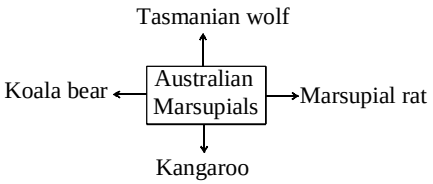
1. The force responsible for fixing in population of neutral characteristics is
   a) Genetic drift b) Mutation
   c) Reproduction d) Genetic recombination
2. Mutation is more common when it is present in
   a) Recessive condition b) Dominant condition
   c) Constant in population d) None of these
3. Choose the correct statements
   I. Law of embryonic development was given by Von Baer
   II. Recapitulation theory was proposed by Haeckel
   III. Haeckel theory states that 'Ontogeny repeats phylogeny'
   IV. Haeckel theory and biogenetic law were proposed by the same person
   The correct combination is
   a) I and II b) II and III c) III and I d) I, II, III and IV
4. 'Every cell of the body contributes gemmules to the germ cells and so shares in the transmission of inherited characters', this theory is known as
   a) Theory of inheritance of acquired characters b) Theory of germplasm
   c) Theory of pangenesis d) Theory of mutation
5. Synthetic theory of evolution was developed by
   a) Several biological specialities b) Darwin
   c) Mendel d) Wallace
6. Natural indicator of industrial pollution is
   a) Algae b) Fungi c) Lichen d) Bacteria
7. Lamarckism cannot explain
   a) Webbed toes in aquatic birds b) Weak muscles in the son of a wrestler
   c) Long narrow and limbless body of snakes d) Heterophylly
8. Arrange the periods of Palaeozoic era in ascending order in a geological time scale.
   a) Cambrian –Ordovician –Silurian –Devonian –Carboniferous -Permian
   b) Cambrian – Devonian – Ordovician – Silurian –Carboniferous -Permian
   c) Cambrian –Ordovician – Devonian – Silurian –Carboniferous -Permian
   d) Silurian – Devonian – Cambrian – Ordovician – Permian - Carboniferous
9. What is common to whale, seal and shark?
   a) Seasonal migration b) Thick subcutaneous fat
   c) Convergent evolution d) Homeothermy
10. Give the name of the first organism who invaded land
    a) Plants b) Consumers c) Animal d) Carnivores
11. Hardy-Weinberg principle can be expressed as
    a) $p^2 + 3pq + q^2 = 1$ b) $p^2 + 2pq + q^2 \geq 1$ c) $p^2 + 2pq + q^2 \leq 1$ d) $p^2 + 2pq + q^2 = 1$
12. Identify what the given diagram indicates



    a) Convergent evolution b) Divergent evolution c) Recapitulation d) Parallel evolution
13. Speciation is the evolutionary process by which
    a) A new gene pool is formed
    b) Evolutionary paths of the species converge
    c) Hybrids species are formed
    d) Differences in physical traits appears
14. First human like hominid is known as

a) Neanderthal man b) *Homo habilis* c) *Dryopithecus* d) *Homo erectus*

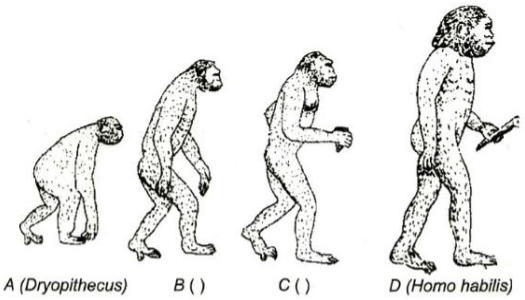
15. 'Darwin's finches' refers to
    a) Fossils of birds collected by Darwin at Galapagos islands
    b) A type of birds present on Galapagos islands
    c) Migratory birds collected by Darwin at Galapagos islands
    d) Fossils of reptiles collected by Darwin at Galapagos islands
16. Age of fossils 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 period for different groups of organisms, include
    a) Study of carbohydrates/ proteins in fossils b) Study of conditions of fossilization
    c) Electron spin resonance (ESR) and fossil DNA d) Study of carbohydrates/proteins in rocks
17. Which of the following is not vestigial in man?
    a) Tail vertebrae b) Nails
    c) Nictitating membrane d) Vermiform appendix
18. Survival of the fittest is possible due to
    a) Over production
    b) Favourable variation
    c) Environmental change
    d) Inheritance of acquired characters
19. Which of the following branch of biology helps in to know the existence of coal?
    a) Palaeobotany b) Bacteriol ogy c) Economic botany d) Ecology
20. Which of the following factor is most likely to decrease the genetic diversity in a population?
    a) Genetic recombination b) Mutation
    c) Genetic drift d) Stabilizing natural selection
21. The first cellular form of life could have originated
    a) 2000 million years back b) 11000 million years back
    c) 1500 million years back d) 500 million years back
22. Origin of life as a result of chemical evolution has been properly explained by or the most logical biochemical theory of origin of life has been given by
    a) Stanley Miller b) Darwin c) A I Oparin d) S Fox
23. The structural similarities between the flippers of whales and the arms of human are used to show that
    a) Human species began life in the oceans
    b) Human species and whales have a common ancestry
    c) Whales are older than the human species
    d) Whales evolved from the human species
24. Fossil X is older than fossil Y if
    a) X was found deeper in sediment than Y
    b) Y was found deeper in sediment than X
    c) Y had less vestigial organs
    d) Fossil Y had a homologous and analogous organs of X
25. I. Oparin's theory of origin of life is based on ...A...
    II. Chemical theory of origin of life was given by ...B...
    Choose the correct option for A and B to complete the statements I and II
    a) A-biological evolution; B-Oparin b) A-elemental evolution; B-Haldane
    c) A-organic evolution; B-Oparin and Haldane d) A-chemical evolution; B-Oparin and Haldane
26. The concept of natural selection in evolution was proposed by
    a) Charles Robert Darwin b) August Weismann
    c) Hugo de Vries d) Jean Baptiste Lamarck
27. Darwin proposed that new species evolve from ancestral forms by the

a) Gradual accumulation of adaptations to changing environment
b) Inheritance of acquried adaptation to the environment
c) Struggle for limited resources
d) Accumulation of mutations

28. Which of the following is not a correct pair?
a) Mesozoic era - Age of mammals
b) Origin of species - Charles Darwin
c) Study of fossil – Palaeontology
d) Mutation theory – Hugo de Vries

29. S L Miller's closed flask contained
a) CH_4
b) H_2
c) NH_3 and H_2O
d) All of these

30. Give the name of B and C



a) B-*Ramaithecus*; C-*Homo erectus*
b) B-Ramapithecus; C-*Australopithecus*
c) B-*Australopithecus*; C-*Ramapithecus*
d) B-*Australopithecus*; C-*Homo erectus*

31. The primate, which existed 15 million years ago, among these was
a) $Homo\ habilis$
b) $Australopithecus$
c) $Ramapithecus$
d) $Homoerectus$

32. Which type of growth living organism undergoes?
a) Reversible
b) Apical
c) Accretion
d) Intussusception

33. Directional selection favours
a) One extreme from over the other extreme from over intermediate from of a trait
b) Both extremist form of trait
c) Environmental differences
d) Intermediate form of a trait

34. What was the most significant trend in the evolution of modern man ($Homosapiens$) from his ancestors?
a) Shortening of jaws
b) Binocular vision
c) Increasing brain capacity
d) Upright posture

35. For a long time it was believed that life came out of decaying and rotting matter like straw mud, etc.
This was the theory of
a) Catastrophism
b) Abiogenesis
c) Panspermia
d) Chemogeny

36. In which of the following era first mammal like reptile originated?
a) Permian period
b) Triassic period
c) Jurassic period
d) Tertiary period

37. Darwin judged the fitness of an individual by
a) Ability to defend itself
b) Strategy to obtain food
c) Number of offsprings
d) Dominance over other individuals

38. In the theory of evolution, Lamarck explained
I. internal vital force
II. effect of environment on organisms
III. inheritance of acquired characters
IV. use and disuse of organs
Choose the correct combination
a) I and II
b) II and III
c) I, II and IV
d) I, II, III and IV

39. Evolutionary development of a species can be studied by

a) DNA analysis b) Finding age by carbon dating
c) Studying fossils of the species d) All of the above

40. Phenomenon of industrial melanism demonstrates
a) Reproductive isolation b) Induced mutation
c) Natural selection d) Geographical isolation

41. Diversity of living organisms is due to
a) Instant changes b) Polyploidy
c) Long term evolutionary changes d) Short term evolutionary changes

42. Darwin's book 'Origin of New Species by Natural Selection' was published in
a) 1809 b) 1859 c) 1957 d) 1869

43. What is the difference between genetic drift and changes drift to the natural selection?
a) Genetic drift do not requires the presence of variations
b) Genetic drift rarely involves competition between the members of a species
c) Genetic drift is most effective in very large populations but natural selection operates in a small isolated population
d) There is no difference between genetic drift and natural selection

44. *Homosapiens* were arose during
a) Ice-age between 25000-10000 years ago
b) Continental drift between 75000-10000 years ago
c) Continental drift between 75000-5000 years ago
d) Ice-age between 50000-10000 years ago

45. Which phenomena confined the pouched mammals of Australia survived because of lack of competition from any other mammals?
a) Continental origination b) Continental shifting
c) Continental drifting d) Continental evolution

46. Which of the following animals is not only a living fossil but also considered as connecting link?
a) *Sphenodon* b) *Limulus* c) *Neopilina* d) *Latimeria*

47. Fossils of *Homoerectus* was found in
a) Java in 1891 b) India in 1921 c) Africa in 1927 d) Australia in 1945

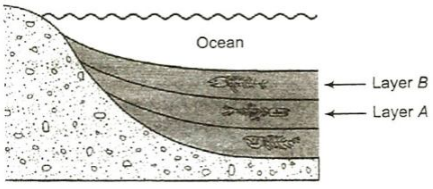
48. Which of the following is a unit of natural selection?
a) Genus b) Species c) Individual d) Population

49. Industrial melanism is an example of
a) Protective resemblance with the surroundings
b) Defensive adaptation of skin against ultraviolet radiations
c) Drug resistance
d) Darkening of skin due to smoke from industries

50. Stanley Miller proposed origin of life by
a) Chemical synthesis b) Abiogenesis c) Biogenesis d) None of these

51. Anthropoids were evolved into
a) Apes, *Proconsul* and monkeys
b) Apes, cro-magnon man and old world monkeys
c) *Proconsul*, new world monkeys and peking man
d) New world monkeys, *Proconsul* and *Homo habilis*

52. The diagram below shows an undisturbed sedimentary strata at the bottom of an ocean. The fossils found in layer *B* resemble the fossils found in layer *A*. This similarity suggests that



a) The fossils in layer *B* were formed before the fossils in layer *A*
b) Modern forms of the life may have evolved from earlier forms of life
c) Vertebrate fossils are only found in sediments
d) The fossils in layer *A* must be more complex than those in layer *B*

53. Hardy –Weinberg equilibrium is known to be affected by gene flow, genetic drift, mutation, genetic recombination and
a) Evolution b) Limiting factors c) Saltation d) Natural selection
54. Struggle for existence and survival of the fittest theories were given by
a) Wallace b) Darwin c) Lamarck d) None of these
55. Theory of continuity of germplasm was given by
a) August Weismann b) Lamarck c) Darwin d) Wallace
56. The process by which different type of finches were evolved in Galapagos islands is
a) Adaptive radiation b) Geographic similarity
c) Geographic dissimilarity d) Unadaptive radiation
57. An evolutionary process, giving rise to new species adapting to new habitat and ways of life is called
a) Adaptive radiation b) Adaptation
c) Convergent evolution d) Microevolution
58. Natural selection is a process in which ...A... variations enables better survival and ability to ...B... and leave ...C... number of progeny
Choose the correct options for A,B and C to complete the given NCERT statement
a) A-heritable, B-reproduce, C-greater b) A-non-heritable, B-reproduce, C-greater
c) A-non-heritable, B-reproduce, C-lesser d) A-heritable, B-reproduce, C-lesser
59. Which of the follows have not left any evidence of organic evolution?
a) *Archaeopteryx* b) Cow c) *Peripatus* d) *Neophilina*
60. Biological concept of species was given by
a) E Mayer b) Darwin c) De Vries d) Mendel
61. Somatic cells of gorilla, chimpanzee and orangutan have
a) 44 chromosomes b) 42 chromosomes c) 46 chromosomes d) 48 chromosomes
62. Natural selection
I. tends to increase its characters that enhances survival and reproduction
II. causes adaptation
III. acts on organism phenotype
IV. mechanism of evolution explained by Darwin
Which of the following statements are correct?
a) I, II, III b) I and II c) II and IV d) I and III
63. Darwinian fitness can be estimated by
a) How long different individual in a population survive
b) Number of offsprings produced by different individual in population
c) Individual have a large size in population
d) Species recover after mass extinction
64. The first life on earth consists of
a) Provirus b) Protovirus c) Virus d) Bacteria
65. Factor affecting the process of speciation are
I. Mutation
II. Recombination
III. Natural selection
IV. Hybridisation
V. Genetic drift
VI. Polyploid
VII. Isolation

Choose the correct combination

a) I, II, V, VII and VI b) II, VI, IV, III and V

c) III, IV, V, VII and II d) I, II, III, IV, V, VI and VII

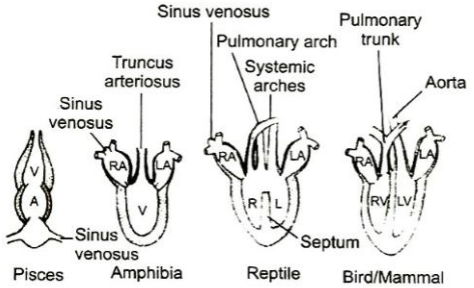
66. Jurassic period of the Mesozoic era is characterized by
    a) Gymnosperms are dominant plants and first birds appear
    b) Radiation of reptiles and origin of mammals like reptiles
    c) Dinosaurs become extinct and angiosperms appear
    d) Flowering plants and first dinosaurs appear
67. Blood groups-A and B are found in
    a) Monkeys b) Apes c) Dogs d) Cats
68. An organism which is the connecting link between the animals and plants is
    a) Bacteria b) Cyanobacteria c) *Euglena* d) *Amoeba*
69. ..... organs shows adaptive radiation.
    Complete the given statement with an appropriate option given below
    a) Homologous b) Analogous c) Progressive organs d) Similar in structure
70. Identify the phenomenon in which a new set of population is formed the set of existing population due to the excessive change in the allele frequency
    a) Founder effect b) Evolutionary effect c) Bottle-neck effect d) None of the above
71. Age of gymnosperm is
    a) Cenozoic era b) Mesozoic era c) Palaeozoic era d) Proterozoic era
72. Which of the following example of variation is not important from an evolutionary standpoint?
    a) Genetic differences between individual organisms comprising the population
    b) Inherited difference between individual organisms comprising the population
    c) Both (a) and (b)
    d) Difference due to diet, health, age and accident that have no affect on an individual's ability to survive and reproduce
73. Organs which are anatomically different, but performs similar functions are called
    a) Analogous organs b) Homologous organ c) Vestigial organs d) Heterologous organs
74. Coacervates are
    a) Protobionts having polysaccharide, protein and H_2O
    b) Protein aggregate
    c) Protein and lipid aggregates
    d) None of the above
75. The primates nearest to humans in the evolutionary line is
    a) New world monkeys b) Apes c) Lemurs d) Echidna
76. Primitive man was originated during
    a) Miocene b) Holocene c) Pleistocene d) Pliocene
77. Survival of the fittest is the basic principle of a competition. Its importance in organic evolution was explained by
    a) Lamarck b) de Vries c) Darwin d) Mendel
78. Which of the following is an example of an ancestral homology?
    a) Almost all modern reptiles, birds and mammals have forelimbs, a trait they also share with contemporary amphibians
    b) The first birds and all their descendant species have feathers, a trait that is unknown in any other group
    c) Humans and many insect species have eyes
    d) All of the above
79. Swan-necked flask experiment proved
    a) Biogenesis b) Abiogenesis c) Gene therapy d) Both (a) and (b)
80. Industrial melanism was highlighted by
    a) *Mimosapudica* b) *Triticumaestivum* c) *Bistonbetularia* d) Rock python

81. de Vries gave his mutation theory on organic evolution, while working on
    a) *Althearosea* b) *Drosophilamelanogaster*
    c) *Oenotheralamarckiana* d) *Pisumsativum*
82. Which of the following statement is correct regarding the evolution of humans?
    I. The skull of adult chimpanzee is more like adult human skull than baby chimpanzee skull
    II. The skull of baby chimpanzee is more like adult human than adult chimpanzee skull
    III. *Dryopithecus* is oldest human like fossil
    IV. *Dryopithecus* found in Miocene rock of Africa and Europe
    The correct option is
    a) I and II b) I and III c) I and IV d) All excepts I
83. Select the correct statement from the given options
    a) Darwinism variation are small and directionless
    b) Fitness is the end result of the ability to adapt and gets selected by nature
    c) All mammals except whales and camels have seven cervical vertebrae
    d) Mutations are random and directional
84. Human arm is homologous to
    a) Seal flipper b) *Octopus* tentacle c) Bird wing d) Both (a) and (c)
85. Lamarck's theory of evolution is also known as
    a) Theory of acquired characters
    b) Theory of genetic characters
    c) Theory of spontaneous characters
    d) Theory of impose characters
86. Which fossil man has been known from Shivalik hills in India?
    a) *Ramapithecus* b) *Zinjanthropus* c) *Shivapithecus* d) *Pithecanthropus*
87. The crosspterygian fish '*Latimaria*' is considered as the ancestor of terrestrial tetrapods. During which period these fishes evolved into Amphibians?
    a) Devonian b) Silurian c) Ordovian d) Cambrian
88. *Australopithecus* is also called
    a) Java ape man b) First ape man c) African ape man d) Both (b) and (c)
89. According to de Vries theory, evolution is
    a) Discontinuous b) Jerky
    c) Continuous and smooth d) Both (a) and (b)
90. Which is a unit of evolution?
    a) Cell b) Individual c) Population d) Species

91. Primates which existed about 15 million years ago were
    I. *Dryopithecus*
    II. *Homo habilis*
    III. *Ramapithecus*
    IV. *Australopithecus*
    V. *Homoerectus*
    VI. Neanderthal man
    Choose the correct option
    a) I and II b) III and IV c) V and VI d) Only III
92. The Coenozoic era is often designated as
    a) Age of fish b) Age of reptiles c) Age of mammals d) Age of amphibians
93. When and who wrote the book. *Theoriginofspecies*?
    a) Mendel in 1809 b) Wallace in 1858 c) Lamarck in 1869 d) Darwin in 1859
94. Spontaneous generation theory was given by
    a) F Redi b) L Spallanzani c) Louis Pasteur d) Aristotle
95. What is the relationship between the wing of a bird and the wing of a bat?

a) They are homologous because they represent modified forms of a trait present in a common ancestor (forelimbs)
b) They are analogous because while each carries out the same function (fight), this trait has arisen independently as a result of convergence
c) There is no relation between the wings of bird and wings of bat
d) They both have undergone severe mutation

96. Given diagram depicts



a) Evolutionary evidences from comparative anatomy and physiology
b) Evolutionary evidences from embryology
c) Evolutionary evidences from biochemistry and physiology
d) Evolutionary evidences from cytology

97. *Homoerectus* lived about
a) 2 million years ago
b) 1.5 million years ago
c) 1 million years ago
d) .5 million years ago

98. The concept of chemical evolution is based on
a) Crystallization of chemicals
b) Interaction of water, air and clay under interse heat
c) Effect of solar radiation on chemicals
d) Possible origin of life by combination of chemicals under suitable environment conditions

99. The stage next to *Homo habilis* was
a) *Homo erectus* b) *Homo sapiens* c) *Dryopithecus* d) Neanderthal man

100. What was the name of the sail ship used by Charles Darwin during the sea Voyage?
a) HMS Beagle b) HSM Beagle c) HMS Eagle d) HSM Eagle

IMPORTANT PRACTICE QUESTION SERIES FOR NEET EXAM – 2

1. If frequency, of 'A' allele is 0.4 than, find out the frequency of 'B' allele and heterozygous genotype in a random mating population at equilibria
a) 0.6 and 0.24 b) 0.6 and 0.96 c) 0.6 and 0.48 d) 0.6 and 0.50

2. Darwin differentiate ...A... species of finches and grouped them into ...B... main types. Choose the correct option for A and B to complete the given statement
a) A-six; B-thirteen b) A-fifteen; B-six c) A-seven; B-three d) A-fourteen; B-seven

3. When a species gets separated geographically, it evolves separately. Which of the following condition would determine whether they are now different species?
I. They failed to interbreed
II. They failed to give fertile offspring
III. They have different coloured body
IV. They appear morphologically slightly different
Choose the correct combination from given options
a) I and II b) II and III c) III and IV d) I and IV

4. First cell produced on earth is
a) Protobiont b) Protozoa c) Metazoa d) None of these

5. Biochemical similarities indicates the

a) Similarities in carbohydrates of organisms b) Similarities in fat (fatty acid) of organisms
c) Similarities in protein and genes of organisms d) All of the above

6. Who proposed the Big-Bang theory?
   a) Father Saurez b) Abbe Lemaitre c) Arno Allen Penzias d) Edwin P Hubble
7. Organic evolution means
   a) Cumulative change of living population b) Progressive development of an organ
   c) Development of different races d) History of human races
8. Fossil man, who made cave paintings, is
   a) Java man b) Neanderthal man c) Cro –magnon man d) Peking man
9. What is meant by the term "Darwin fitness"
   a) The ability to survive and reproduce b) High aggressiveness
   c) Healthy appearance d) Physical strength
10. Primary source of allelic variation is
    a) Due to long periods of evolutionary changes b) Due to abrupt mutations
    c) Suddenly on earth d) By seed dispersal
11. All organism shares the same types of proteins and biochemical pathways. This supports the fact that
    a) Evolution occurs very fast b) Life began on earth a long time ago
    c) All organism have common ancestry d) Evolution is an ongoing process
12. *Ornithorhynchus* is a connecting link between
    a) Birds and reptiles b) Reptiles and amphibians
    c) Birds and amphibians d) Fishes and amphibians
13. Analogous organs appears as the result of
    a) Divergent evolution b) Progressive evolution
    c) Retrogressive evolution d) Convergent evolution
14. Who proposed that the first form of life could have come from pre-existing non-living organic molecules?
    a) S L Miller b) Oparin and Haldane c) Charles Darwin d) Alfred Wallace
15. Vestigial organ in human being is
    a) Canine b) Hindlimb c) Incisor d) Premolar
16. The scientific name of Java man is
    a) *Homo habilis* b) *Homosapiensneanderthalensis*
    c) *Homoerectuserectus* d) *Australopithecusboisei*
17. Example of convergent evolution is
    a) Darwin finches and marsupial mouse b) Placental wolf and Tasmanian wolf
    c) Placental wolf and Darwin finches d) Tasmanian wolf and marsupial mouse
18. Which theory arguments that life on earth came from outer space?
    a) Theory of panspermia b) Cosmozoic theory
    c) Spore theory d) All of these
19. Which of the following is the most primitive ancestor of man?
    a) *Homo habilis* b) *Homoneanderthalensis*
    c) *Australopithecus* d) *Ramapithecuspunjabicus*
20. Presence of visceral pouches in the embryos of all vertebrates supports the theory of
    a) Organic evolution b) Biogenesis c) Metamorphosis d) Recapitulation
21. A population exhibiting Hardy-Weinberg equilibrium possesses 25% recessive traits. Find out the frequency of recessive alleles in the gene pool of the same population
    a) 0.5 b) 0.4 c) 0.3 d) None of these
22. Which of the following natural process is likely to fasten organic evolution?
    a) Favourable environment b) Overproduction
    c) Abundant genotypic variations d) Reproductive isolation
23. *Homosapiensneanderthalensis* and *Homosapienssapiens* (Cro-magnon man), were

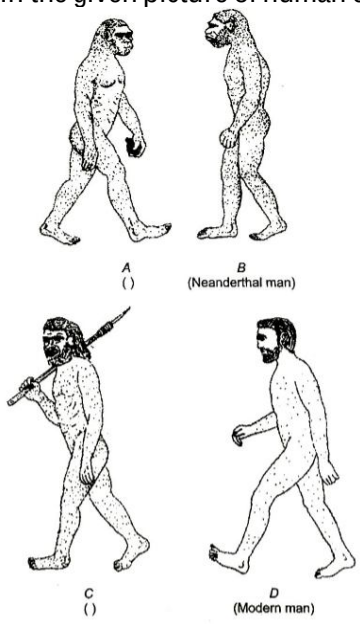
originated from

a) *Homo erectus* b) *Homo habilis* c) *Ramapithecus* d) *Proconsul*

24. How might an evolutionary biologist why a species of salamander becomes blind after colonizing a cave?
    a) It is possible that in the cave there is a source of pollution that increases the mutation rate for a gene that makes salamanders blind. Over time, due to exposure to this chemical, the members of the population lose their sight
    b) Members of the ancestral population that colonized the cave differed in their ability to see. If maintaining the ability to see in the cave was a waste of energy, blind salamanders might actually have more offspring than those who could see
    c) There is no to explain this in terms of natural selection
    d) The members of this salamander species no longer needed to use their eyes. Over time, due to the lack of use, they lost the ability to see
25. Which one amoung the following is an example for homology?
    a) Eye of $Octopus$ and mammals
    b) Tuber of sweet potato and potato
    c) Wings of butterfly and birds
    d) Thorn and tendrils of $Bougainvillea$and$Cucurbita$
26. Coacervates belong to category of
    a) Cyanobacteria
    b) Protozoans
    c) Molecular aggregates
    d) Molecular aggregate surrounded by lipid membrane
27. Which of the following sequences was proposed by Darwin and Wallace for organic evolution?
    a) Over-production, constancy of population size, variations, natural selection
    b) Variations, natural selection, over-production, constancy of population size
    c) Over -production, variations, constancy of population size, natural selection
    d) Variations, constancy of population size, over-production, natural selection
28. Fossils are useful in
    a) Studying extinct organisms b) Studying history of organism
    c) Both (a) and (b) d) None of the above
29. Biological concept of species is mainly based on
    a) Reproductive isolation b) Morphological features only
    c) Methods of reproduction only d) Morphology and methods of reproduction
30. Which of the following statements stands in favour of abiogenesis?
    I. Spontaneous generation
    II. Origin of viruses and microbes
    III. Origin of life from living organism
    IV. Origin of life from non-living organism
    The correct combination is
    a) I and II b) II and III c) III and IV d) I and IV
31. The brain capacity of $Homoerectus$ was about
    a) 650 cc b) 900 cc c) 1200 cc d) 1400 cc
32. Single step large mutation leading to speciation is also called
    a) Founder's effect b) Saltation c) Branching descent d) Natural selection
33. According to Oparin, which one of the following was not present in the primitive atmosphere of the earth?
    a) Methane b) Oxygen c) Hydrogen d) Water vapour
34. What is the use of Electronic Spin Resonance (ESR) in fossil studies?
    a) It helps to study the proteins in sedimentary fossils
    b) It helps to revise the evolutionary period for different groups of organisms

c) It helps to study the enzymes present in sedimentary fossils
d) All of the above

35. In the given picture of human evolution, identify the missing stages, $i.e.$, A and C



a) A-*Homo erectus*; C-Cro-magnon man b) A-*Homo erectus*; C-*Australopithecus*
c) A-Cro-magnon man; C-*Australopithecus* d) A-Cro-magnon man; C-*Homo erectus*

36. Wings of birds and wings of flies perform similar functions so they are examples of
a) Homologous organ b) Analogous organ c) Evolutionary organ d) Paralogous organ

37. Vestigial organs present in an adult individual are examples of …….. Basis of evidence of evolution.
a) morphological b) Palaeontological c) Embryological d) Anatomical

38. Evolution that shift the allele frequency in a study consistent direction is called?
a) Directional evolution
b) Disruptive evolution
c) Molecular evolution
d) All of these

39. Bird with average sized wings survived in the severe strom but the short winged birds died. It shows
a) Stabilizing selection b) Gene flow c) Diversifying selectiond) Founder effect

40. Cosmozoic theory was proposed by
a) Helmhontz b) Richter c) Pasteur d) Arrhenius

41. Major radiations of mammals, birds and pollinating insects took place in which epoch?
a) Oligocene b) Ecocene c) Pliocene d) Palaeocene

42. In the early earth, organic acids were produced by the combination of H_2 with
a) Ammonia and methane b) Hydrogen
c) Organic matter d) Sulphates and nitrates

43. 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

44. The first enzyme on the primitive earth was/were
a) Proteins b) DNA c) RNA d) Amino acids

45. Ancestor of man, who first stood erect, was
a) $Australopithecus$ b) Cromagnon c) Java –ape man d) Peking man

46. Theory of special creation arguments that
I. all living organisms were created as such

II. the diversity was always the same since creation
III. earth is 4000 years old
Choose the right option to complete the given statement
a) I and II b) II and III c) I and III d) I, II and III

47. 'Use and disuse' theory was proposed by
a) Lamarck b) Darwin c) Hugo de Vries d) Malthus

48. What kind of variation contributes to the height of animals?
a) Somatogenic variations b) Discontinuous variations
c) Continuous variations d) Blastogenic variations

49. The most recent and direct prehistoric ancestor is
a) Cro –magnon b) Pre –Neanderthal c) Neanderthal d) None of these

50. Evolution for Darwin was gradual, while de Vries believed that mutations, caused speciation. The belief of de Vries supports the concept of
a) Saltation b) Evolution c) Genetic equilibrium d) Variance

IMPORTANT PRACTICE QUESTION SERIES FOR NEET EXAM – 1 (ANSWERS)

1)	**a**	**2)**	**b**	**3)**	**d**	**4)**	**b**
5)	**a**	**6)**	**c**	**7)**	**b**	**8)**	**a**
9)	**c**	**10)**	**a**	**11)**	**d**	**12)**	**b**
13)	**a**	**14)**	**b**	**15)**	**b**	**16)**	**c**
17)	**b**	**18)**	**b**	**19)**	**a**	**20)**	**d**
21)	**a**	**22)**	**c**	**23)**	**b**	**24)**	**a**
25)	**d**	**26)**	**a**	**27)**	**a**	**28)**	**a**
29)	**d**	**30)**	**b**	**31)**	**c**	**32)**	**d**
33)	**a**	**34)**	**c**	**35)**	**b**	**36)**	**a**
37)	**c**	**38)**	**d**	**39)**	**d**	**40)**	**c**
41)	**c**	**42)**	**b**	**43)**	**b**	**44)**	**a**
45)	**c**	**46)**	**c**	**47)**	**a**	**48)**	**d**
49)	**a**	**50)**	**a**	**51)**	**a**	**52)**	**b**
53)	**d**	**54)**	**b**	**55)**	**a**	**56)**	**a**
57)	**a**	**58)**	**a**	**59)**	**b**	**60)**	**a**
61)	**d**	**62)**	**a**	**63)**	**b**	**64)**	**b**
65)	**d**	**66)**	**a**	**67)**	**b**	**68)**	**c**
69)	**a**	**70)**	**a**	**71)**	**b**	**72)**	**d**
73)	**a**	**74)**	**a**	**75)**	**b**	**76)**	**c**
77)	**c**	**78)**	**a**	**79)**	**a**	**80)**	**c**
81)	**c**	**82)**	**d**	**83)**	**b**	**84)**	**d**
85)	**a**	**86)**	**c**	**87)**	**a**	**88)**	**c**
89)	**d**	**90)**	**c**	**91)**	**d**	**92)**	**c**
93)	**d**	**94)**	**d**	**95)**	**c**	**96)**	**a**

97) b 98) d 99) a 100) a

1 **(a)**
Genetic drift is an evolutionary force operating in small populations. It is responsible for fixing in population of neutral characteristics.

2 **(b)**
Mutation is more common when it is present in **dominant condition**. The reason is that the dominant mutant gene can express in both homozygous and heterozygous conditions.

3 **(d)**
Von Bear's law The development of an organism proceeds from the general to the special forms and the embryos belonging to various classes closely resemble one another in their earlier stages but diverge more and more as development proceeds. He formulated Baer's laws of embryology
(i) General characteristics of the group to which an embryo belongs, develops before the special characteristics
(ii) General structural relations are likewise formed before the most specific relations appear
(iii) The form of any given embryo does not converge upon other definite forms but, on the contrary, separates itself from them
(iv) Fundamentally, the embryo of a higher animal form never resembles the adult of another animal form

4 **(b)**
Charles Darwin (1809-1882) tried to suggest the physical basis of heredity by pangenesis theory and suggested that every cell of the body contributes gemmules to the germ cells and so shares in the transmission of inherited characters.

5 **(a)**
The synthetic theory of evolution is the result of the work of a number of scientist namely T Dobzhansky, RA Fisher, JBS Haldane, Sewall Wright, Ernst Mayer.
Homology is also seen amongst the molecules. This is called molecular. For example, the proteins found in the blood of man and ape are similar. The phylogeny of an organism can be traced by using the base sequence in nucleic acids and the amino acid sequence of the proteins in related organisms

6 **(c)**
Lichen are very sensitive to the air pollution specially to the sulphur dioxide. Lichen are the symbiotic association of algae and fungi. Generally, lichens are not found in the industrial areas

7 **(b)**
Lamarckian theory is also known as theory of inheritance of acquried characters or theory of use and disuse of organs. This theory can not explain the reason of weak muscles in the son of a wrestler.

8 **(a)**
The correct order of the poriods of Palaeozoic era in ancending order in a geological time scale is–
Cambrian –Ordovician –Silurian –Devonian –Carboniferous -Permian

9 **(c)**
Distantly related animals (as whale, seal and shark) inhabiting similar habitats often develop similar morphological features that make them look similar. This is termed as **adaptive convergence** or **convergent evolution**. Dogfish (pisces) and whale (mammals) have

acquried aquatic character though distantly related.

10 **(a)**

Plants were the first who invaded land. They prominanted modern era

11 **(d)**

$p^2 + 2pq + q^2 = 1$

Hardy-Weinberg Principle

It was proposed by GH Hardy an English mathematician and W Weinberg a German physician independently in 1908

(i) It describes a theoretical situation in which a population is undergoing no evolutionary change. This is called genetic or Hardy-Weinberg equilibrium

(ii) It can be expressed as $p^2 + 2pq + q^2 = 1$ or $(p + q)^2 = 1$

(iii) Evolution occurs when the genetic equilibrium is up set (evolution is a departure from Hardy-Weinberg equilibrium principle)

The sum of total of Allelic frequency$(p + q) is = 1$

$p^2 + 2pq + q^2$ or $(p + q)^2$

Where, p^2 = % homozygous dominant individuals

p = frequency of dominant allele

q^2 = % homozygous recessive individuals

q = frequency of recessive allele

$2pq$ = % heterozygous individuals

Realize that $(p + q)^2 = 1$ (three are only 2 alleles)

$p^2 + 2pq + q^2 = 1$ (these are the only genotypes)

Example An investigator has determined by the inspection that 16% of a human population has a recessive trait. Using this information, we can calculate all the genotypes and allele frequencies for the population, provided the conditions for Hardy-Weinberg equilibrium are met

Given $q^2 = 16\% = 0.16$ are homozygous recessive individuals

Therefore,

$q = \sqrt{0.16} = 0.4$ = frequency of recessive allele

$p = 1.0 - 0.4 = 0.6$ = frequency of dominant allele

$p^2 = 0.6 \times 0.6 = 0.36$ or 36% are homozygous dominant individuals

$2pq = 2 \times 0.6 \times 0.4 = 0.48 = 48\%$ are heterozygous individuals

Or = 1.00 – 0.52

= 0.48

Thus, 84% (36+48) have the dominant phenotype

12 **(b)**

Divergent evolution.

Divergent evolution is the accumulation of differences between groups which can lead to the formation of new species. Usually, it is a result of diffusion of the same species to different and isolated environments which blocks the gene flow among the distinct populations allowing differentiated fixation of characteristics through genetic drift and natural selection Primarily diffusion is the basis of molecular division which can be seen in some higher-level characters of the structure and function that are readily observable in organisms. For example, the vertebrate limb is one example of divergent evolution. The limb in many different species has a common origin, but has diverged somewhat in overall structure and function

13 **(a)**

Speciation is an evolutionary process by which new biological species arises.

There are five types of speciation : allopatric,peripatric, parapatric, and sympatricand

artificial

(i) **Allopatric Speciation** It occurs when a species separates into two separate groups which are isolated from one another. A physical barrier, such as a mountain range or a waterway, makes it impossible to breed with one another. Each species develops differently, based on the demands of their unique habitat or the genetic characteristics of the group that are passed on to offspring

(ii) **Peripatric Speciation** When small groups of individuals break off from the larger groups and forms new species, this is called peripatric speciation. As in allopatric speciation, physical barriers make it impossible for numbers of groups to interbreed with one another, the main difference between allopatic speciation and peripatric speciation is that in peripatric speciation, one group is much smaller than the other

(iii) **Parapatric Speciation** A species is spread over a large geographic area. Although it is possible for any member of the species to mate with another member, individuals only mate with those in their own geographic region

(iv) **Sympatric Speciation** Some scientists don't believes that this form exists. Sympatric speciation occurs when there are no physical barriers preventing any member of a species from mating with another and all members are in close proximity to one another.

A new species, perhaps based on a different food source of characteristics, seems to develop. The theory is that some individuals becomes dependent on certain aspects of an environment-such as shelter or food sources, while others do not

(v) **Artificial Speciation** Is the creation of new species by people. This is achieved through lab experiments, where scientists mostly research insects like fruit files, and in animal husbandry. Animal husbandry is the care and breeding of livestock (animals). Many agricultural products, such as dairy, meat and wool, depends on animal husbandry

14 **(b)**

Homo habilis; (*homo* = human; *habilis* = able) 2-1.5 mya. Brain of *Homo habilis* was one half the size of a modern human. They were more sophisticated with rudimentary speech

15 **(b)**

Darwin's finches refers to a type of birds present on Galapagos islands.

16 **(c)**

Electrons Spin Resonance (ESR) measures number of charges occupying deep traps in crystal band gap. The basic principle of ESR is same as those for luminescene, *i.e.*, electorns become trapped and stored as a result of ionising radiations, *e.g.*, dating of tooth enamel.

17 **(b)**

Vestigial organs are incompletely developed, *i.e.*, rudimentary and generally non-functional organs, *e.g.,* tail vertebrae, nictitating membrane and vermiform appendix are vestigial organs of man.

Nails are not vestigial organs because these are the functional structure.

18 **(b)**

The organisms which are provided with the favourable variations would survive because they are fittest to face their surrounding while unfit organism are destroyed

19 **(a)**

Palaeobotany is the branch of Palaeontolgoy in which we study the fossils of plants. Coal was formed by large pteridophyte in prehistoric time

20 **(d)**

Stabilizing natural selection is a condition in which the conditions of natural selection become static. Due to static conditions, there is no origin of variation. That's way, the genetic diversity decreases in the stabilizing natural selection

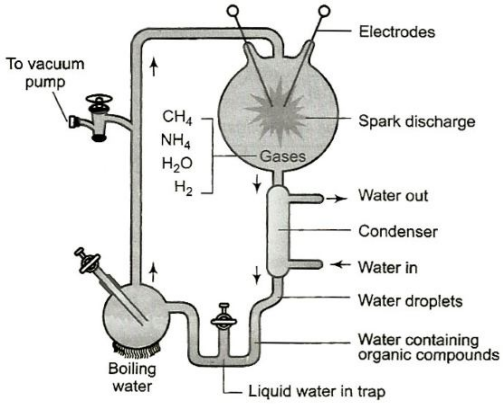
21 **(a)**

20000 million years.

Experimental Evidences of Chemical Evolution

Experi ik mentally chemical theory of evolution performed by SL Miller and HC Uray in 1953.

He created electric discharge in a closed flask containing CH_4, H_2, NH_3 and water vapour at 800 C. He observed formation of amino acids. In similar experiments other the observed, formation of sugar, nitrogen bases, pigments and fats



Diagrammatic representation of Miller's experiment

The first non-cellular forms of life could have originated-3 billion years back. The first cellular form of life did not possibly originated till about 2 billion years ago because the conditions were non-biogenic at that time. This version of biogenesis, *i.e.*, the first form of life arose slowly through evolutionary forces from non-living molecule was accepted by majority

22 **(c)**

Modern theory of origin of life was proposed by **A I Oparin** andJ **B S Haldane** As per this theory origin of life is the result of long series of physico-chemical changes which brought about first by chemical evolutions and then by biological evolution.

23 **(b)**

Comparing structural similarities is called comparative anatomy. The more similar two different species body structures are, the closer they evolutionary linked and the more recently they shared a common ancestor

24 **(a)**

If the fossil X is order than fossil Y than in the sedimentary rock or sedimentation fossil X will be found deeper than the fossil Y. In sedimentation the layers are deposited one above the other as the time proceeds

25 **(d)**

A-Chemical evolution; B-Oparin and Haldane

26 **(a)**

As a result of struggle for existence, variability and inheritance the successive generations tend to become better adopted to their environment. These adaptations are preserved and accumulated in the individual of the species. **Darwin** summarised them under the heading '**Origin of Species by Natural Selection'**.

27 **(a)**

According to Darwin, speciation is the result of gradual accumulation of adaptations to

changing environment.

28 **(a)**
Mesozoic era is known as the **age of reptiles**. Coenozoic era known as age of mammals.

29 **(d)**
The first experimentalsupport to Oparin-Haldane's theory of origin of life came from Urey and Stanley Miller's experiment in 1953. He built an apparatus of glass tubes and flasks in the laboratory. He created an atmosphere containing
hydrogen (H_2), **ammonia** (NH_3), **methane** (CH_4) and **watervapours** (H_2O) in one large flask and allowed condensed liquids to accumulate in another small flask. The ratio of methane, ammonia and hydrogen in large flask was 2 : 1 : 2.

30 **(b)**
B-*Ramapithecus*; C-*Australopithecus*

31 **(c)**
Ramapithecus survived about 14-15 million years ago during late Miocene to Pliocene. **Edward Lewis** (1932) obtained fossil of *Ramapithecus* from Pliocene rocks of Shivalik hills of India. *Ramapithecus* became extinct about 1-8 million years ago.

32 **(d)**
In physiology, intussusception is the reception of foreign matter by living organisms and its conversion into food by ingestion, digestion and assimilation of food, including the whole process of nutrition and growth. It is the mode of interstitial growth characteristic of organic life.
In botany, intussusception theory proposed by Nageli, the growth of cell walls by the intercalation of new solid particles between those already in existence. The intussusception theory is opposed to the theory of growth by apposition, which; supports that the new particles are deposited in layers on the inner side of the cell wall

33 **(a)**
Directional selection favours one extreme value for a particular trait in a distribution of these value.

34 **(c)**
The first human-like being was the hominid called *Homo habilis*. The brain capacities were between 650-800cc. They probably did not eat meat. Fossils discovered in Java in 1891 revealed the next stage, *i.e.*, *Homoerectus*. *Homoerectus* had a large brain and probably are meat ester. The Neanderthal man with a brain size of 1400 cc lived in near east and central Asia between 1,00,00-40,000 year back. They used animal skin to protect their body and burried their dead. *Homosapiens* arose in Africa and moved across continents and developed into distinct races. During ice age between 75,000-10,000 years back modern *Homosapiens* arose.

35 **(b)**
Theory of spontaneous generation (Abiogenesis or Autogenesis).
This theory states that life originated from non-living things in a spontaneous manner. This concept was held by early Greek philosophers like Thales, Anaximander, Xanophanes, Empedocles, Plato, Aristole, etc.

36 **(a)**
Permian period

37 **(c)**
Darwin realised that under the intense competition of members in a population, any

variation which favoured survival in a particular environment would increase the individual's ability to reproduce and leave fertile offsprings. While less favourable variations decrease the chance of successful reproduction. Hence, Darwin judged the fitness of an individual by reproducing ability and the **number of offsprings**.

38 **(d)**

I, II, III and IV.

Lamarck's theory (theory of acquired characters). *Lakarckism includes the fourmain factors*

(i) **Internal Vital Force** All the living things and their component parts are continually increased due to the internal vital force

(ii) **Effect of Environment and New Needs** Environment influences all the type of organisms. Any changes in environment brings about changes in organisms. It gives rise to the new needs of organisms

(iii) **Use and Disuse of Organs** If an organ is constantly used it would be better developed whereas disuse of organ results in its degeneration

(iv) **Inheritance of Acquired Characters** Whatever an individual acquires (to possess) characters in its life time due to internal vital forces effect of environment, new needs and use and disuse of organs, they are inherited (transmitted) to the next generations. After several generations, the variations are accumulated upto such extent that they give rise to new species

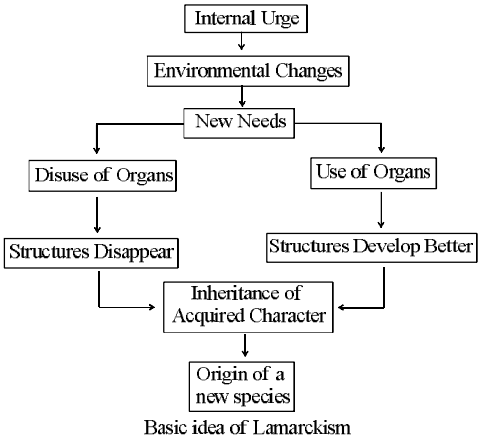
Objection in Lamarck Theory

(i) Boring of pinna (external ear) and nose of women is never inherited to the next generations

(ii) The wrestler's powerful muscles are not transmitted to the offspring

(iii) European ladies wear tight waist garments in order to keep their waist slender but their off spring at the time of birth have normal waists

(iv) Chinese women used to wear irons shoes in order to have small feet, but their children at the time of birth have always normal feet



Basic idea of Lamarckism

39 **(d)**

DNA analysis, finding age by carbon dating, studing fossils of species, these all are the methods through which evolutionary development of a species can be studied

40 **(c)**

Phenomenon of industrial melanism demonstrates **natural selection**, *e.g.*, occurrence of dark (melanic) form of insects in regions with high industrial pollution.

41 **(c)**

Diversity of living organism occurs due to the long term evolutionary changes which accumulated gradually in the organisms

42 **(b)**

Darwin's book **Origin of New Species by Natural Selection** was published in **1859**.

43 **(b)**
Natural selection leads to the competition between the members of same species or different species but in genetic drift there is very little competition between the members of the same species

44 **(a)**
Homo sapiens sapiens (the man of today) appeared about 25000 years ago and started spreading all over the world about 10,000 years ago. Morphologically, the transition is marked merely by slight raising of skull cap, thining of skull bones and cranial capacity (1300-1600 CC) and formation of four flexor in vertebral column

45 **(c)**
Continental drift pouched mammals of Australian survived because of lack of competition from other mammals or animals

46 **(c)**
*Neopilina*is a living fossil and also considered as connecting link between Annelida and Mollusca.

47 **(a)**
Fossils of *Homo erectus* (Java ape man) were obained from Java and the similar fossils were found in the cave near Peking China in the 1891. They were named *Homo erectus pekinensis*

48 **(d)**
Natural selection is the differential success in reproduction and it leads to the adaptation of organisms to their environment. Thus, natural selection occurs through an interaction between the environment and the population

49 **(a)**
Industrial melanism is an example of directional selection, changing, environment leading to change in the phenotypic/genotypic constitution of a population.

50 **(a)**
Stanley Miller proposed that the life has originated in the sea due to reactions taken place between the organic compounds.

51 **(a)**
Anthropoid are like a human being or an ape
Examples for Anthropoid
Gorillas, chimpanzees and gibbons are all anthropoid apes, having long arms, no tails and highly developed brains.
Monkeys, apes and humans, proconsul, are all anthropoids

52 **(b)**
These fossils demonstrates gradualism,the theory on the time frame of evolution that states that the species gradually changes over time. Since, the fossils are found in the different layers of sedimentary rocks, the older layer contains species that evolved into new species with some changes into the new layer of rock

53 **(d)**
The Hardy –Weinberg law states that the gene and genotypic frequencies in a Mendelian population remain constant generation after generation if there is no selection, mutation, migration or random drift.

54 **(b)**

Darwin gave both theories—struggle for existence and survival of the fittest.

55 **(a)**

Theory of continuity of germplasm was give by **August Weismann** (1834-1914).

Theory of continuity of germplasm by **August Weismann** (1834-1914). A German biologist, was the main opposer of the inheritance of acquired characters. He put forward the theory of continuity of germplasm. According to Weismann, the characters influencing the germ cells are only inherited. There is a continuity of germplasm (protoplasm of germ cells) but the somatoplams (protoplasm of somatic cells) is not transmitted to the next generation. Hence, it do not carry characters to the next generation. Weismann cut off the tails of rats for as many as 22 generations and allowed them to breed, but tailless rats were never born

56 **(a)**

Adaptive radiation.

Examples of adaptive radiation are

(i) **Darwin's Finches of Galapagos Island** They had common ancestors but different types of modified beaks according to their food habits.

Darwin differentiated thirteen species of the finches according to their food habits

(ii) **Australian Marsupials** Darwin explained that adaption radiation gave rise to the varieties of marsupials (pouched mammals) in Australia by the same process of adaptive radiation as found in the finches of Galapagos Islands.

(iii) **Placental mammals** in Australia exhibit adaptive radiation in evolving into varieties of placental mammals each of which appears to be similar to corresponding marsupials

57 **(a)**

When a group of organisms shares a homologous structure, which is specialized to perform a varity of different functions, it shows **adaptive radiation**, which represents evolution of new forms in several directions from the common ancestral type (divergence).

58 **(a)**

A-Inheritable, B-Reproduce, C-Greater

59 **(b)**

Among these, **cow** does not left any evidence of organic evolution.

60 **(a)**

Biological concept of species was given by Ernst Mayer. Alternative ways of defining a species

Biological Aspect	**Definitions**
Breeding	A group of organisms capable of interbreeding and producing fertile offspring
Genetic	A group of organisms showing close similarity in genetic karyotype
Ecological	A group of organisms sharing the same ecological niche; no two species can share the same ecological niche
Evolutionary	A group of organisms sharing a unique

	collection of structural and functional characteristics

61 **(d)**

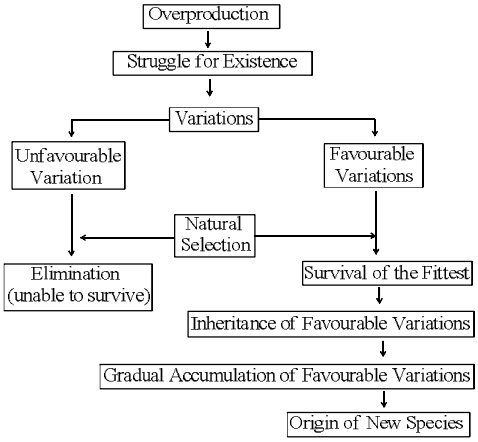
Somatic cell of gorilla, chimpanzee and orangutan have 48 chromosome (24 pairs) while humans have 46 chromosome (23 pairs)

62 **(a)**

Natural selection

(i) Tend to increase the characters that enhance survival and reproduction

(ii) Cause adaptation



Central theme of Darwinism

63 **(b)**

Darwinian fitness can be estimated by the number of offspring produced by different individual in a population. The organisms which have favourable variation in accordance with environment have more offspring than the other which don't variations in accordance with environment

64 **(b)**

Protoviruses are considered as the first life on earth.

65 **(d)**

All new species develop from the pre-existing species. The phenomenon of the development of a new species from the pre-existing ones is called speciation. A species is a collection of demes.

The deme is a group of population with a common gene pool. Mutation, recombination, natural selection, hybridization, genetic drift polyploidy, isolation, all of these factors affects the phenomenon of speciation

66 **(a)**

Jurassic period is the second geological period of Mesozoic era. In this period, the **gymnosperms** were dominant and the plants included ferns, cycads, *Ginkgo*, rushes and conifers, among animals, important invertebrates included anamniotes, corals, brachiopods, bivalves and echinoids. Reptiles dominated the vertebrates and the **first flying reptiles**, the pterosaurs appeared. The **first primitive bird**,$Archaeopteryx$ also made its appearance.

67 **(b)**

Evidences for common ancestory of great apes and man are as follows

Evidence from Blood Protein It has been proved by the blood protein tests that man is most closely related to great apes (Chimpanzee and Gorilla) and next closest, in order are the old world monkeys the new world monkeys and tarsiers

Evidence from Blood Group In humans four blood groups A, B, AB and O occurs. The blood

groups A and B are found in apes but not in monkeys. This indicates that human beings are more closely related to apes than to monkeys

Evidence from Haemoglobin There is 99% homology in haemoglobin of man and gorilla. This suggests that the two are closely related

68 **(c)**

Euglena is a member of protist kingdom. It has both the animals and plant characteristics. That's way, it is considered as the connecting link between animals and plants

69 **(a)**

Homologous organ.

Concept of adaptive radiation in evolution was developed by **HF Osborn** in 1902. Adaptive radiation is also called divergent evolution. Homologous organ shows the adaptive radiation

70 **(a)**

Founder Effect Sometime the change in allele frequency is so different in the new sample of population that they become a different species.

The original drifted population becomes founders and the effect is called founder effect. Generally, this effects operates when a population drifted to the new geographical area permanently

71 **(b)**

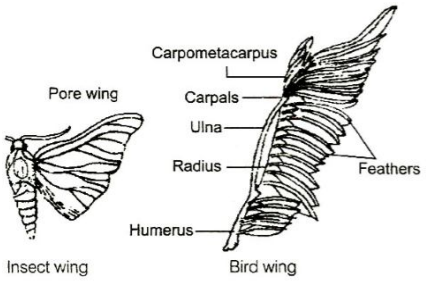
Mesozoic era

72 **(d)**

Difference in diet, health age and accident do not affect organism's hereditary material. Therefore, it is not important in evolutionary point of view

73 **(a)**

Analogous Organs The organs which have similar functions but are different in their details and origin are called analogous organs. The analogous organs shows convergent evolution



74 **(a)**

Oparin and **Sydney Fox** held that large organic molecules, synthesized abiotically on primitive earth, formed large colloidal aggregates due to intermolecular attraction. These colloidal particles were called coacervates, which are protobionts having polysaccharide, protein and water.

75 **(b)**

Humans blood group are as A, AB, B, O. Blood groups A and B are also found in apes, but not in monkeys. This indicates that human beings are more closely related to apes than to monkeys

76 **(c)**

$Australopithecus$(first ape-man) lived from 4 to 1.5 million years ago in cave during **Pleistocene** period. It was erect posture, omnivorous and have cranial capacity of 500-700 cc.

77 **(c)**

Darwin gave theory to explain organic evolution. The main postulates, which formed the basis of Darwin's theory were-over production, limited resources, struggle for existence,

variations, survival of the fittest (natural selection) and formation of new species.

78 **(a)**
Almost all modern reptiles, birds and mammals, have forelimbs means, they all have same basic plan of the structure but they perform different functions. This phenomenon is called ancestral homology

79 **(a)**
Pasteur performed a swan-necked flasked experiment for proving biogenesis, according to biogenesis, all the living oranisms have originated from other living organisms. This experiment disproved the concept of spontaneous generation completely.

80 **(c)**
Industrial melanism is a term used to describe the evolutionary process, in which darker individuals come to predominate over lighter individuals. Since, the industrial revolution as a result of natural selection. Until 1848, almost every individual of peppered moth ($Bistonbetularia$) captured in Great Britain had light-coloured wings with black specklings. In 1848, a black form of moth was recorded in Manchester and by 1895, 98 of the peppered moth population in Manchester was black. This black melanic form arose by a recurring random mutation.

81 **(c)**
deVries gave his mutation theory on organic evolution, while working on $Oenotheralamarckiana$ (4'O clock plant).

82 **(d)**
The skull of baby chimpanzee is more like adult human skull than the adult chimpanzee skull.
Dryopithecus is the most oldest human like fossil. It is considered as the common ancestor of both human and ape.
Dryopithecus was found in miocene rock of Africa and Europe

83 **(b)**
Fitness (survival of the fittest) is a result of selection and proliferation of only those organisms, which were most suitably adapted to the environment and get selected by nature.

84 **(d)**
Both (a) and (c).
Homologous Organs The organs which have the same fundamental structure but are different in functions are called homologous orangs. These organs follows the same basic plan of organization during development. But in adult condition, these organs are modified to perform different function as an adaptation to the different environment. Homologous organs are the resultant of divergent evolution
Implants homologous organs may be a those of *Bougainvillea* or a tendril of *Cucurbita*, both arising in the axillary position

85 **(a)**
Lamarck's theory (theory of acquired characters). *Lakarckism includes the fourmain factors*
(i) **Internal Vital Force** All the living things and their component parts are continually increased due to the internal vital force
(ii) **Effect of Environment and New Needs** Environment influences all the type of organisms. Any changes in environment brings about changes in organisms. It gives rise to the new needs of organisms
(iii) **Use and Disuse of Organs** If an organ is constantly used it would be better developed

whereas disuse of organ results in its degeneration

(iv) **Inheritance of Acquired Characters** Whatever an individual acquires (to possess) characters in its life time due to internal vital forces effect of environment, new needs and use and disuse of organs, they are inherited (transmitted) to the next generations. After several generations, the variations are accumulated upto such extent that they give rise to new species

Objection in Lamarck Theory

(i) Boring of pinna (external ear) and nose of women is never inherited to the next generations

(ii) The wrestler's powerful muscles are not transmitted to the offspring

(iii) European ladies wear tight waist garments in order to keep their waist slender but their off spring at the time of birth have normal waists

(iv) Chinese women used to wear irons shoes in order to have small feet, but their children at the time of birth have always normal feet

86 **(c)**

Fossil of *Shivapithecus* reported from Shivalik hills (India) from the rocks of Miocene epoch (about 20-25 million years ago).

87 **(a)**

Devonian

88 **(c)**

Australopithecus (first ape man)

Australopithecus africanus appeared about 5 million years ago and is also called African ape man. He was about 1.5 meters high and had human as well as ape characters.

Australopithecus africanus had also gave rise to man like apes called *Australopithecus robustus* and *Australopithecus boisei* along a separate line end that ends blindly

89 **(d)**

Hugo de Vries pioneered the theory of mutation to explain the mechanism of evolution. According to him evolution is discontinuous and jerky process. Frequency of a mutated gene in population is expected to increase if that gen is selected by nature.

90 **(c)**

Population is the unit of evolution. The individuals of a population form a unique set of genotype or gene pool and local environmental factors act as selective agents to alter the gene pool in ways that adapt the organisms to the local conditions. Thus, each population of a species follows its own course of evolution.

91 **(d)**

The fossils *Dryopithecus africanus* was discovered from Miocene rock of Africa and Europe. It lived about 20-25 million years ago.

Dryopithecus gave rise to the *Ramapithecus* which was on the direct line of human evolution. They appeared about 14-15 million years ago

92 **(c)**

Coenozoic is regarded as **age of mammals**. In this era, varity of mammals like whale, bat and man appeared for first time.

93 **(d)**

In 1859, Darwin published his observations and conclusion under the name 'origin of species'. Darwin's book became very popular and it had changed people's thinking about organic evolution

94 **(d)**

Spontaneous generation theory was given by **Aristotle**. According to this theory, life originated not only from living but also from non-living forms, spontaneously.

95 **(c)**

Both (a) and (b).

Divergent evolution is the accumulation of differences between groups which can lead to the formation of new species. Usually, it is a result of diffusion of the same species to different and isolated environments which blocks the gene flow among the distinct populations allowing differentiated fixation of characteristics through genetic drift and natural selection Primarily diffusion is the basis of molecular division which can be seen in some higher-level characters of the structure and function that are readily observable in organisms. For example, the vertebrate limb is one example of divergent evolution. The limb in many different species has a common origin, but has diverged somewhat in overall structure and function

96 **(a)**

In the given diagram, the evolution of heart is in dictated from the two chambered heart of fishes to the most evolved four-chambered heart of mammals. It is an example of evolution from comparative anatomy and morphology

97 **(b)**

1.5 million years ago

98 **(d)**

The concept of **chemical evolution** is based on possible origin of life by combination of chemical under suitable environmental conditions.

99 **(a)**

Character of *Homo erectus* (1.6 million to 200 000 years ago)

Upright human protruding jaw, no chin, thick brow ridges and a long skull

(i) teeth smaller than in *habilis*

(ii) much larger brain than habilis (1000 mm)

(iii) may have had advanced speech controlled fire

(iv) made more sophisticated tools then predecessors

(v) left Africa and spread throughout Asia and Europe

100 **(a)**

Based on observation made during a sea voyage in a sail ship called HMS Beagle round the world. Charles Darwin conclude that the existing living forms share similarities to varying degrees not only among themselves but also with the life forms that existed millions of years ago

IMPORTANT PRACTICE QUESTION SERIES FOR NEET EXAM – 2 (ANSWERS)

1)	**c**	**2)**	**b**	**3)**	**a**	**4)**	**a**
5)	**c**	**6)**	**b**	**7)**	**a**	**8)**	**c**
9)	**a**	**10)**	**a**	**11)**	**c**	**12)**	**b**
13)	**d**	**14)**	**b**	**15)**	**a**	**16)**	**c**
17)	**b**	**18)**	**d**	**19)**	**d**	**20)**	**a**

21)	**a**	**22)**	**a**	**23)**	**a**	**24)**	**b**
25)	**d**	**26)**	**d**	**27)**	**c**	**28)**	**c**
29)	**a**	**30)**	**d**	**31)**	**b**	**32)**	**b**
33)	**b**	**34)**	**a**	**35)**	**a**	**36)**	**b**
37)	**b**	**38)**	**a**	**39)**	**a**	**40)**	**b**
41)	**d**	**42)**	**a**	**43)**	**c**	**44)**	**c**
45)	**a**	**46)**	**d**	**47)**	**a**	**48)**	**a**
49)	**a**	**50)**	**a**				

1 **(c)**

HW Principle = $p + q = 1$

$p^2 + 2pq + q^2 = 1$

Here, $p = A$ and q is $= B$

Allele frequency of B = 1-0.4 = 0.6

Allele frequency of heterozygous is = 2 × 0.6 × 0.4

= 0.48

2 **(b)**

Darwin's finches (also known as the Galapagos finches) were a group of about fifteen species of passerine birds. They are often are classified as the sub-family-Geospizinae. It is still not clear which bird family they belong to, but they are not related to the true finches. They were first collected by Charles Darwin on the Galapagos islands during second voyage of the Beagle

3 **(a)**

Interbreeding members of a same population are called species.

If the members of same population can't interbreed, than they are considered as different species

4 **(a)**

Protobionts are aggregated forms of different types of molecules, formed abiotically in the primitive sea. These are considered first cells produced on the earth because they have an internal environment that differs from their surroundings and also exhibit some signs of life, such as metabolism and excitability.

5 **(c)**

Biochemical Similarities between Groups

The different types of biochemical reactions occur in every living organism. These reactions are same in all the living organisms. *Some of the chemicals and their reactionsare*

(i) **Enzymes** The amylase in all the living organisms digests the carbohydrates. The trypsin in all the living organisms digests the proteins.

(ii) **Hormones** In frog, the metamorphosing hormone is thyroxin. If human thyroxin is injected into thyroid free tadpole larva, if undergoes metamorphosis. This indicates that the function of thyroxin is same in all animals.

(iii) **Haemoglobin** It carries oxygen and carbon dioxide in all animals. Haemoglobin carries oxygen in the form of oxyhaemoglobin. In all birds the oxyhaemoglobin is identical. This indicates that the birds have close relationship among themselves

6 **(b)**

Origin of Universe There are several theories regarding the origin of universe but most accepted is Big-Bang theory.

Big-Bang Theory This theory was proposed by **Abbe Lemaitre** in 1931. According to the Big-Bang theory about 15 billion years ago, cosmic matter was in a condensed form. Explosion took place which broke the condensed matter and scattered its fragments into space at an enormous velocity making a Big-Bang sound and thus the theory came to be known as the

Big-Bang theory

7 **(a)**

Organic Evolution Organic evolution is a process of cumulative change of the living populations and in the descendant populations of organisms. In other words, it is **descent with modification**

8 **(c)**

Cro –magnon was omnivorous, wore skin clothes and made paintings on the cave walls.

9 **(a)**

Darwin proposed the theory of Natural Selection. The organisms with favourable variations would survive because they are fittest to face their surroundings while unfits are destroyed originally, it was an idea of Herbert Spencer who used the term survival of the fittest while Darwin named it as Natural Selection.

10 **(a)**

Diversification in plants life appeared **due to long periods of evolutionary changes**. The evolutionary changes sequence is

Bryophyte (thalloid, no vascular tissue)→ Pteridophytes

(differentiation in vascular tissue begins) →Gymnosperms

(no fruit formation) →Angiosperms (fruit present).

11 **(c)**

All organisms have common ancestry.

Biochemical Evidences The similarities is proteins and genes performing a common given function among the diverse organisms gives the clue to common ancestry. Several metabolic processes possesses the same enzyme in different organisms.

e. g., Krebs' cycle, glycolysis, nucleotide synthesis, etc.

12 **(b)**

Ornithorhynchus anatinus. Duck-billed platypus is one of the three species of monotremes. These species are unique among mammals in that they retain their ancestral characteristic of egg laying. They have a cloaca through which eggs are laid and both liquid and solid waste is eliminated. Duck-billed platypus is stream-lined and elongated, they have fur ranging from medium brown to dark brown on the dorsal side and brown to silver-gray on the ventral side

13 **(d)**

Convergent evolution describes the acquisition of the same biological trait in an unrelated lineages.

The wings are the classic example of convergent evolution in action. Flying insects, birds and bats have all evolved the capacity of flight independently. They have 'convergent' on this useful trait.

The ancestors of both bats and birds were terrestrial quadrupeds, and each of them had independently evolved powered flight via adaptations are superficially 'wing-shaped', they are substantially dissimilar in construction.

The bat wing is a membrane stretched across four extremely elongated fingers, while the airfoil of the bird wing is made of feathers, which are strongly attached to the forearm the ulna and the highly fused bones of the wrist and hand the carpometacarpus, with only tiny remnants of two fingers remaining, each anchoring a single feather.

Both bats and birds have retained the thumb for specialized functions. So, while the wings of bats and birds are functionally convergent, they are not anatomically convergent

14 **(b)**

Oparin of Russia and Haldane of England proposed that the first form of life could have come from pre-existing non-living organic molecules (*e.g.,* RNA, protein, etc.) and that formation of life was preceeded by chemical evolution.

15 **(a)**

Vestigial organs are non-functional or imperfectly developed organs that were functional in ancestral species and may still be functional in related species, *e.g.*, vermiform appendix, nictitating membrane, etc.

In man, wisdom tooth (3rd molar) and **canines** (tearing) are also the vestigial sturctures.

16 **(c)**

Java man named $Pithecanthropuserectus$ (ape man that can walk erect) by **Eugene Dubois** and $Homoerectuserectus$ by **Mayer** (1950).

17 **(b)**

In convergent evolution two or more different group of organisms develops similar characters due to the same environmental forces Tasmanian wolf and placental wolf are the examples of convergent evolution

18 **(d)**

Theory of panspermia (cosmozoic) was proposed by, Richter (1865). According to this theory, 'protoplasm' reached the earth in the form of spores of germs or other simple particles from some unknown parts of the universe with the cosmic dust, and subsequently evolved into various forms of life

19 **(d)**

$Ramapithecuspunjabicus$ is known only by few teeth and some fragments of jaw. It is considered to be the earliest man-like primate and oldest of man's ancestors. Its fossils have been discovered from the Shivalik hills in India and date back to 14-15 million years ago in **Miocene**.

20 **(a)**

The theory of recapitulation is often known as ontogeny recapitulates phylogeny. It was an idea of Etienne Serres in 1824-26. In 1886 Ernst Haeckel proposed that the embryonic development of an individual organism (its ontogeny) followed the same path as the evolutionary history of its species (its phylogeny).

It is also called the biogenetic law or embryological parallelism. It was a theory (idea) that tied evolution (the change organisms over time) with embryology (the way organisms develop before they are born).

The theory basically stated that before they were born, organisms passed through the developmental stages that look like adult animals of other species, in roughly the same order that these other species split off during evolution

21 **(a)**

Presence of recessive traits = 25%

(q_1^2) = 25%

q_1 = 0.5

Total allelic frequency $(p + q)$ = 1

p + 0.5 = 1

Allelic frequency p = 0.5

22 **(a)**

As per modern synthetic theory of evolution, there are five basic factors involved in the process of organic evolution:

1.Gene mutation

2.Changes in chromosome structure and number

3.Genetic recombinations

4.Natural selection

5.Reproductive isolation

The first three factors are responsible for providing genetic variability and the last two are responsible for giving direction to the evolutionary processes.

23 **(a)**

Homo erectus (erect man) appeared about 1.7 million years ago in middle Pleiostocene. *Homo erectus* was evolved from *Homo habilis*. He was about 1.5-1.8 metres tall. He was the progenater of two main sub-species Neanderthal and Cro-magnon man

24 **(b)**

Nature select an organism which have an advantage to the particular given environment. Members of the ancestral salamander population that colonized the cave differed in their abilities. In caves, the eyes are of no use. So in that condition blind salamander were selected over the salamanders having eyes

25 **(d)**

Homology indicates common ancestry. It is based on divergent evolution, In plants, the thorns and tendrils of $Bougainvillea$and$Cucurbita$, respectivelyrepresent homology.

26 **(d)**

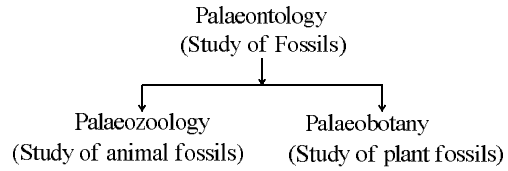
It is suggested that the large organic molecules formed abiotically in the primitive earth came together spontaneously and due to intermolecular attractions formed large colloidal aggregates called **coacervates**. An envelose of water molecules formed around each such aggregate due to hydrophilic nature of some of these compounds.

27 **(c)**

Though living organisms tend to multiply geometrically, the number of individuals of a species tend to remain constant over along period of time. Out of heterogenous population, (due to variation) best adapted individuals are selected by nature.

28 **(c)**

Both (a) and (b).



Palaeontological evidences (Evidences from fossil records)

Study of fossils is called Palaeontology

Leonardo de Vinci (1452-1519) an italian painter and invertor is called the Father of Palaeontology

Fossils are the remains of hard parts of life-forms found in rocks. Rocks forms sediments and a cross-section of earth's crust indicates the arrangement of sediments one over the other during the long history of earth

A variety of fossils ranging from the modern organisms to extint organisms can be observed and depicted by evolution

By studing the different sedimentary layers, the geological time period in which the

organisms existed can be predicted

29 **(a)**

A species can be defined as 'a group of closely related organisms', which are capable of inbreeding to produce fertile offsprings. Thus, biological concepts of species is mainly based on **reproductive isolation**, which preserve the integrity of the species by checking hybridization.

30 **(d)**

Spontaneous generation and origin of life from non-living organism are the most common alternative ways to describe the process of abiogenesis

31 **(b)**

$Homoerectus$ had a large brain having cranial capacity 900cc.

32 **(b)**

Saltation is the occurrence of a major mutation in a single generation, bringing about singnificant change.

33 **(b)**

According to **Oparin**, the atmosphere of primitive earth was reducing because H atoms were most numerous and most reactive. Large quantities of $H_2, N_2, H_2O, CO_2, CH_4$ and NH_3 were present but free oxygen was not present in significant amount.

34 **(a)**

Electron Spin Resonance (ESR) **Dating** Many materials found in archeological sites are able to trap electronic charges as a result of bombardment by radioactive radiation from the surrounding sediment.

The presence of these trapped charges can be detected by Electron Spin Resonance (ESR) spectroscopy.

The intensity of the ESR signal is a measure of the accumulated dose and thus of the age.

Tooth enamel is ubiquitous at archeological sites and is well suited for ESR dating, with a precision of about 10-20%.

This method has now been used to date many sites critical to the biological and cultural evolution on modern man

35 **(a)**

A-*Homo erectus*; B-Cro-magnon man

36 **(b)**

Organs which perform similar functions but having different origin and structure are called **analogous organs**. Wings of birds and wings of insects are analogous organs. Such organs are not antomically similar through they perform similar functions. Hence, analogous structures are result of convergent evolution. Other examples of analogy are the eye of the $Octopus$ and mammals, the flippers of penguins and dolphins, sweet potato and potato, etc.

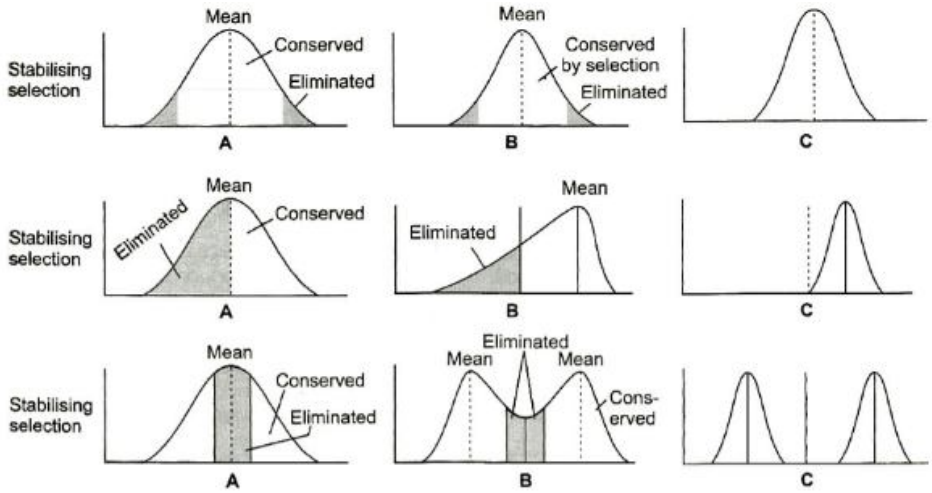
37 **(b)**

Vestigial organs present in an adult individual are examples of palaeontologicalbasis of evidence of evolution.

38 **(a)**

Directional.

Selection process in natural selection are



(i) **Stabilizing Selection** (Balancing selections) This type of selection favours average sized individuals, while eliminates small sized individuals. It reduces variation and hence, do not promote evolutionary changes. It maintains the mean value from generation to generation. If we draw a graphical curve of population, it is bell-shaped

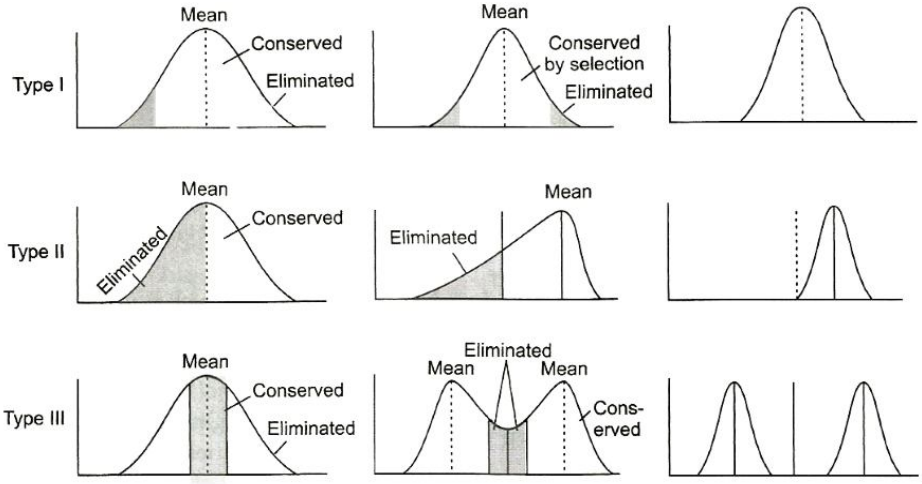
(ii) **Directional Selection** (Progressive Selection) In this selection, the population changes towards one particular direction. It means this type of selection favours small or large-sized individuals and more individuals of that type will be present in new generation. The mean size of the population changes

(iii) **Disruptive Selection** (Diversifying selection) This type of selection favours both small-sized and large-sized individuals. It eliminates most of the members with mean expression, so as to produce two peaks in the distribution of the trait that may lead to the development of two different populations. This kind of selection is opposite of stabilizing selection and is rare nature but is very important in bringing about evolutionary changes

39 **(a)**

Stabilizing selection.

Selection process in natural selection are



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40 **(b)**

Cosmozoic theory or hypothesis of Panspermia was developed by **Richter** (1865) and then supported by Thomson, Helmhontz, Van Tieghem and others. According to this hypothesis, life comes from other space in the form of spores of simple organisms.

41 **(d)**

Major radiations of mammals, birds and pollinating insects took place in **Palaeocene** epoch.

42 **(a)**

Stanley Miller and **Harold Urey** built an apparatus of glass tube and flasks in laboratory. He created early earth atmosphere containing hydrogen, methane, ammonia and water vapours and produced simple organic acids such as urea, hydrogen cyanide, sugars, purines, pyrimidines and amino acids.

43 **(c)**

Hardy –Weinberg principle illustrates that change of frequency of alleles in a population results in evolution.

44 **(c)**

RNAs most probably could have catalyzed the formation of lipid like molecules that could have in turn formed plasma membrane and proteins. The proteins might have taken over most enzymatic heredity molecule then, DNA evolved from RNA template. Once cells were evolved, DNA probably replaced RNA in most organisms

45 **(a)**

*Australopithecus*are considered as connecting link between ape and man. They were the ancestors of man, who first stood erect. Their cranial capacity was 300-500 cc.

46 **(d)**

All of above.

mportant theories to explain the origin of life on earth are

(i) **Theory of Special Creation** The greatest supporter of this theory was father Suarez. According to this theory life was created by supernatural powers. According to Bible the world was created in six days. The earth is 4000 yrs old. All the diversity was existed since creation

(ii) **Theory of Panspermia** This theory is also called the cosmozoic theory. Early Greek thinkers thought units of life called spores were transferred to the different plants including earth from the other planets

(iii) **Theory of Spontaneous Generation** This theory also is called a biogenesis or autogenesis. This theory states that the life originated from non-living by itself or spontaneous manner

Dismissial of Spontaneous Generation Theory Louis Pasteur by carefully experimentation demonstrated that, life comes only from pre-existing life. He showed that in pre-sterilised flasks life did not come from killed yeast, while in another flask open to air, new living organisms arose from 'killed yeast'. Spontaneous generation theory was dismissed once and for all. However, this did not answer how the first life came on the earth.

(iv) **Theory of Chemical Evolution** This theory is also called modern theory of evolution or neuralistic theory of evolution

Oparin and Haldane proposed that the first form of life could have come from pre-existing non-living organic molecules ($e.g.$, RNA, protein, etc.) and that formation of life was preceded by chemical evolution, *i.e.*, formation of diverse organic molecules from inorganic constituents

47 **(a)**

Lamarck's theory of evolution was published in $PhilosophieZoologique$ in the year 1809. It is popularly known as 'the inheritance of acquried characters in organisms'. According to this, if an organ is used continuously and constantly, it will tend to become highly developed, whereas disuse results in its degeneration.

48 **(a)**

Continuous Variations Continuous variations are minute variations, which occurs in graded series. They fluctuate an either side of the average condition and differ only slightly from one another

49 **(a)**

Cro –magnon man (*Homo sapiens fossilis)* is the most recent and direct prehistoric ancestor of present man. It arose about 3,40,000 years ago.

50 **(a)**

Hugo de Vries believed that mutation causes evolution and not the minor heritable variations, which was mentioned by Darwin

Mutation are random and directionless, while Darwin's variations are small and directional

Term 'saltation' is also called single step large mutation, which leads to new specks