7. Evolution

Question1. Explain antibiotic resistance observed in bacteria in light of Darwinian selection theory.

Solution:
In the presence of antibiotic, the bacteria that are sensitive to it will die. However, if there are any mutants in the population, that can somehow survive its effect, they will multiply and increase in numbers. After that, they will live as antibiotic resistant bacteria.

Question2. Find out from newspapers and popular science articles any new fossil discoveries or controversies about evolution.

Solution:
Scientists have found the fossil of a 60-million-year-old creature in Morocco, which is the rabbit sized ancestor of the modern day elephant. Paleontologist Emmanuel Gheerbrant discovered the rabbit-size proto-elephant's skull fragments in a basin 60 miles (100 kilometers) east of Casablanca, Morocco. The creature, called Eritherium azzouzorum, bolsters the case that whole new orders of mammals were already around less than 6 million years after global catastrophe ended the age of reptiles some 65.5 million years ago.

Question3. Attempt giving a clear definition of the term species.

Solution:
Species can be defined as a group of organisms that can interbreed under natural conditions and produce fertile offsprings.

Question4. Try to trace the various components of human evolution (Hint: Brain size and function, skeletal structure, dietary preference, etc.).

Solution:

Name	Features
Dryopithecus	Ape like, canines large, arms and legs are of equal size, ate soft fruits and leaves
Ramapithecus	More man-like, canines were small while molars were large, walked more erect, ate seeds and nuts
Australopithecus	Man-like, canines and incisors were small, walked upright, hunted with stone weapons, ate fruits, brain capacities were between 400-600cc.

Homo habilis	First human like being, canines were small, first tool makers, did not ate meats, brain capacities were between 650-800cc.
Homo erectus	Used stone and bone tools for hunting games, ate meat, brain capacity 900cc.
Homo neanderthalnsis	Cave dwellers, used hides to protect their bodies, and buried their dead, brain capacity 1400cc.
Homo sapiens (Modern human)	Modern man with high intelligence, developed art, culture, language etc., cultivated crops and domesticated animals.

Question5. Find out through internet and popular science articles whether animals other than man has self-consciousness.

Solution:
Self-consciousness needs to be defined as the mental link or ones awareness of oneself as an individual or of one's own being, actions, or thought. There are many other than humans, which have self-consciousness such as dolphins, crow, parrot, chimpanzee, gorilla, etc.

Question6. List 10 modern-day animals and using the internet resources link it to a corresponding ancient fossil. Name both.

Solution:

Animals	Fossils
Man	Homo Sapiens
Dog	Leptocyon
Chimpanzee	Dryopithecus
Elephant	Moerithers
Horse	Eohippus
Gorilla	Dryopithecus
Camel	Protylopus
Whale	Protocetus
Fish	Arandaspis
Octopus	Belemnite

Question7. Practice drawing various animals and plants.

Solution:
Draw various animals and plants from the chapter.

Question8. Describe one example of adaptive radiation.

Solution:
Darwin finches of the Galapagos Islands is an example of adaptive radiation. They once had a common ancestor but as time passed they underwent evolution and adapted itself according to their food habitat.

Question9. Can we call human evolution as adaptive radiation?

Solution:
No, human evolution cannot be called adaptive radiation because adaptive radiation is an evolutionary process that produces new species from a single, rapidly diversifying lineage, which is not the case with human evolution.

Question10. Using various resources such as your school Library or the internet and discussions with your teacher, trace the evolutionary stages of any one animal say horse.

Solution:
The evolutionary stages of horse are:

- **Eohippus:** It appeared in the Eocene period about 52 million years ago. It was approximately the size of a fox (0.4 m), with a relatively short head and neck and a springy, arched back. It had four functional toes and a splint of 1 and 5 on each hind limb and a splint of 1 and 3 in each forelimb.
- **Mesohippus:** Approx, 40 million years ago in Oligocene period, Mesohippus which was slightly larger than Eohippus about 0.6 metre. It had three toes in each foot.
- **Merychippus:** In Miocene period the grazer Merychippus flourished. It had the size of approx. 1m. It still had three toes in each foot, but it could run on one toe. The side toe did not touch the ground. The molars were adapted for chewing the grass.
- **Pliohippus:** Around 12 million years in Pilocene period, modern horse Pilohippus emerged. It had a single functional toe with splint of 2nd and 4th in each limb.
- **Equus:** Pliohippus gave rise to modern horse, Equus. It have one toe in each foot. They have incisors for cutting grass and molars for grinding food.