Chapter 7
EVOLUTION

ONE MARK QUESTIONS:

1. What does evolutionary biology deal with? (K)
2. Name the unit used to measure stellar distances? (K)
3. How old is the universe? (K)
4. Mention the theory that explains the Origin of Universe. (K)
5. Name the galaxy to which earth belongs. (K)
6. Why the atmosphere on earth before the origin of life is regarded as reducing atmosphere? (A)
7. Who proposed the theory of chemical evolution of origin of life? (K)
8. When was the earth formed? (K)
9. What does the theory of Panspermia propose? (K)
10. State the theory of spontaneous generation.(K)
11. Who provided an experimental proof for chemical evolution of life? (K)
12. What was the temperature maintained in Stanley Miller's experiment in the spark discharge chamber? (K)
13. What is 'fitness' according to Charles Darwin? (K)
14. What are fossils? (K)
15. Name the method which is used to calculate the age of a fossil? (K)
16. Who proposed embryological evidence for evolution? (K)
17. Who disapproved the embryological evidence for evolution which was proposed by E Heckel? (K)
18. What are homologous organs ? (K)
19. Mention an example for homologous organs. (K)
20. Define divergent evolution. (K)
21. Give an example for divergent evolution. (K)
22. What kind of evolution thorns of *Bougainvillea* and tendrils of *Cucurbita* represent? (K)
23. With respect to evolution, what do the forelimbs of whales, bats and cheetah signify? (K)
24. "Even though the forelimbs of bat, whale, cheetah and human being perform different functions, they indicate common ancestry". Justify the statement. (A)
25. "Homologous organs originated due to divergent evolution". Justify with a reason. (A)
26. What are analogous organs? (K)
27. Give an example for analogous organs. (K)
28. Define convergent evolution. (K)
29. Give an example for convergent evolution. (K)
30. Why the wings of butterfly and birds are called analogous organs? (A)
31. "Analogous organs arose due to convergent evolution". Justify with a reason. (A)
32. Why evolution is considered as a stochastic process? (A)
33. Anthropogenic action hastens evolution. Justify with an example. (A)
34. State a reason for the increased population of dark coloured moths coinciding with the loss of lichens (on tree barks) during industrialization period in England. (A)
35. What is adaptive radiation? (K)
36. Give an example for adaptive radiation. (K)
37. "Darwin's finches represent one of the best examples of adaptive radiation". Justify. (A)

38. “Australian marsupials represent one of the best examples of adaptive radiation”. Justify. (A)
39. Define saltation. (K)
40. What is the reason for speciation according to Hugo de Vries? (K)
41. Name the plant on which Hugo de Vries worked. (K)
42. Define gene pool. (K)
43. Define gene frequency. (K)
44. Define genetic equilibrium. (K)
45. State Hardy-Weinberg's principle. (K)
46. What does Hardy-Weinberg equation $p^2 + 2pq + q^2 = 1$ convey? (A)
47. What would an alteration in Hardy-Weinberg equilibrium lead to? (A)
48. Define gene migration. (K)
49. Define gene flow. (K)
50. Define genetic drift. (K)
51. Define natural selection. (K)
52. Predict the type of natural selection in which more individuals acquire mean character value for different traits. (A)
53. Predict the type of natural selection in which more individuals acquire value other than the mean character value for different traits. (A)
54. Predict the type of natural selection in which more individuals acquire peripheral character value at both ends of the distribution curve for different traits. (A)
55. When the first invertebrates formed on earth? (K)
56. Name the ancestors of modern day frogs and salamanders. (K)
57. When did jawless fish evolved on earth? (K)
58. When were the sea weeds found for the first time on earth? (K)
59. Which were the first organisms that invaded land? (K)
60. What is the significance of Coelacanth in evolution? (K)
61. Name the fish with stout and strong fins that appeared during the course of evolution which could move on land and go back to water. (K)
62. Name the fish which evolved into the first amphibians. (K)
63. Name the ancestral form of dinosaurs. (K)
64. Name a fish like reptile that lived in water. (K)
65. Name the biggest dinosaur. (K)
66. When did dinosaurs disappear from earth? (K)
67. Name a character that makes reptiles more successful than amphibians. (K)
68. Name the first mammals to evolve on earth. (K)
69. Where did Australopithecines live? (K)
70. Write the scientific name of Java man. (K)
71. Name the ancestor of man who essentially ate fruit and hunted with stone weapon .(K)
72. Name the first human like being to evolve on earth. (K)
73. What is the brain capacity of *Homo habilis*? (K)
74. When was pre-historic cave art developed by *Homo sapiens*?(K)
75. What is the brain capacity of *Homo erectus* ?(K)
76. What is the brain capacity of Neanderthal man?(K)
77. Where did Neanderthal man live?(K)
78. Mention the approximate period in which Neanderthal man lived? (K)

79. Name the ancestor of human who used hides to protect his body and buried the dead. (K)
80. Write the scientific name of man-like primate who probably lived in East African grasslands about 3 – 4 million years ago. (K)
81. Name the first human-like hominid to evolve who had a brain capacity of 650 – 800 cc. (K)
82. Write the scientific name of man-like primate that lived about 1.5 million years ago which had a large brain with cranial capacity of 900 cc. and which probably ate meat. (K)
83. When did modern *Homo sapiens* arise? (K)
84. When did agriculture came and human settlements started? (K)

TWO MARK QUESTIONS:

1. Name any two theories that explain the origin of life. (K)
2. How could the experiment of Louis Pasteur dismiss theory of spontaneous generation of life. (A)
3. Mention two assumptions of Oparin and Haldane with reference to Origin of life. (K)
4. How does Miller's experiment supports the theory of chemical evolution? (A)
5. Name the naturalist who also came to similar conclusions on evolution as Darwin and where did he work? (K)
6. List any four areas which provide evidences for evolution. (K)
7. What is divergent evolution? Give an example. (K)
8. What is divergent evolution? Mention an example in plants. (K)
9. What is divergent evolution? Mention an example in animals. (K)
10. Explain with the help of an example the type of evolution which is based on homology. (U)
11. State the evolutionary relationship giving reasons between the thorn of *Bougainvillea* and tendril of *Cucurbita*. (A)
12. Give two examples for homologous organs. (K)
13. What are homologous organs? Mention an example. (K)
14. What are homologous organs? Mention an example from plants. (K)
15. What are homologous organs? Mention an example from animals. (K)
16. Comment on the similarity between the thorn of *Bougainvillea* and tendril of C*ucurbita* with reference to evolution. (U)
17. Analyze the evolutionary relationship between forelimbs of whales and human. (A)
18. Mention the type of evolution that has resulted in the development of flippers of penguins and dolphins. What are such structures called? (U)
19. (a) Select the homologous structures from the combinations given below: (U)
    (i) Tuber of potato and sweet potato
    (ii) Eyes of octopus and mammals
    (iii) Forelimbs of whales and bats
    (iv) Thorns of *Bougainvillea* and tendrils of *Cucurbita*
    (b) State the kind of evolution they represent. (U)
20. What is convergent evolution? Give an example. (K)
21. What is convergent evolution? Give an example in plants. (K)
22. What is convergent evolution? Give an example in animals. (K)
23. Explain with the help of an example the type of evolution which is based on analogy. (U)
24. State the evolutionary relationship giving reasons between sweet potato and potato. (A)
25. Give two examples for analogous organs. (K)

26. What are analogous organs? Give an example. (K)
27. What are analogous organs? Give an example from plants. (K)
28. What are analogous organs? Give an example from animals. (K)
29. What type of organs the eye of an octopus and that of a human are called? Name the evolutionary process they represent. (U)
30. Is the eye of octopus analogous or homologous to the eye of humans? Give reasons to support your answer. (A)
31. Is sweet potato analogous or homologous to potato tuber? Give reasons to support your answer. (A)
32. Differentiate divergent evolution from convergent evolution. (U)
33. Differentiate homologous organs and analogous organs. (U)
34. What is adaptive radiation? List two examples for adaptive radiation. (K)
35. Mention an example where more than one adaptive radiation have occurred in an isolated geographical area. Name the type of evolution involved in it. (U)
36. Mention two examples of evolution by anthropogenic action. (K)
37. Mention the two key concepts of Darwinian theory of evolution. (K)
38. How does 'fitness' of individuals help in evolution according to Darwin? (A)
39. List any four factors that affect Hardy-Weinberg's equilibrium. (K)
40. List any four factors that affect genetic equilibrium. (K)
41. Giving two reasons, explain how Hardy-Weinberg equilibrium is affected ? (U)
42. What is natural selection ? Mention the three ways through which natural selection operates. (K)
43. Mention the evolutionary significance of the following organisms: (a) Shrews (b) Lobefins (K)
44. Write the names of any two extinct dinosaurs. (K)
45. List any two characteristic features of *Tyranosaurus rex.* (K)
46. Name the fish like reptile and the largest dinosaur that appeared on earth during the course of evolution.
47. About 65 million years ago, the dinosaurs suddenly disappeared from the earth. What could be the reasons. (U)
48. Name the primates that lived 15 million years ago. Mention any two of their characteristics. (K)
49. Mention two features of Ramapithecus.
50. List two characteristic features of Australopithecines. (K)
51. Mention two features of Neanderthal man.
52. Mention any two characteristic features of *Homo erectus*. (K)
53. Write the probable differences in eating habits of *Homo habilis* and *Homo errectus.*(K)

THREE MARK QUESTIONS:

1. Explain Big Bang theory of origin of universe. (K)
2. What were the conditions on primitive earth before the origin of life according to the theory of chemical evolution of life? (K)
3. Draw a labelled diagram of Miller's experimental set-up.
4. (i) What were the different gases did the flask used as an experimental setup by S.L.Miller contained? (K)
   (ii) What conditions of primitive earth was recreated in the flask? (K)
   (iii) Write the conclusion drawn from this experiment. (K)
5. How paleontological evidences have helped in understanding the evolution of life forms? (U)

6. After industrialization in England, it was observed that white winged moth did not survive.
   (i) What is the cause? (K)
   (ii) What was the change and why it had happened? (K)
   (iii) Which organism is known as natural indicator to air pollution? (K)
7. Differentiate homologous and analogous organs with an example for each. (U)
8. Differentiate convergent evolution and divergent evolution with an example for each. (U)
9. "Australian marsupials and Australian placental mammals explain convergent evolution and adaptive radiation". Justify the statement. (A)
10. (i) Mention the evolutionary process that has resulted in evolution of placental wolf and Tasmanian wolf. (K)
    (ii) Explain the evolutionary process by which Tasmanian wolf evolved. (U)
    (iii) Compare placental wolf and Tasmanian wolf. (U)
11. Explain Lamarck's theory of evolution of life forms. (U)
12. How is Darwin's concept of evolution different from that of Hugo de Vries concept of mutation? (A)
13. Explain Hardy-Weinberg principle with the help of equation. (A)
14. State Hardy – Weinberg law. List four evolutionary factors which disturb genetic equilibrium. (K)
15. State Hardy – Weinberg law. Explain two evolutionary factors which disturb Hardy – Weinberg equilibrium. (U)
16. Explain briefly three factors that affect Hardy – Weinberg or genetic equilibrium. (U)
17. Define the terms gene pool, gene flow and genetic drift. (K)
18. Define the terms saltation, gene pool and gene flow. (K)
19. Define the terms saltation, gene pool and genetic drift. (K)
20. Describe three different ways by which natural selection can affect the frequency of a heritable trait in a population. (K)
21. List three characteristic features of Dryopithecus. (K)
22. Mention any three features of *Homo habilis*. (K)
23. Mention three characteristics of Neanderthal man who lived in near east and Central Asia? (K)
24. Write the brain capacities of the following pre-historic human: (K)
    (i) *Homo habilis* (ii) *Homo erectus* (iii) *Neanderthal man.*
25. List the period, brain capacity and probable food of *Homo erectus* stage of human evolution. (K)
26. List the period, brain capacity and probable food of *Homo erectus* stage of human evolution.
27. List the period, brain capacity and one feature of Neanderthal man of human evolution.
28. Name the different stages of human evolution in sequential order. (K)
29. Arrange the following ancestral forms of man in the order of their evolution:
    (a) *Homo habilis* (b) *Homo erectus* (c) Neanderthal man (d) Dryopithecus (e) Ramapithecus (f) Australopithecines (K)

FIVE MARK QUESTIONS:

1. Explain Miller's experiment with the help of a neat labeled diagram. Write the conclusion that can be drawn from the experiment. (S)
2. Explain evolution by natural selection by taking an example of white-winged moths and dark-winged moths of England in pre and post-indutrialization period. (U)
3. How does comparative anatomy and morphology act as an evidence for evolution? Explain with the help of suitable examples. (U)

4. Identify the following pairs as homologous or analogous. (K)
    (a) Bones of forelimbs of whales and bats
    (b) Eyes of octopus and of mammals
    (c) Thorn of *Bougainvillea* and tendril of *Cucurbita*
    (d) Sweet potato and potato
    (e) Wings of butterfly and birds.
5. According the Darwinian theory, the rate of appearance of new forms is linked to their life cycles. Explain. (U)
6. Explain Darwin's view about evolution. (U)
