. The concept of chemical evolution is based on_____

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

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

d) **crystallization of chemicals**

Solution : -

Concept of chemical evolution refers to origin of life from non living matter. First inorganic compounds and then organic compounds were formed in accordance with ever changing environmental conditions.

24. Similarities in organism with different genotype indicates_____ .

a) Micro evolution b) Macro evolution c) **Convergent evolution** d) Divergent evolution

Solution : -

Microevolution is the change in allele frequencies that occurs over the time within a population. This change is due to different process. It is evolution in which taxa higher than the level of species are formed following the morphological and cytological changes. Formation of different functional forms of a basically similar structure is called divergent evolution.

25. The first non-cellular form of life could have originated_____billion years back

a) **3** b) 8 c) 10 d) 1

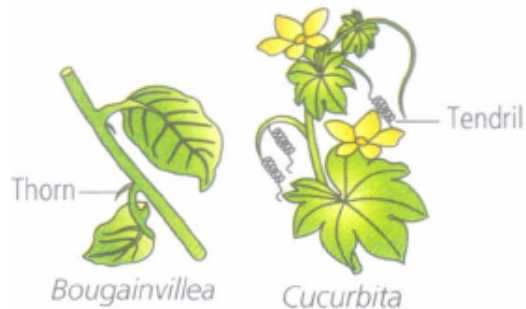
26. What was the most significant trend in evolution of modern man (Homo sapiens) from his ancestors?

a) Upright posture b) Shortening of jaws c) Binocular vision d) **Increasing brain capacity**

Solution : -

The most significant trend in the evolution of modern man (*Homo sapiens*) from his ancestors was increasing brain capacity. Hominid also called *Homo habilis* was first human like with brain capacity between 650-800 cc. They probably do not eat meat. Fossils discovered in Java in 1891 indicates the next stage i.e. *Homo erectus*. *Homo erectus* had large brain capacity and probably they ate meat. The Neanderthal man, brain capacity of 1400 cc were lived east and central Asia between 1, 00,000-40,000 year back. They used hides to cover their body and buried their dead. *Homo sapiens* arose in Africa and moved across continents and developed into distinct races. During ice age between 75,000-10,000 years ago modern *Homo sapiens* arose.

27. The given figure shows an example of



- a) homologous organs b) convergent evolution c) divergent evolution **d) both (a) and (c)**

Solution : -

A thorn of *Bougainvillea* and a tendril of *Curcurbita*, both are stem modifications and thus represent homologous structures. The modifications indicate the evolution of the organ to suit different functions which is also known as divergent evolution.

28. Evolutionary convergence is characterised by

- a) development of dissimilar characteristics in closely related groups
b) development of a common set of characteristics in groups of different ancestry
 c) development of characteristics by random mating
 d) replacement of common characteristics in different groups.

29. Theory of natural selection dwells on _____

- a) role of environment in evolution **b) natural selection acting on favourable variations**
 c) changes in gene complex resulting in heritable variations d) None of the above

Solution : -

According to Darwin's theory of natural selection, in the struggle for existence, only those individuals survive which possess the most useful variations.

Useful variations present in the surviving individuals are passed on to the next generation. Next generation repeats the process of development of variations and natural selection.

30. First life form on earth was a

- a) cyanobacterium **b) chemoheterotroph** c) autotroph d) photoautotroph

Solution : -

It is presumed that the first living organisms were chemoheterotrophs that obtained energy by the fermentation of complex organic substances available to them from the sea broth. They were anaerobes

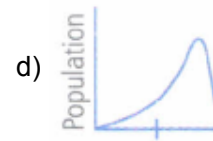
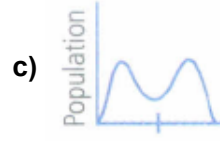
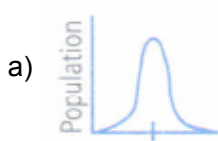
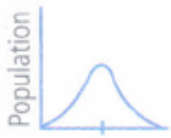
31. The effects of genetic drift are more marked in

- a) larger populations b) Mendelian populations c) island populations **d) smaller populations**

Solution : -

The random changes in gene frequencies in a population occurring by chance alone rather than by natural selection are called genetic drift or Sewall Wright effect. The effects of genetic drift are most marked in very small isolated population, although it occurs in all populations.

32. The given graph shows the range of variation among population members for a trait determined by multiple genes. If this population is subjected to disruptive selection for several generations, which of the following distributions is most likely to result?



Solution : -

Stabilising selection favours average sized individuals whereas eliminates small sized individuals. It reduces variation and thus does not promote evolutionary change. But, it maintains the mean value from generation to generation. In directional selection, the population changes towards one particular direction. It favours small or large sized individuals and more individuals of that type will be present in next generation. The mean size of the population changes. Disruptive selection favours both small-sized and large-sized individuals. It eliminates most of members with mean expression, so produces two peaks in the distribution of the trait that may lead to development of two different individuals. It is important in bringing about evolutionary change.

33. Common origin of man and chimpanzee is best shown by _____
a) banding pattern in chromosomes number 3 and 6 b) cranial capacity c) binocular vision
 d) dental formula

Solution : -

A comparative study of the banding of chromosomes of man and the great apes has shown that the total amount of DNA in human diploid cells and that of apes is more or less similar. The banding pattern of human chromosome numbers 3 and 6 are compared with those of particular autosomes in the chimpanzee, which shows a common origin. Moreover, blood protein test also proves that man is most closely related to great apes (chimpanzee and gorilla).

34. The most accepted line of descent in human evolution is
 a) Australopithecus → Ramapithecus → Homo sapiens → Homo habilis
 b) Homo erectus → Homo habilis → Homo sapiens
c) Ramapithecus → Homo habilis → Homo erectus → Homo sapiens
 d) Australopithecus → Ramapithecus → Homo erectus → Homo habilis → Homo sapiens.

35. Abiogenesis theory of origin supports
a) spontaneous generation b) origin of life from blue-green algae
 c) origin of life is due to pre-existing organisms d) organic evolution is due to chemical reactions

Solution : -

Abiogenesis theory of origin states that life originated from non-living things in a spontaneous manner.

36. The wings of a bird and the wings of an insect are:
 a) Homologous structures and represent divergent evolution
b) Analogous structures and represent convergent evolution
 c) Phylogenie structures and represent divergent evolution
 d) Homologous structures and represent convergent evolution

Solution : -

Wings of butterfly and of birds look alike. They are not anatomically similar structures though they perform similar functions. Hence, analogous structures are a result of convergent evolution different structures evolving for the same function and hence having similarity

37. Evolutionary history of an organism is known as ____
a) Ancestry b) Paleontology c) Ontogeny **d) Phylogeny**

Solution : -

Paleontology is the study of fossils, phylogeny is known as the history of an organism through ages during evolution. Ontogeny is the process of development of organism in the embryo stage.

38. Which one of the following statement is correct?
a) There is no evidence of the existence of gills during embryogenesis of mammals
b) All plant and animal cells are totipotent. **c) Ontogeny repeats phylogeny**
d) Stem cells are specialize cells

Solution : -

Ontogeny repeats phylogeny.

39. Among the following sets of examples for divergent evolution, select the incorrect option_____.
a) Brain of bat, man and cheetah b) Heart of bat, man and cheetah c) Forelimbs of man, bat and cheetah
d) Eye of Octopus, bat and man

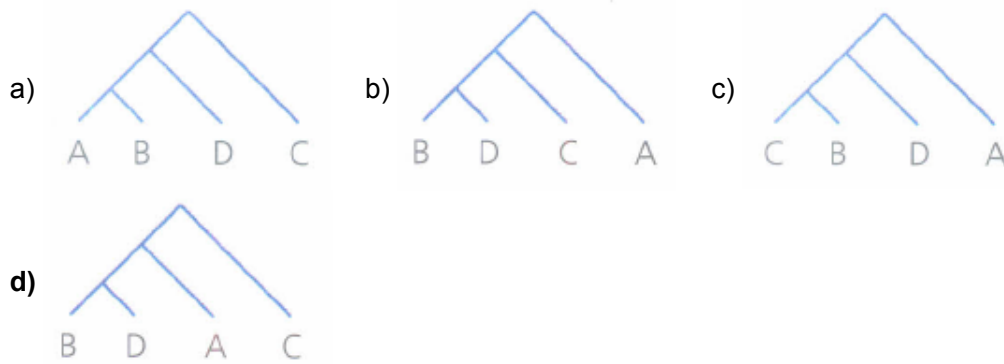
Solution : -

Eyes of octopus, bat and man are examples of ategus organs which show convergent evolution. Divergent evolution results in development of homologous structures. These organs have similar fundamental structure but different in function. Structure brain, heart and foreign. Structural homology is found in forelimb of man, bat and cheetah.

40. Which of the following are necessary for evolution by natural selection to take place?
(i) Offspring resemble their parents more than other individuals in the population.
(ii) Differences among individuals exist and lead to different numbers of successful offspring being produced.
(iii) Individuals adjust their development depending on the environment
(iv) Every individual possess enormous fertility.
a) (i) and (ii) **b) (ii) and (iv)** c) (i), (iii) and (iv) d) (iii) only

41. Following table shows data on amino acid substitution in the a chain of haemoglobin in four different mammalian species A, B, C and D. On the basis of the data shown in the table, choose the most appropriate evolutionary tree from those given below.

Comparison of Species	Number of Amino Acid Substitution
A and B	19
B and C	26
A and C	27
D and C	27
A and D	20
D and B	1



Solution : -

The molecular clock is the concept that during evolution the number of substitutions in the nucleotides of nucleic acids (DNA or RNA) and hence in the protein encoded by nucleic acid, is proportional to time. The molecular clock uses fossil constraints and rates of molecular change to deduce the time in geologic history when two species or other taxa diverged. It is used to estimate the time of occurrence of events called speciation or radiation.

42. 'Continuity of germplasm' theory was given by _____
 a) De Vries **b) Weismann** c) Darwin d) Lamarck

Solution : -

August Weismann, a German scientist formulated his famous 'Theory of continuity of germplasm' in 1886, on experimenting with mice. His theory states that inheritance in multicellular organisms takes place by means of germ cells i.e. egg and sperm cells only.

43. 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 foreheads, large jaws with heavy teeth, stocky bodies, a Wembering gait and stooped posture was:
 a) Homo habilis b) Cro-magnon humans **c) Neanderthal human** d) Ramapithecus

Solution : -

Fact

44. Which one of the following statements about fossil human species is correct?
 a) Fossils of Homo neanderthalensis have been found recently in South America
 b) Neanderthal man and Cro-magnon man did exist for sometime together
 c) Australopithecus fossils have been found in Australia **d) Homo erectus was preceded by Homo habilis**

Solution : -

Homo erectus was a large hominid. It had a length of about 150 to 170cm (5 to 5.5 feet) with a low but distinct forehead strong browridge and a brain capacity of about 1000cc. Homo erectus was social and living in tribes of 20 to 50 people and thus had a successful and complex culture. It became widespread throughout the tropical and temperate old world.

45. The age of the fossil of Dryopithecus on the geological time scale is _____ .
 a) 5×10^6 yr back **b) 25×10^6 yr yr back** c) 50×10^6 yr back d) 75×10^6 yr back

Solution : -

Dryopithecus lived about 20-25 million years ago. Droopithecus had the combined characters of great apes, old world monkeys and man. The main structural characteristics of Dryopithecus are broad jaws, large canines, semi-erect walking, 5 cusped molars and absence of brow ridges.

46. The different forms of interbreeding species that live in different geographical regions are called
 a) sibling species b) sympatric species **c) allopatric species** d) polytypic species

Solution : -

In allopatric speciation, a part of the population becomes geographically isolated from the main population. The population becomes entirely separated and finally constitutes a new species. Formation of Darwin's finches that formed separate species in Galapagos islands is an example of allopatric speciation.

47. 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.

Solution : -

The bones of forelimbs of whale, bat, cheetah, and man are similar in structure, because they are homologous organs. The organs which have the same fundamental structure but are different in functions are called homologous organs. These organs follow the same basic plan of organisation during their development. But in the adult condition, these organs are modified to perform different functions as an adaptation to different environments. The homologous structures are a result of divergent evolution. Homology indicates common ancestry.

48. In which condition the gene ratio remains constant for any species?
- a) Sexual selection
 - b) Random mating**
 - c) Mutation
 - d) Gene flow

Solution : -

Mutations are sudden inheritable changes taking place in the genetic material. Sexual selection refers to the selection of a mate by an organism.

49. Among the human ancestors the brain size was more than 1000 cc in _____
- a) Homo erectus
 - b) Ramapithecus
 - c) Homo habilis
 - d) Homo neanderthalensis**

Solution : -

Homo habilis had a cranial capacity in the range of 680-720cc and that of Homo erectus 775-990 cc. Homo erectus pekinesis 915-1200 cc. Homo neanderthalensis 1300-1600 cc

50. Single step large mutation leading to speciation is also called
- a) founder effect
 - b) saltation**
 - c) branching descent
 - d) natural selection

Solution : -

Hugo de Vries believed that mutation causes evolution and not the minor heritable variations which were mentioned by Darwin. According to Darwin, evolution was gradual while de Vries believed mutations appear suddenly and hence called it saltation (single step large mutation).