
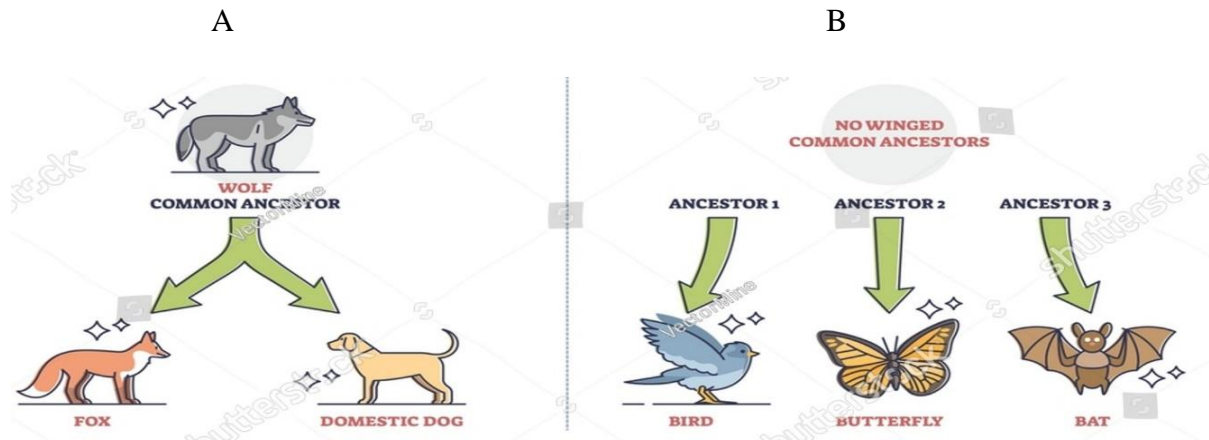
	<b>INDIAN SCHOOL AL WADI AL KABIR</b>	
<b>Class: XII</b>	<b>Department: SCIENCE 2023 – 24</b> <b>SUBJECT: BIOLOGY</b>	<b>Date of submission:</b> <b>24/8/23</b>
<b>Worksheet No: 7</b> <b>WITH ANSWERS</b>	<b>UNIT: GENETICS &amp; EVOLUTION</b> <b>Chapter: EVOLUTION</b>	<b>Note:</b> <b>A4 FILE FORMAT</b>
<b>NAME OF THE STUDENT</b>	<b>CLASS &amp; SEC:</b>	<b>ROLL NO.</b>

### 1. Case Study: EVIDENCES FOR EVOLUTION

Comparative anatomy and morphology show similarities and differences among organisms of today and those that existed years ago. Such similarities can be interpreted to understand whether common ancestors were shared or not.



- Identify the type of evolution exhibited by the fox and the domesticated dog with reason.
- The wings of the animals illustrated in the fig. B show what type of organs, give reason for your answer
- Differentiate between A & B in relation to the type of evolution.

Or

Identify the analogous & homologous organs given below with reasons.

i) Thorns and tendrils of Bougainvillea and Cucurbita

ii) Sweet potato and potato

## 2. Case Study : Natural Selection.

In a collection of moths made in 1850s, i.e., before industrialisation set in, it was observed that there were more white-winged moths on trees than dark-winged or melanised moths. However, in the collection carried out from the same area, but after industrialisation, i.e., in 1920, there were more dark-winged moths in the same area, i.e., the proportion was reversed.

Figure showing white - winged moth and dark - winged moth (melanised) on a tree trunk  
(a) In unpolluted area (b) In polluted area



a. What could be the possible explanation for the high population of white winged moth during pre-industrialization.

b. The condition reversed post industrialization, comment on the findings.

c. Can the above example of moth population before and after industrialization be an example of evolution by anthropogenic actions or purely natural selection or both, give reasons.

Or

Excess use of herbicides, pesticides and antibiotics have created resistant microbes. These are examples of evolution by anthropogenic action, briefly explain this statement with reasons.

## MULTIPLE CHOICE QUESTIONS

1. The conditions of the earth's atmosphere conducive for the origin of life were:

- (a) Presence of high temperature,  $\text{CH}_4$ ,  $\text{NH}_3$ , and  $\text{H}_2\text{O}$
- (b) High temperature,  $\text{CH}_4$ ,  $\text{NH}_3$ , volcanic eruption
- (c) High temperature, volcanic eruption,  $\text{O}_2$ ,  $\text{NH}_3$
- (d) Volcanic eruption,  $\text{CH}_3$ ,  $\text{NH}_3$  and  $\text{O}_2$

2. Which of the followings are homologous or analogous (Indicate H for homologous and A for Analogous)

- (a) Wing of bat and butterfly \_\_\_\_\_
- (b) Wing of bat and flipper of whale \_\_\_\_\_
- (c) Wing of butterfly and flipper of whale \_\_\_\_\_
- (d) Flipper of whale and wing of bird \_\_\_\_\_

3. Analogous organs arise due to

- (a) Convergent evolution
- (b) Genetic drift
- (c) Divergent evolution
- (d) Artificial selection

4. Darwin judged the fitness of species by

- (a) Ability to defend itself
- (b) Number of offsprings produced
- (c) Strategy to obtain food
- (d) Dominance over another species

5. Change in frequency of alleles in a population results in evolution. This statement was proposed by

- (a) Darwin
- (b) DeVries
- (c) Hardy – Weinberg
- (d) Morgan

### **TWO MARKS QUESTIONS**

- 6. “Sweet potato tubers and potato tubers are result of convergent evolution.” Justify the statement.
- 7. State the significance of the study of fossils in evolution.
- 8. Mention the key concepts about the mechanism of biological evolution/ speciation according to:
  - (i) Hugo de Vries

- (ii) Darwin
9. Give some examples showing common embryological patterns among vertebrates.
  10. Mention two key concepts of Darwinian's theory of evolution. What was the concept proposed by Lamarck?

### THREE MARKS QUESTIONS

11. How do Darwin's finches illustrate adaptive radiation?
12. Explain convergent and divergent evolution with the help of one example each.
13. Name any three organs homologous to human hand. Why are they considered homologous?
14. Write Oparin and Haldane's hypothesis about the origin of life on earth. How does meteorite analysis favour this hypothesis?
15. Explain any two examples to prove that anthropogenic actions can lead to evolution.

### FIVE MARKS QUESTIONS

16. (a) State Hardy Weinberg principle. Name any two factors which affect it.  
(b) Draw a graph to show that natural selection leads to directional change.
17. (a) Name the primates that lived about 15 million years ago. List their characteristic features.  
(b) Where was the first man like animal found?  
(c) Write the order in which Neanderthals, *Homo habilis* and *Homo erectus* appeared on earth. State the brain capacity of each one of them  
(d) When did modern *Homo sapiens* appear on this planet?

### PREVIOUS BOARD QUESTIONS

18. Comment on the similarity between the wings of a cockroach and the wings of a bird. What do you infer from the above with reference to evolution?
19. Why are analogous structures a result of convergent evolution?
20. List any two propositions of Oparin and Haldane.
21. List any two characteristics of mutation that helps in explaining evolution.
22. Explain the increase in numbers of melanic moths in the urban areas of post-industrialization period in England.
23. (a) Rearrange the following in an ascending order of evolutionary tree:  
Reptiles, salamander, lobefins, frogs  
(b) Name two reproductive characters that probably make reptiles more successful than amphibians.
24. How does the process of natural selection affect Hardy-Weinberg equilibrium? Explain. List other four characters that disturb the equilibrium.

25. Darwin observed a variety of beaks in small black birds inhabiting Galapagos Islands. Explain what conclusion did he draw and how.

**Answers**

Qn. No.	<b>MULTIPLE CHOICE QUESTIONS</b>	Marks
1	(a) Presence of high temperature, CH <sub>4</sub> , NH <sub>3</sub> , and H <sub>2</sub> O	1
2	(a) Wing of bat and butterfly _____ <b>A</b> (b) Wing of bat and flipper of whale _____ <b>H</b> (c) Wing of butterfly and flipper of whale _____ <b>A</b> (d) Flipper of whale and wing of bird _____ <b>H</b>	1
3	(a) Convergent evolution	1
4	(b) Number of offsprings produced	1
5	(c) Hardy – Weinberg	1
	<b>TWO MARKS QUESTIONS</b>	
6	(Hints: Mention the type – analogous organs, no common ancestor, definition of convergent evolution)	2
7	(Hints: Evidence for evolution, paleontological studies, similarities and changes of fossils of different geological time scale)	2
8	(Hints: (i) mutation and saltation, (ii) branching of descent and natural selection)	2
9	(Hints: development of vertebrate embryo and presence of vestigial organs)	2
10	(Hints: branching descent and natural selection, use and disuse theory)	2
	<b>THREE MARKS QUESTIONS</b>	

11	(Hints: definition of adaptive radiation, Darwin's finches as example, common ancestry and radiation to different geographical areas based on feeding habit, difference in beak pattern)	3
12	(Hints: definition of convergent evolution and example for analogous organs, definition of divergent evolution and example for homologous organs)	3
13	(Hints: forelimbs of cheetah, flippers of whale, wings of bats – same structure and different functions)	3
14	(Hints: two postulates of Oparin and Haldane's theory of chemical evolution, presence of biomolecules like amino acids in meteorites supports this)	3
15	(Hints: explanation of formation of pesticide resistant insects and antibiotic resistant bacteria due to the over usage of pesticides and antibiotics)	3
<b>FIVE MARKS QUESTIONS</b>		
16	(Hints: State the principle, explanation and mathematical expression, factors – gene flow, migration, genetic drift, mutation, genetic recombination, natural selection – any two, graph of natural selection - directional)	5
17	(Hints: (a) –Dryopithecus & Ramapithecus – hairy and walked like gorillas, (b) – Eastern Africa, (c) - <i>Homo habilis</i> , <i>Homo erectus</i> , Neanderthals – 650 – 800 cc, 900 cc, 1400 cc, (d), during ice age between 75,000 – 10,000 years ago)	5
<b>PREVIOUS BOARD QUESTIONS</b>		
18	(Hints: explanation of analogous organs and convergent evolution & no common ancestry)	2

19	(Hints: convergent evolution starts from different structures and doing similar functions due to the environment, explanation of analogous organs)	2
20	(Hints: formation of life from non-living organic molecules, chemical evolution)	2
21	(Hints: change in genetic makeup, heritable, random and directionless)	2
22	(Hints: explanation of industrial melanism – conditions during post industrialisation period, formation of melanic moth followed by natural selection)	3
23	(Hints: (a) – lobefins, frogs, salamander, reptiles  (b)- internal fertilisation and presence of calcareous shell around eggs)	2
24	(Hints: explanation of natural selection and operation of directive, stable and disruptive selections, characters – gene migration, recombination, genetic drift, mutation)	3
25	(Hints: explanation of adaptive radiation, beak pattern of finches, common ancestry)	3

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