

10th Science Lesson 19 Questions in English**19] Origin And Evolution Of Life**

1. What are the significant characters of the living organisms?

- a) Evolution of diversities
- b) Organizational and functional unity
- c) Balanced relationship with nature
- d) All the above**

Explanation

Living organisms possess distinct characteristics, display organizational and functional unity, entail a mechanism of origin and evolution of diversities and maintain a balanced relationship with nature. Most aspects of evolution indicate that the knowledge of the past has become essential for fully understanding the present.

2. Define evolution of life.

- a) Adaptations of living organisms throughout the time.**
- b) Origin and adaptations of life.
- c) Knowledge of the past.
- d) Changes in the life style on earth.

Explanation

Life since its beginning on earth had changed through time. The history of life comprises of two aspects, one is the origin of life on earth and the other is mechanism involved in the gradual changes and adaptations of living organisms through time which is known as the evolution of life.

3. Assertion (A): The Origin of the Universe is explained by the Big Bang theory.

Reasoning(R): As per Big Bang theory the Universe originated by an explosive mechanism.

- a) Both A and R is True and R is the correct explanation of A.**
- b) Both A and R is True but R is not the correct explanation of A.
- c) A is True but R is False.
- d) Both A and R is False.

Explanation

Origin of Earth: Origin of life is linked with the origin of earth. The Big Bang theory explains the Origin of Universe. It proposes that the universe had an explosive beginning (Big Bang) and originated 15 billion years ago.

4. Choose the correct statements.

- i) The Universe is made up of stars, cloud of gas and dust.
- ii) The gaseous clouds collapsed due to own gravity and atoms and particles were formed.
- iii) Atoms, dust grains and gaseous disc aggregated to form clumps which gave rise as planets.

- a) i only
- b) ii only
- c) iii only
- d) All the above**

Explanation

The universe comprised of stars, clouds of gas and dust which form the galaxies. The solar system was probably created when the gaseous clouds started to collapse due to the force of its own gravity forming atoms and particles. Atoms, dust grains and gaseous disc aggregated to form clumps and gave rise to planets. This forms the solar system of the Milky Way galaxy.

5. Assertion (A): Earth was supposed to have formed about 4.5 billion years back.

Reasoning(R): Life appeared 500 million years after the formation of earth.

- a) Both A and R is True and R is the correct explanation of A.**
- b) Both A and R is True but R is not the correct explanation of A.
- c) A is True but R is False.
- d) Both A and R is False.

Explanation

Earth was supposed to have been formed about 4.5 billion years back. Life appeared 500 million years after the formation of earth.

6. Which of the following ideas or theory supports earth as a divine creation?

- a) Special creation**
- b) Spontaneous generation
- c) Cosmic origin
- d) Biogenesis

Explanation

Many theories have been postulated to explain the origin of life. The view on the origin of life has been put forth as Special creation: This idea embodies that life on Earth is a divine creation and also attributes to supernatural event at a particular time in the past. It also emphasizes that life has not changed ever since its origin.

7. Which of this theory of life is based on the spontaneous generation?

- a) Life came from outer space.
- b) Earth is a divine creation.
- c) Life originated from lifeless matter.**
- d) Life originates from pre-existing life.

Explanation

Spontaneous generation (Abiogenesis): According to this theory life originated spontaneously from lifeless matter. It was believed that fishes originated from mud, frogs from moist soil and insects from decaying matter.

8. Who speculated the biogenesis concept of life?

- a) Gregor Mendel
- b) Louis Pasteur**
- c) Albert Einstein
- d) Carolus Linnaeus

Explanation

Biogenesis: It was speculated by Louis Pasteur (1862) that life originates from preexisting life. He showed that pre-sterilized flasks kept closed airtight, with killed yeast, did not give rise to any life form, while in another flask kept open to air living organisms arose from killed yeast.

9. Which of these were the basis of life in earth and other planets by the Extraterrestrial origin?

- a) Dust particles
- b) Panspermia**
- c) Chemical reactions
- d) Amoeba

Explanation

Extraterrestrial or cosmic origin: Some scientists still believe that life came from outer space. This states that units of life called spores (Panspermia) were transferred to different planets including earth. This is still an idea of some astronomers.

10. Choose the Incorrect statements regarding the Chemical evolution of life.

- i) Oparin and Haldane developed the idea of chemical evolution of life.
 - ii) Life arose by a series of sequential chemical reactions with the conditions prevailing on earth.
 - iii) The first form of life could have come from a pre-existing living organic molecule.
- a) i only
 - b) ii only
 - c) iii only**
 - d) None of the above

Explanation

Chemical Evolution of Life: This idea was developed by Oparin (1922) and Haldane (1929). They proposed that with the conditions prevailing on earth, life arose by a series of sequential chemical reactions. The first form of life could have come from pre-existing nonliving inorganic molecules which gave rise to formation of diverse organic molecules which are transformed into colloid system to produce life. The modern concept on chemical evolution regarding origin of life was accepted.

11. Which of this concept is accepted by the relationship between existing and extinct organisms?

- a) Pre-existing non-living inorganic molecules gave rise to diverse organic molecules.
- b) All organisms evolved from common ancestors.**

- c) Life started by a series of chemical reactions.
- d) Life originated spontaneously from lifeless matters.

Explanation

Evolution can be better understood only by observing the interrelationship between the existing organisms and also relating the similarities with the extinct organisms. The inter relationship of the organisms is also supported by evidences from different branches of biology. These evidences support the concept that all organisms have evolved from common ancestors.

12. Which of these are the homologous structures in the mammals?

a) Fore limbs

- b) Feet
- c) Eyes
- d) Skull

Explanation

Homologous organs: The homologous organs are those which have inherited from common ancestors with similar developmental pattern in embryos. The fore limbs of mammals are homologous structures. A human hand, a front leg of a cat, flipper of a whale and a bat's wing look dissimilar and adapted for different functions. Their mode of development and basic structure of bone are similar.

13. Assertion (A): Analogous organs look similar and used to perform similar functions.

Reasoning(R): The wings of a bat and a bird have different origin and development pattern.

a) Both A and R is True and R is the correct explanation of A.

- b) Both A and R is True but R is not the correct explanation of A.
- c) A is True but R is False.
- d) Both A and R is False.

Explanation

Analogous organs: The analogous organs look similar and perform similar functions but they have different origin and developmental pattern. The function of the wings of a bat, the wings of a bird and wings of an insect are similar, but their basic structures are different.

14. Which of the following is not a vestigial organ of a human?

- a) Appendix
- b) Caudal vertebra
- c) Wrist bones**
- d) Coccyx

Explanation

Vestigial organs: The degenerated and non-functional organs of animals are called vestigial organs. The same organs are found to be well developed and functional, in some of the related forms. Some

of the vestigial organs in man are vermiform appendix, nictitating membrane, caudal vertebra, coccyx etc.

15. Define Atavism.

a) Degenerated organs of animals due to improper usage.

b) Reappearance of ancestral characters in some individuals.

c) Organs looking similar and having different structures.

d) Organs inherited from common ancestors with similar development pattern.

Explanation

Atavism: The reappearance of ancestral characters in some individuals is called atavism. E.g Presence of rudimentary tail in new born babies, presence of thick hair on the human body.

16. Choose the Incorrect statements.

i) The comparative study of embryology of different animals supports the evolution concept.

ii) The embryos from fish to mammals are similar in their early stages of development.

iii) The differentiation of the special characters in the animals appears in the early stages of development.

a) i only

b) ii only

c) iii only

d) None of the above

Explanation

The study of comparative embryology of different animals supports the concept of evolution. The embryos from fish to mammals are similar in their early stages of development. The differentiation of the special characters appears in the later stages of development.

17. Assertion (A): According to Biogenetic law Ontogeny recapitulates Phylogeny.

Reasoning(R): The Development stage of individuals repeats the evolutionary history of the entire race.

a) Both A and R is True and R is the correct explanation of A.

b) Both A and R is True but R is not the correct explanation of A.

c) A is True but R is False.

d) Both A and R is False.

Explanation

Biogenetic law or Recapitulation theory was given by Ernst Haeckel. According to this theory, Ontogeny recapitulates Phylogeny. The stage of development of the individual animal repeats the evolutionary history of the entire race of the animal.

18. Choose the correct statements.

i) The study of fossils is called as Paleontology.

- ii) The study of fossils is used for understanding the evolution line of Invertebrates and Vertebrates.
iii) The Origin of modern birds is supported by the paleontology evidences.

- a) i only
b) ii only
c) iii only

d) All the above

Explanation

Paleontology deals with the study of fossils. The study of fossils helps us to understand the line of evolution of many invertebrates and vertebrates. Fossil records show that the evolution has taken a gradual process from simple to complex organisms. The origin of modern birds is supported by the evidences from paleontology.

19. Who is known as the Father of Palaeontology?

- a) Leonardo da Vinci**
b) Jean Baptiste Lamarck
c) Charles Darwin
d) Ernst Haeckel

Explanation

Leonardo da Vinci is called the Father of Palaeontology.

20. Which of the following statement is not true regarding Archaeopteryx?

- a) It is the oldest known fossil bird like form found in Jurassic period.
b) This creature links between the reptiles and birds.
c) The reptile features of these form is clawed digits and conical teeth.

d) The small skull is the bird feature of archaeopteryx.

Explanation

Archaeopteryx: Archaeopteryx is the oldest known fossil bird. It was an early birdlike form found in the Jurassic period. It is considered to be a connecting link between reptiles and birds. It had wings with feathers like a bird. It had long tail, clawed digits and conical teeth like a reptile.

21. Assertion (A): Evolution is the formation of new species due to the changes in specific characters over several generations.

Reasoning(R): Evolution is the gradual change occurring in living organisms over a period of time.

- a) Both A and R is True and R is the correct explanation of A.**
b) Both A and R is True but R is not the correct explanation of A.
c) A is True but R is False.
d) Both A and R is False.

Explanation

Life had evolved along with evolution of earth towards the end of 18th century. Evolution is the gradual change occurring in living organisms over a period of time. Formation of new species due

to changes in specific characters over several generations as response to natural selection is called evolution.

22. Which of these theories explain the natural changes in evolution?

- a) Ernst Haeckel
- b) Lamarck and Darwin**
- c) Leonardo da Vinci
- d) Oparin and Haldine

Explanation

The natural changes occurring are explained through the theories of evolution as proposed by Lamarck and Darwin.

23. Which of the following publication depicted the theory of evolution of Jean Baptiste Lamarck?

- a) Origin of Species
- b) Philosophic Zoologique**
- c) The Selfish Gene
- d) Species Plantarum

Explanation

Jean Baptiste Lamarck (1744-1829) was a French naturalist, well known for his theory of evolution. His theory of evolution was published in 'Philosophic Zoologique' in the year 1809.

24. Which of the following is the Lamarck's theory of evolution?

- a) Theory of Inheritance of Acquired characters
- b) Use and Disuse theory
- c) Lamarckism
- d) All the above**

Explanation

Lamarck's theory of evolution was published in 'Philosophic Zoologique' in the year 1809. It is popularly known as "Theory of inheritance of Acquired Characters" or "Use and Disuse theory" or Lamarckism.

25. Which of the following statements is not related to the principles of Lamarckism?

- a) Living organisms or their parts tend to increase in size continuously.
- b) The study of fossils method is used to study the variations of the living organisms.**
- c) Environment change brings variations in the need of the organisms.
- d) New adaptations of the organisms may develop new body parts.

Explanation

Principles of Lamarckism: Internal vital force, living organisms or their component parts tend to increase in size continuously. This increase in size is due to the inherent ability of the organisms. Environment and new needs, a change in the environment brings about changes in the need of the

organisms. In response to the changing environment, the organisms develop certain adaptive characters. The adaptations of the organisms may be in the form of development of new parts of the body.

26. Choose the Incorrect statements regarding the concept of Use and Disuse theory.

- i) Lamarck's theory states that if an organ is used constantly that specific organ is developed and strengthened.
 - ii) Organ which is not used for a long time degenerates immediately.
 - iii) The continuous stretching of giraffe neck and forelimbs is the example for organ of disuse.
- a) i only
 - b) ii only
 - c) iii only**
 - d) None of the above

Explanation

Use and disuse theory: Lamarck's use and disuse theory states that if an organ is used constantly, the organ develops well and gets strengthened. When an organ is not used for a long time, it gradually degenerates. The ancestors of giraffe were provided with short neck and short forelimbs. Due to shortage of grass, they were forced to feed on leaves from trees. The continuous stretching of their neck and forelimbs resulted in the development of long neck and long forelimbs which is an example for constant use of an organ. The degenerated wing of Kiwi is an example for organ of disuse.

27. Which of the following is called as the acquired character of an animal?

- a) Characters developed in response to the environment changes.**
- b) Characters needed for surviving in the challenging environment.
- c) Mutation characters developed during the life time of an animal.
- d) Transferred characters from the ancestors without any changes.

Explanation

Theory of Inheritance of acquired characters: When there is a change in the environment the animals respond to the change. They develop adaptive structures. The characters developed by the animals during their life time in response to the environmental changes are called acquired characters. According to Lamarck, the acquired characters are transmitted to the offspring by the process of inheritance.

28. Which of the following statements are not true based on the life history of Charles Darwin?

- a) Charles Darwin was one of the great naturalist and philosopher of 18th century.
- b) Charles Darwin was born in South America in the year 1809.**
- c) J.S.Henslow nominated Darwin for the 5 years voyage of exploration on a ship named H.M.S. Beagle.

d) Darwin made elaborate observations on nature of the land, plants and animals worked for a period of 20 years to develop the theory of natural selection.

Explanation

Charles Darwin (1809-1882) was one of the great naturalist and philosopher of 18th century. He was born in England in 1809. While studying in college through his friendship with Professor J.S.Henslow he was fascinated towards nature. At that time the British Admiralty planned a voyage of exploration for 5 years on a ship named H.M.S. Beagle around South America. Dr Henslow was asked to nominate a young naturalist for the voyage. Darwin was given the opportunity. During his five years (1831–1835) voyage he visited many parts of the world, a number of islands including the Galapagos Island and Pacific Island. Darwin made elaborate observations on nature of the land, plants and animals of the regions he visited. He further worked for a period of 20 years to develop the theory of natural selection.

29. Which of these results in the evolutionary transformation according to Darwin theory?

- a) Environmental changes
- b) Natural selection**
- c) Need of new species
- d) Atmospheric and cosmic variations

Explanation

Darwin published his observations and conclusions under the name 'Origin of species' in 1859. The book of Darwin demonstrates the fact of evolution. It elaborates on the theory of Natural selection for evolutionary transformation.

30. Assertion (A): Living beings are able to reproduce more and multiply in a geometrical manner. Reasoning(R): Overproduction creates an intense competition for food and space leading to struggle.

- a) Both A and R is True and R is the correct explanation of A.**
- b) Both A and R is True but R is not the correct explanation of A.
- c) A is True but R is False.
- d) Both A and R is False.

Explanation

Principles of Darwinism: Overproduction, Living beings have the ability to reproduce more individuals and form their own progeny. They have the capacity to multiply in a geometrical manner. This will increase reproductive potential leading to overproduction. Struggle for existence, Due to overproduction a geometric ratio of increase in population occurs. The space to live and food available for the organisms remain the same. This creates an intense competition among the organisms for food and space leading to struggle.

31. Which of these is known as the competition among the individuals of same species?

- a) Environmental struggle
- b) Interspecific struggle**

c) Intraspecific struggle

d) Evolution struggle

Explanation

The struggles for existence are of three types:

Intraspecific struggle: Competition among the individuals of same species.

Interspecific struggle: Competition between the organisms of different species living together.

Environmental struggle: Natural conditions like extreme heat or cold drought and floods can affect the existence of organisms.

32. Which of these cause the environmental struggle among the living beings?

a) Heat or cold

b) Flood

c) Drought

d) All the above

Explanation

Environmental struggle: Natural conditions like extreme heat or cold drought and floods can affect the existence of organisms.

33. Choose the Incorrect statements regarding the variations.

i) The Occurrence of variation is a characteristic feature of mammals only.

ii) Small variations are important for evolution.

iii) Favorable variations are useful and unfavorable variations are harmful to the organisms.

a) i only

b) ii only

c) iii only

d) None of the above

Explanation

Variations: The occurrence of variation is a characteristic feature of all plants and animals. Small variations are important for evolution. According to Darwin favorable variations are useful to the organism and unfavorable variations are harmful or useless to the organism.

34. Which of the following statements are related to the concept of survival of the fittest?

a) Species unable to face challenges are unfit to survive and disappear.

b) All organisms must adapt to the surrounding environment by overcoming a challenging situation.

c) An organ is used constantly then it is developed well and gets strengthened.

d) The process of selection of organisms with favorable variation is natural selection.

Explanation

Survival of the fittest or Natural selection: During the struggle for existence, the organisms which can overcome the challenging situation, survive and adapt to the surrounding environment.

Organisms which are unable to face the challenges are unfit to survive and disappear. The process of selection of organisms with favorable variation is called as natural selection.

35. What is the origin of species according to Darwin theory?

- a) **Gradual accumulation of favorable variations for number of generations.**
- b) Environment changes lead to the new parts of living organisms.
- c) Evolution and variations are not related to each other.
- d) Use and Disuse theory is the major reason for the new species.

Explanation

Origin of species: According to Darwin, new species originates by the gradual accumulation of favorable variations for a number of generations.

36. Which of these leads to the differences in the phenotype of off springs from its parents?

- a) Adaptation
- b) **Variations**
- c) Evolution
- d) Environmental changes

Explanation

Sexual reproduction, which involves meiosis, helps in recombination of genes during gametic fusion. This leads to differences in the phenotype of the offspring from its parents. These differences are called variation.

37. Choose the correct statements.

- i) Variations play an important role in evolution.
 - ii) Variations are the difference among the individuals of the same species and the off springs of same parent.
 - iii) Evolution is not possible without variations.
- a) i only
 - b) ii only
 - c) iii only
 - d) **All the above**

Explanation

Variation is the difference found among individuals of the same species and the offspring of the same parent. Variation is the raw material which plays an important role in evolution. Evolution would not be possible without variation.

38. Which of this variation affects the body cells of the organisms?

- a) **Somatic variation**
- b) Germinal variation
- c) Discontinuous variation

d) Continuous variation

Explanation

Somatic variation: These are the variations which affect the body (somatic) cells of the organisms. They are not heritable. They occur due to environmental factors.

39. Which of these is not a factor of germinal variation?

a) Variations are produced in germ cells of an organism.

b) Two types of germinal variations are classified.

c) Germinal variations are present in ancestors.

d) These variations are not inherited in organisms.

Explanation

Germinal variation: These variations are produced in germ cells of an organism. They are inherited. They may be present in ancestors or may occur suddenly. They are classified into two types: Continuous variation and Discontinuous variation.

40. Which of these are also known as the continuous variations?

a) Fluctuating variations

b) Sudden variations

c) Accumulating variations

d) Germinal variations

Explanation

Continuous variation: These are small variations which occur among individuals of a population. They are also called as fluctuating variations. They occur by gradual accumulation in a population. e.g. skin color, height and weight of an individual, color of eye, etc.

41. Which of the following statements are not true regarding the discontinuous variation?

a) Sudden changes occur in an organism due to mutations.

b) Discontinuous variation is large and not used for evolution.

c) These variations may have intermediate forms.

d) Discontinuous variation forms the basis for mutation theory proposed by De Vries.

Explanation

Discontinuous variation: These are sudden changes which occur in an organism due to mutations. They do not have any intermediate forms. These large variations are not useful for evolution. E.g. short legged Ancon sheep, six or more digits (fingers) in human, Discontinuous variation form the basis for Mutation theory proposed by De Vries.

42. Choose the correct statements.

i) Mutation and Variation are events involved in the process of evolution.

ii) The Variations leads to Mutation.

iii) Variations bring changes in a single individual.

iv) Mutation arises due to errors occurring in DNA.

a) i, iii only

b) ii, iv only

c) i, iii, iv only

d) iv only

Explanation

Relationship between Mutation and Variation: Mutation and Variation are two events involved in the process of evolution. Mutation arises due to errors occurring in DNA during replication or exposure to UV rays or chemicals. Mutation leads to variation. It brings about changes in a single individual.

43. What is the origin of the word Paleobotany?

a) Greek

b) Persia

c) Latin

d) Rome

Explanation

Paleobotany is derived from Greek words paleon that means "old" and botany the study of plants. It is the branch of paleontology that deals with recovery and identification of plant remains of geological past.

44. Assertion (A): Majority of plants fossils are disarticulated parts of plants that have died long back.

Reasoning(R): Only part of a plant is preserved and it is rare to find preserved form of whole plant.

a) Both A and R is True and R is the correct explanation of A.

b) Both A and R is True but R is not the correct explanation of A.

c) A is True but R is False.

d) Both A and R is False.

Explanation

A plant fossil is any preserved part of a plant that has died long back. Fossils may be a prehistoric impression that may be hundred to millions of years old. Majority of the plant fossils are disarticulated parts of plants, it is rare to find plants to be preserved as whole.

45. What is the importance's of Fossils?

a) Historical approach to plant kingdom.

b) Used to classify the plants.

c) Used in descriptive and comparative anatomy.

d) All the above

Explanation

Importance of fossils: They throw light on phylogeny and evolution of plants. Fossil plants give a historical approach to plant kingdom. Fossils are useful in classification of plants. Fossil plants can be used in the field of descriptive and comparative anatomy.

46. Who is known as the Father of Paleobotany?

- a) Birbal Sahani
- b) J.W.Harshberger
- c) Kaspar Maria Von Sternberg**
- d) W.F.Libby

Explanation

Kaspar Maria Von Sternberg is the "Father of Paleobotany" (1761–1838) was born in Europe. He established the Bohemian National Museum in Prague and is deemed to be the founder of Modern Paleobotany.

47. Assertion (A): Birbal Sahani is the Father of Indian Paleobotany.

Reasoning(R): Birbal Sahani presented his research on the fossil plants of Indian Gondwana formations.

- a) Both A and R is True and R is the correct explanation of A.**
- b) Both A and R is True but R is not the correct explanation of A.
- c) A is True but R is False.
- d) Both A and R is False.

Explanation

Birbal Sahani is the "Father of Indian Paleobotany" (1891–1949). He presented his research on two different areas of Paleobotany, the anatomy and morphology of Paleozoic Ferns and the fossil plants of the Indian Gondwana Formations.

48. Which of these methods are the common methods of fossilization?

- a) Petrification
- b) Molds and cast
- c) Carbonization
- d) All the above**

Explanation

The process of formation of fossil in the rocks is called fossilization. Common methods of fossilization include petrification, molds and cast, carbonization, preservation, compression and infiltration.

49. Define petrification.

- a) Minerals or sediments fill the hollow depression to form a cast.
- b) Organisms are preserved in ice or amber to prevent it from decaying.
- c) Minerals like silica penetrate and replace the original organic tissue to form fossils.**

d) Organism are buried in sediments and dissolved in underground water.

Explanation

Petrifaction: Minerals like silica slowly penetrate in and replace the original organic tissue and forms a rock like fossil. This method of fossilization can preserve hard and soft parts. Most bones and wood fossils are petrified.

50. Choose the incorrect statements.

- i) Mold is a hollow depression formed when an organism is buried in sediments and dissolved in water.
 - ii) Mold shows the original shape and the internal structure of the organisms.
 - iii) The Minerals or sediments filling the hollow depression to form a cast.
- a) i only
 - b) ii only**
 - c) iii only
 - d) None of the above

Explanation

Mold and Cast: A replica of a plant or animal is preserved in sedimentary rocks. When the organism gets buried in sediment it is dissolved by underground water leaving a hollow depression called a mold. It shows the original shape but does not reveal the internal structure. Minerals or sediment fill the hollow depression and forms a cast.

51. Which of these are used for preserving the original animals or plants?

- a) Ice or Amber**
- b) Alcohol
- c) Carbon
- d) Mercury

Explanation

Preservation: Original remains can be preserved in ice or amber (tree sap). They protect the organisms from decay. The entire plant or animal is preserved.

52. By which of these process fossils are formed?

- a) Replacement
- b) Compression**
- c) Preservation
- d) Petrification

Explanation

Compression: When an organism dies, the hard parts of their bodies settle at the bottom of the sea bed and are covered by sediment. The process of sedimentation goes on continuously and fossils are formed.

53. Which of these minerals are used for infiltration or replacement?

- a) Calcium carbonate
- b) Silica
- c) Magnesium carbonate
- d) All the above**

Explanation

Infiltration or Replacement: The precipitation of minerals takes place which later on infiltrate the cell wall. The process is brought about by several mineral elements such as silica, calcium carbonate and magnesium carbonate. Hard parts are dissolved and replaced by these minerals.

54. Which of the following is an example of living fossils?

- a) Ammonites
- b) Brachiopods
- c) Ginkgo biloba**
- d) Archaeopteryx

Explanation

Living Fossils: These are living organisms that are similar in appearance to their fossilized distant ancestors and usually have no extinct close features. E.g. Ginkgo biloba.

55. Which of these radioactive elements is not used to determine the age of fossils?

- a) Carbon
- b) Mercury**
- c) Lead
- d) Potassium

Explanation

The age of fossils is determined by radioactive elements present in it. They may be carbon, uranium, lead or potassium. It is used in Palaeo botany and anthropology for determining the age of human fossils and manuscripts.

56. Who discovered the Radio-active carbon dating method?

- a) W.F.Libby**
- b) Kaspar Maria Von Sternberg
- c) J.W.Harshberger
- d) Birbal Sahani

Explanation

Radioactive carbon (C14) dating method: This method was discovered by W.F. Libby (1956). By calculating which of these in a dead animals or plants the time of Carbon consumption of animals and plants stops after death and since then, only the decaying process of C14 occurs continuously. The time passed since death of a plant or animal can be calculated by measuring the amount of C14 present in their body.

57. Assertion (A): The Geological time scale is a system of chronological dating related to the geological rock strata to time.

Reasoning(R): The geological time scale describes the timing and relationships of events occurred during Earth's history.

- a) **Both A and R is True and R is the correct explanation of A.**
- b) Both A and R is True but R is not the correct explanation of A.
- c) A is True but R is False.
- d) Both A and R is False.

Explanation

The geological time scale is a system of chronological dating that relates geological rock strata to time, and is used by geologists, paleontologists, and other Earth scientists to describe the timing and relationships of events that have occurred during Earth's history.

58. Which of the following statements is not true?

- a) The organic matter of the trees are replaced by silica and fossilized.
- b) **The fossilized trees do not retain their original color, shape and texture.**
- c) The trees are converted into solid rocks and every property of plants is still visible.
- d) Thiruvakkarai fossil wood park is located in Villupuram district, Tamil Nadu.

Explanation

Thiruvakkarai fossil Wood Park (Villupuram district, Tamil Nadu): 2 million years ago tree trunks that got buried along the river, in course of time the organic matter was replaced by silica and was fossilized. They retained their color, shape and texture and was converted into solid rocks. The annular rings, the texture, colors of the layers, nodes and every properties of plants are still visible.

59. Choose the incorrect statements regarding Ethno botany.

- i) Ethno botany is the study of a region's plants and their practical usages.
 - ii) J.W.Harshberger in 1895 coined the term Ethno botany.
 - iii) Ethno botany emerged as a distinct academic branch of natural science from the ancient times.
- a) i only
 - b) ii only
 - c) **iii only**
 - d) None of the above

Explanation

Ethno botany is the study of a region's plants and their practical uses through the traditional knowledge of the local culture of people. The term Ethno botany was coined by J.W. Hershberger in 1895 to include the study of plants used by the primitive and aboriginal people. Though this discipline has existed for ages, ethno botany emerged as a distinct academic branch of natural science in 20th century.

60. What are the main aspects of Ethno botany?

- a) Economic up liftment
- b) Biodiversity conservation
- c) Sustainable use of plant resources.
- d) All the above**

Explanation

Aspects of ethno botany: Ethno botany has relevance with problems of nutrition, health care and life support system, faith in plants, cottage industries, economic up liftment, conservation of biodiversity and sustainable use of plant resources.

61. Which of the following statements is not related to ethno botany?

- a) Ethno botany provides the traditional usages known and unknown plants.
- b) Synthesized medicines and drugs are made by the various parts of plants.**
- c) Ethno medicinal data is a useful source of information for the herbal medicine practitioners.
- d) Plant parts like bark, stem, root, seeds and oils are used for treating diseases.

Explanation

Importance of Ethno botany: It provides traditional uses of plant. It gives information about certain unknown and known useful plants. The ethno medicinal data will serve as a useful source of information for the chemists, pharmacologists and practitioners of herbal medicine. Tribal communities utilize ethno medicinal plant parts like bark, stem, roots, leaves, flower bud, flowers, fruits, seeds, oils, resins, dyes, gum for the treatment of diseases like diarrhea, fever, headache, diabetes, jaundice, snakebites, leprosy, etc.

62. What are the objectives of Astrobiology or Exobiology?

- a) A branch of science deals with presence of extra-terrestrial life in the Universe.
- b) Origin, evolution and distribution of life in the Universe.
- c) Investigates the possibility of life in other world.
- d) All the above**

Explanation

Astrobiology/exobiology is the science which looks for the presence of extra-terrestrial life in the universe. Astrobiology deals with the origin, evolution and distribution of life in the universe and to investigate the possibility of life in other world.

63. Which of the following is not a criterion for a habitable zone?

- a) A planet must have a right mass to retain an atmosphere.
- b) The size of the planet must be small enough to have aquatic zones.**
- c) The orbit of the planet must be at a right distance from the Star.
- d) The distance between planet and the star has to be neither too hot nor not too cold.

Explanation

The major concept in astrobiology is the habitable zone. The theory explains that any planets can support the existence of life, if it fulfills two important criteria. It must have a right mass to retain an atmosphere. It must have an orbit at just the right distance from its star (Sun) that it allows liquid water to exist. Thus, the distance need to be neither too hot nor not too cold and is often referred as Goldilocks Zone for life.

64. Assertion (A): Earth is the only planet in the solar system which is in the Goldilocks zone.

Reasoning(R): Mars planet is likely to have creatures that can survive in extreme environments of Earth.

- a) **Both A and R is True and R is the correct explanation of A.**
- b) Both A and R is True but R is not the correct explanation of A.
- c) A is True but R is False.
- d) Both A and R is False.

Explanation

In our solar system 'Earth' is the only planet in the goldi lock zone. Since, this zone varies at times as the star evolves we know that Mars have also been habitable. The life on Mars is likely to be the creatures, we find in extreme environments on earth.

65. Which of these are called as Extremophiles?

- a) Multi cell organisms found in aquatic regions.
- b) **Organisms living in extreme environmental conditions.**
- c) Extinct organisms.
- d) Single cell organisms.

Explanation

The organisms which live in extreme environmental conditions on earth are called extremophiles. Thus, within our own Solar System, there are many areas that are different from the Earth where it is probable to find the presence of life similar to extremophile bacteria.

66. What are the objectives of the NASA's Mars 2020?

- a) Surface geological process
- b) Possibility of past life
- c) Preserving bio signatures
- d) **All the above**

Explanation

NASA is developing the Mars 2020 astrobiology to investigate an Astor biologically relevant ancient environment on Mars, its surface geological processes and the possibility of past life on Mars and preservation of bio signatures within accessible geological materials.