EVOLUTION

1. According to one of the most widely accepted theories, earth's atmosphere before origin of life consisted of a mixture of

   (A) O_3,CH_4,O_2 and H_2O

   (B) O_3, NH_3 , $CH_4$and H_2O2

   (C) H_2, CO_2 ,NH3 and CH_4

   (D) CH_4, NH_3,H_2 and H_2O vapours

2. 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) spontaneous generation

   (C) panspermia

   (D) chemogeny

3. Who proposed that the first form of life could have come from pre-existing non-living organic molecules and it precedes chemical evolution?

   (A) SL Miller

   (B) Oparin and Haldane

   (C) Charles Darwin

   (D) Alfred Wallace

4. The sequence of origin of life may be

   (A) Inorganic materials → Organic materials→ Colloidal aggregate→Eobiont→ Cell

(B) Organic materials → Inorganic materials →Colloidal aggregate →Eobiont→ Cell

(C) Inorganic materials →Organic materials →Eobiont→Cell→Colloidal aggregate

(D) Organic materials →Inorganic materials→Eobiont→Cell→Colloidal aggregate

5. According to Charles Darwin's observations

(A) existing life forms share similarities to the life forms that existed million of years ago

(B) life forms evolve gradually

(C) any population has built in variations which enable them to survive in natural conditions

(D) All of the above

6. Evidence that evolution of life forms has indeed taken place on earth has come from

(A) fossil studies (palaeontological evidences)

(B) morphological and comparative anatomical studies

(C) biochemical studies

(D) All of the above

7. Fossils are useful in

(A) studying extinct organisms

(B) studying history of organisms

(C) Both (A) and (B)

(D) None of the above

8. Embryological support for evolution given by Ernst Haeckel includes the

   (A) presence of hair all over the body in adult human

   (B) absence of tail bone and presence of wisdom tooth

   (C) absence of vestigial gill slits in human's embryo

   (D) presence of row of vestigial gill slits in embryo of all vertebrates

9. What does presence of homologous organs in different animals indicate?

   (A) Different ancestry

   (B) Common ancestry

   (C) Independent development

   (D) Dependent development

10. Tendrils of Cucurbita and thorns of Bougainvillea are examples of

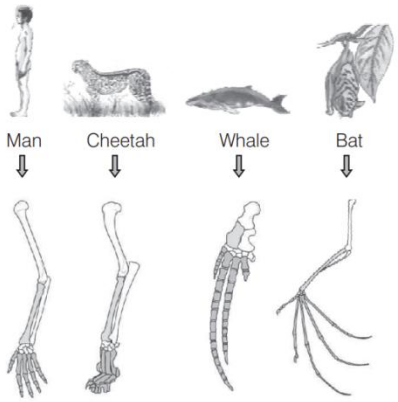
   (A) vestigial organs

   (B) analogous organs

   (C) homologous organs

   (D) homoplasy

11. Diagram given below indicates



(A) analogous organs

(B) homologous organs

(C) convergent evolution

(D) All of these

12. Change of lighter coloured variety of peppered moths (Bistonbetularia) to darker variety in the industrial era occurred due to

(A) selection of darker variety for survival

(B) deletion of gene

(C) industrial carbon deposited on the wings

(D) translocation of gene

13. Example of anthropogenic evolution is

(A) selection of resistant microbes to pesticides

(B) antibiotic resistant eukaryotic cells

(C) Industrial melanism is Bistonbetularia

(D) All of the above

14. Development of different functional structures from a common ancestral form is called

(A) differential evolution

(B) adaptive radiation

(C) non-adaptive radiation

(D) regressive evolution

15. The process by which different type of finches were evolved in Galapagos islands is a consequence of

(A) adaptive radiation

(B) geographic similarity

(C) geographic dissimilarity

(D) adaptive convergence

16. The diversity in the type of finches and adaptation to different feeding habits on the Galapagos islands, as observed by Darwin, provides an evidence of

(A) origin of species by natural selection

(B) intraspecific variation

(C) intraspecific competition

(D) interspecific competition

17. Australian marsupials are the example of

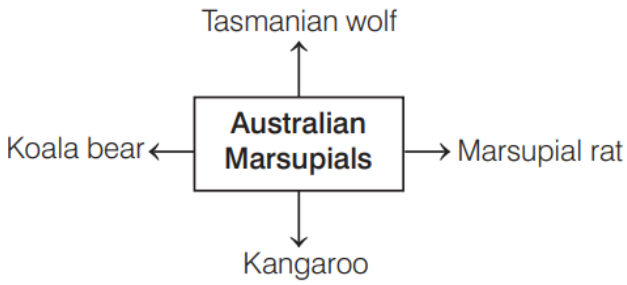
(A) homologous radiation

(B) analogous radiation

(C) adaptive radiation

(D) convergent radiation

18. Identify what the given diagram indicates?



(A) Convergent evolution

(B) Divergent evolution

(C) Recapitulation

(D) Parallel evolution

19. Which of the following is not an examples of adaptive radiation?

(A) Wombat, numbat, flying phalanger

(B) Darwin's finches

(C) Different mammals in other parts of world

(D) Lemur and spotted cuscus

20. Survival of the fittest is possible due to the

(A) overproduction

(B) favourable variations

(C) environmental changes

(D) inheritance of acquired characters

21. Darwinian fitness can be estimated by

(A) how long different individual in a population survive

(B) number of offspring produced by different individuals in population

(C) individual have a large size in population

(D) species recover after mass extinction

22. Which of the following are the two key concepts of Darwinian theory of evolution?

(A) Genetic drift and mutation

(B) Adaptive radiation and homology

(C) Mutation and natural selection

(D) Branching descent and natural selection

23. Which of the following situations would most likely result in the highest rate of natural selection?

(A) Reproduction by asexual method

(B) Low mutation is an stable environment

(C) Little competition

(D) Reproduction by sexual method

24. Which of the following factors was not taken into account by Darwin in his theory of natural selection?

(A) Struggle for existence

(B) Discontinuous variations

(C) Parasites and predators as natural enemies

(D) Survival of the fittest

25. What was the Lamarck's explanation for long necked giraffes?

(A) Stretching of necks over many generations

(B) Short neck suddenly changed into long one

(C) Natural selection

(D) Mutation

26. Hugo de Vries put forth his idea of mutation by his work on

(A) pea plant

(B) Drosophila

(C) evening primrose

(D) maize plant

27. Genetic equilibrium refers to the phenomenon in which

(A) the trait remains constant in a population

(B) the total genes remain constant in a population

(C) the total genes keeps on varying in a population

(D) traits keeps on varying in a population

28. Hardy-Weinberg principle can be expressed as

(A) $p^2 - 2pq - q^2 = 1$

(B) $p^2 + 2pq + q^2 \geq 1$

(C) $p^2 + pq + q^2 \leq 1$

(D) $p^2 + pq + q^2 = 1$

29. Which of the following conditions represents the extent of evolutionary change in Hardy-Weinberg principle?

(A) Value of $(p + q)^2$

(B) Difference between measured value and expected value

(C) Sum of measured value and expected value

(D) This principle cannot predict the extent of evolutionary change

30. 'XX' is a type of selection process in evolution that promotes population changes in one particular direction. 'XX' favours small or large sized individuals mean size of population changes. Identify 'XX'.

(A) Stabilising selection

(B) Directional selection

(C) Disruptive selection

(D) None of the above

31. Artificial selection to obtain cows yielding high milk output represents

(A) stabilising selection as it stabilises this character in the population

(B) directional as it pushes the mean of the character in one direction

(C) disruptive as it splits the population into two, one yielding higher output and the other lower output

(D) stabilising followed by disruptive as stabilises the population of produce higher yielding cows

32. Choose the incorrect pair.

(A) Invertebrates were formed and active – By 500 mya

(B) Seaweeds existed – Around 320 mya

(C) First organisms that invaded land – Single-celled animals

(D) Fish with stout and strong fins – Around 350 mya

33. Giant dinosaurs and reptiles predominated during the Jurassic period. This period was also marked for the evolution of higher insects and angiosperms, conifers, cycads, etc. Jurassic period belongs to which era?

(A) Cenozoic

(B) Palaeozoic

(C) Mesozoic

(D) Proterozoic

34. In which era Protozoa, sponge and algae originate?

(A) Cenozoic era

(B) Azoic era

(C) Proterozoic era

(D) Mesozoic era

35. The correct order of evolutionary scale is

(A) Palaeozoi →Archaeozoic→ Cenozoic

(B) Archaeozo →Palaeozoic→Proterozoic

(C) Palaeozoic→Mesozoic → Cenozoic

(D) Mesozoic →Archaeozoic→ Proterozoic

36. First human like hominid is known as

(A) Neanderthal man

(B) Homo habilis

(C) Dryopithecus

(D) Homo erectus

37. Brain (cranial) capacity of Homo habilis was

(A) 750-850 cc

(B) 750-800 cc

(C) 650-800 cc

(D) 550-700 cc

38. The difference between Homo sapiens and Homo erectus was

(A) Homo sapiens originated in Africa, while Homo erectus originated in Asia

(B) Homo erectus were much smaller in size than Homo sapiens

(C) Homo erectus stayed in Africa, while Homo sapiens did not

(D) the size of the brain of Homo erectus was smaller than that of Homo sapiens

39. Homo sapiens arose during

(A) ice age between 75000-10000 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

40. The chronological order of human evolution from early to the recent stages is

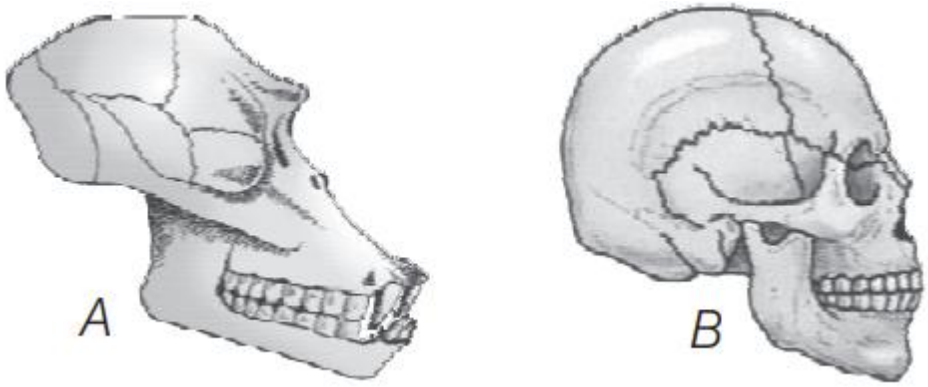
(A) Ramapithecus→ Australopithecus → Homo habilis→ Homo erectus

(B) Australopithecus → Ramapithecus → Homo habilis→ Homo erectus

(C) Pithecanthropus pekinensis→ Homo habilis→ Homo erectus

(D) Australopithecus →Ramapithecus→ Pithecanthropus pekinensis→ Homo erectus

41. The diagram given here shows the skull of two different mammals. Choose the most appropriate difference between A and B difference between A and B.



(A) Skull A has more teeth than skull B

(B) Skull A has more brain capacity than skull B

(C) Skull A is of a human and skull B is of an ape

(D) Skull A is of an ape and skull B is of human

Answer Key

1	(D)	2	(B)	3	(B)	4	(A)	5	(D)
6	(D)	7	(C)	8	(D)	9	(B)	10	(C)
11	(B)	12	(A)	13	(D)	14	(B)	15	(A)
16	(A)	17	(C)	18	(B)	19	(D)	20	(B)
21	(B)	22	(D)	23	(D)	24	(B)	25	(A)
26	(C)	27	(B)	28	(D)	29	(B)	30	(B)
31	(B)	32	(C)	33	(C)	34	(C)	35	(C)
36	(B)	37	(C)	38	(D)	39	(A)	40	(A)
41	(D)								

HINTS AND EXPLANATION

2. (B) 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 spontaneous generation.

Theory of spontaneous generation (abiogenesis or autogenesis) states that, life originated from non-living things in a spontaneous manner.

3. (B) 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.

5. (D) Based on observations made during a sea voyage in a sail ship called HMS Beagle round the world, Charles Darwin concluded that existing living forms share similarities to varying degrees not only among themselves but also with life forms that existed millions of years ago. There has been gradual evolution of life forms. A population has been built on variations, in characteristics. Those characteristics which enable some to survive better in natural conditions (climate, food, physical factors, etc.) would outbreed others that are less-endowed to survive under such natural conditions.

8. (D) Embryological support for evolution given by Ernst Haeckel includes the presence of row of vestigial gill slits in embryo of all vertebrates. This proposal was disapproved by Karl Ernst von Baer who noted that embryos never pass these gill slits to their the adult stages. He proposed that embryos start from few basic forms similarly in different animals and then develop into branching patterns.

11. (B) The given diagram indicates homologous organs. Whales, bats, cheetah and human (all mammals) share similarities in the pattern of bones of forelimbs. In plants, the thorns and tendrils of Bougainvillea and Cucurbita, respectively represent homology.

12. (A) Change of lighter coloured variety of peppered moths (Bistonbetularia) to darker variety in the industrial area occurred due to the selection of darker variety for survival. It is an excellent example which supports the theory of natural selection by Charles Darwin. 14. (B) Development of different functional structures from a common ancestral form is called adaptive radiation. The concept of adaptive

radiation in evolution was developed by HF Osborn in 1902. Homologous organs show adaptive radiation.

16. (A) The diversity in the type of finches and adaptation to different feeding habits on the Galapagos islands was observed by Darwin. He provides an evidence of origin of species by natural selection.

17. (C) Darwin explained that adaptive 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.

19. (D) Lemur and spotted cuscus are not examples of adaptive radiation. These are examples of convergent evolution. Rest of the pairs are examples of adaptive radiation.

20. (B) The organisms, which acquire or develop favourable variations would survive because they are fittest to face their surrounding, while unfit organisms are eliminated.

21. (B) Darwinian fitness can be estimated by the number of offspring produced by different individuals in a population. The organisms which bear favourable variations in accordance to the environment have more offspring than the others which do not have variations in accordance with environment.

23. (D) Reproduction by sexual methods brings about changes in genes of progeny. In genes of sexually reproduced organisms, independent assortment of genes and genetic recombination takes place. Due to these events, the progeny have high rate of natural selection than the asexually repoducing organisms.

24. (B) Natural selection theory of Darwin did not believe in any role of discontinuous variation. Darwin called these variations as sports, while Hugo de Vries used the term mutation for these variations. These variations are sudden heritable changes, which can occur in any stage of development.

27. (B) Hardy-Weinberg principle states that allele frequencies remains constant from generation to generation. This is called as genetic equilibrium.

32. (C) The pair in option (C) is incorrect and can be corrected as follows. First organisms that invaded land were supposed to be plants and not single-celled animals. Rest of the pairs are correct.

39. (A) Homo sapiens arose in Africa and moved across continents and developed into distinct races. During the ice age between 75,000-10,000 years ago modern

Homo sapiens arose. Pre-historic cave art developed about 18,000 years ago. One such cave paintings by Pre-historic humans can be seen at Bhimbetka rock shelter in Raisen district of Madhya Pradesh. Agriculture came around 10,000 years back and human settlements started.

40. (A) The chronological order of human evolution is as follows

Ramapithecus (earliest hominid fossil about 14-15 mya)

↓

Australopithecus (first ape man about 2 mya)

↓

Homo habilis (tool maker handyman about 1.2-1.5 mya)

↓

Homo erectus (Erect man about 1.5 mya