Book Name: NCERT Solutions

Question 1:

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

Solution 1:

According to Darwin, environment selects organisms with favourable variations and these organisms are allowed to survive. When a bacterial population encounters a particular antibiotic, those sensitive to it die. But some bacteria having mutations become resistant to the antibiotic. Such resistant bacteria survive and multiply quickly as the competing bacteria have died. Some the resistance providing genes become widespread and entire bacterial population becomes resistant.

Question 2:

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

Solution 2:

Chimps are more evolved that humans (The Times of India):

Chimpanzees are more evolved than humans, a study suggests. There is no doubt that humans are the more advanced species. But a comparison of 14,000 human and chimpanzee genes shows the forces of natural selection have and greatest impact on our ape cousins.

The researcher's discovery challenges the common assumption that our large brains and high intelligence were the gifts of natural selection. Humans and chimps followed different evolutionary paths from a common ape ancestor about 5 million years ago. Both underwent changes as the fittest survived to pass their genes on to future generations. But the US study shows that humans possess a 'substantially smaller' number of positively-selected genes than chimps.

Question 3:

Attempt giving a clear definition of the term species.

Solution 3:

Species is population or group of individuals that have potential of interbreeding and are able to produce viable, fertile young ones but are reproductively isolated from members of other species.

Question 4:

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

Solution 4:

	Evolution of Brain (in human-brain volume)	**Skeletal structures**
•	Australopithecus (450-600 cc) Homo erectus (900-1200 cc) Neanderthal man (1400 cc) Cromagnon (2200 cc) Homo sapiens (2500 cc)	In apes – The backbone forms a simple arch, arms are longer than legs. In man – The backbone S-shaped and legs are longer than arms.
•	Increase in grey matter	
•	Increase in no. of gyri and sulci in brain hypothalamus	

Dietary preference:

Dryopithecus and Ramapithecus – herbivores Australopithecus Africans, Homo Carnivores habilis Homo erectus, Homo sapinens – Omnivores

Question 5:

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

Solution 5:

Recent studies on self consciousness says gibbons are the nearest to human in this respect. Apes and orangutans came next. Among domestic animals, dog and other members of canidae family show subtle self consciousness.

Question 6:

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

Solution 6:

(i) Cockroach, Limulus (king carb), Neopilina, Latimaria (Fish) are fossil that has remain unchanged over years.
(ii) Trilobites – fossil arthropods
(iii) Lung fishes – connecting link between fishes and amphibians
(iv) Peripatus – connecting link between annelids and arthropods
(v) Woody mammoth – ice fossils
(vi) Gastropods – mould and cast fossil
(vii) Giant elk – amber fossil of asphalt
(viii) Dinosaur footprint – imprints

Question 7:

Practice drawing various animals and plants.

Solution 7:

(1) Elephant

(2) Camel

(3) Dog

(4) Rose

(5) Dahlia

(6) hibiscus

Question 8:

Describe one example of adaptive radiation.

Solution 8:

Darwin's finches of the Galapagos islands had common ancestors but now have different types of modified beaks according to their food habits.

Question 9:

Can we call human evolution as adaptive radiation?

Solution 9:

Yes, human evolution is an example of adaptive radiation as different species of human evolved across different areas of world as they diverged to different areas in following fashion.

(i) Hominid introduction occurred in Africa and Asia:

(ii) Homo habilis lived in Africa – 2 million years ago.

(iii) Homo erectus – migrated to Asia and Europe and diverged into 2 species – Java Man and Peking Man.

(iv) Similarly Homo erectus – was followed by Homo sapiens.

(v) Primitive Neanderthal man in Europe gave way to African cromagnon.

Homo sapiens sapiens
(25,000 years, 1.5-1.8 M, 1300-1600 c.c.)
↑
Homo sapiens fossils
(34,000 years, 1.8 M, 1650 c.c.)
↑
Homo erectus
(1.7 million years, 800-1100 c.c.)
↑
Homo habilis
(2 million years, 735 c.c., First fossil man
who used tools of chipped stones)
↑
Australopithecus africanus
(5 million years, 1.5 m, 350-450 c.c.)
↑
Ramapithecus
(14-15 million years, survived from
Late Miocene to pliocene)
↑
Apes ← Dryopithecus africanus
(20-25 million years)

Fig. Schematic representation of Evolution of Man.
Age, height and cranial capacity are also given

Question 10:

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 10:

Evolutionary stages of horse:
Eohippus – Mesohippus – Merychippus – Pliohippus – Equus.
Evolutionary trend:
(i) Increase in body size.
(ii) Elongation of neck.
(iii) Lengthening of limbs.
(iv) Enlargement of third digit.
(v) Increase **in** structural complexity of teeth for feeding on grass.