

Heredity and Evolution

Q1:- Who proposed the theory of natural selection?

Ans - Charles Darwin

Q2:- Define inheritance

Ans - The transmission of characters from parent to offsprings is known as inheritance.

Q3 - What is gene?

Ans Gene is a unit of inheritance, a segment of DNA that takes part in expressing a particular character.

Q4 - What are homologous structure? Give example?

Ans - Homologous structure are those which have similar origin, similar development, similar internal structure and basic plan but show different structural form and function. Example forelimb of bat, horse and flipper of whale.

Q5 - A woman has only daughters. Analyse the situation genetically and provide a suitable explanation.

Ans - A woman produces only one type of ova ($22+X$) while her husband produces two types of sperms ($22+X$) and ($22+Y$) in equal proportion. It is a chance that each time the woman conceived only the ($22+X$) fertilized the egg so that only daughters were born.

Q.6 - Study the following cross showing self pollination in F_1 . Fill in the blanks and answer the question that follow

Parent	$RRYY$	$\times$	$rryy$
	Round yellow		wrinkled green
		$\downarrow$	
	$RrYy$	$\times$	?
	Round yellow		

Ans - $RrYy$ (Round yellow)

Q7 - In the above question what are combinations of characters in F_2 progeny? what are their ratios?

Ans Round yellow 9, Round green 3, wrinkled yellow 3, wrinkled green 1 i.e. 9:3:3:1

Q8 - All the human races like African, Asians, Europeans, Americans and others might have evolved from a common ancestor. Provide a few evidences in support of this view.

Ans All human races have evolved from a common ancestor because they possess
(a) Common body plan (b) Common structure
(c) Similar physiology (d) Similar metabolism
(e) Similar chromosome number (f) Common genes
(g) Free interbreeding.

Q9 - What factors could lead to the rise of a new species?

Ans 1. Accumulation of different variations
II. Natural selection
III. Genetic drift
IV. Reproductive isolation
V. Gene Flow

Q10. How are two areas of study evolution and classification interlinked?

Ans - Classification is based on similarities and differences amongst organisms. The more characteristics two species have in common, the more closely related they are. They must have evolved from common ancestor. Similarly more differences means different adaptation and divergence from common ancestor in the remote past.

Q 11 - Give a pair of contrasting traits of the following character in pea plant and mention which is dominant and recessive. 1 Yellow seed
11. Round seed.

Ans - Seed colour - Yellow dominant Green recessive
Seed shape - Round dominant Wrinkle recessive

Q 12. Define evolution

Ans - It is formation of newer types of organism from pre existing ones through modification.

Q 13 Differentiate between acquired trait and inherited trait.

Ans Acquired trait develops during the life time of an individual which affects somatic parts and dies with the death of individual. Inherited trait are obtained from the parents influence genes of germ cells and is passed on to the next generation.

Q 14 If a trait A exists in 10% of a population of an asexually reproducing species and trait B exists in 60% of the same species which trait is likely to have arisen earlier?

Ans In asexually reproducing population there is no reshuffling of traits. New trait do develop due to small inaccuracies produced during DNA copying. They will be smaller proportion than the traits already present. Therefore trait B which exists in 60% of population must have arisen earlier than than the trait A which occurs in 10% of the population.

Q 15 - Who proposed the theory of inheritance of acquired character?

Ans - Jean Baptist. Lamarck. (1809)

Q. 16 - What is speciation?

Ans - It is formation of new species from an existing one due to reproductive isolation of a section of its population.

Q. 17 - Can wing of a butterfly and wing of bat be considered homologous? why and why not?

Ans No, wing of butterfly and bat are fundamentally different in their origin and structure. In butterfly they are integumentary out growth having hollow tubes. In bat they are modified fore limb with which are covered by skin. Such organ which has different origin and basic structure but are functionally similar are called analogous organ.

Q. 18 - What are the rules for inheritance of traits in human being?

Ans - 1. Both father and mother contribute practically equal amounts of genetic material to the child.

2. Each trait can be influenced by both paternal and maternal DNA

Q. 19 - Do all the variations in a species have equal chances of surviving in the environment in which they find themselves?

Ans No all the variations in a species do not have equal chances of surviving in the environment in which they find themselves. Depending on the

variation; different individuals would have different kind of advantages.

Q-20 - Match the columns -

1 Monohybrid cross	a 3:1
2 Dihybrid cross	b 9:3:3:1
3 Monohybrid ratio	c Tall x dwarf
4 Dihybrid ratio	d Round and Yellow x wrinkled and green

Ans. 1-c, 2-b, 3-a, 4-d

our Environment

Q1 - What is the role of decomposer?

Ans - Decomposers help in the decay of complex organic matter and reduce them to simple inorganic substances. They are added to the soil and make it fertile.

Q2 - Name two kind of decomposer.

Ans Bacteria and fungi.

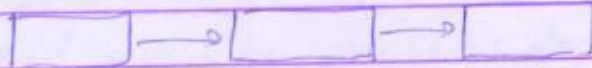
Q3 - What will be the effect of depletion of ozone?

Ans - Ozone shields the Earth's surface from harmful ultraviolet rays and protects the living organisms from the radiation which may otherwise cause skin cancer.

Q4 - What is CFCs?

Ans Chlorofluorocarbon.

Q5 - Fill in the steps of the food chain below which is found in aquatic habitat.



Ans - Aquatic plant → small fish → Big fish

Q6 - What is ozone? What is its role in the atmosphere and ecosystem?

Ans Ozone is molecule formed by three atoms of oxygen - O_3 .

At higher levels of the atmosphere, ozone shield the surface of earth from harmful ultraviolet (UV) radiation of the sun.

Q7 - What are the two general principles of energy flow?

Ans (a) The flow of energy is unidirectional.

(b) As the energy moves progressively through

the various trophic levels, it is no longer available to the previous level.

Q8 - Name some chemicals which are responsible for depletion of the ozone layer.

Ans CFCs, CH_4 , CCl_4 and N_2O Cause depletion of ozone.

Q9 - Why do the food chains generally consist of only three to four steps.

Ans According to 10% law, the average value for the amount of organic matter that is present at each step and reaches the next level of consumers is only 10%. The loss of energy at each step is so great, that very little usable energy remains after four trophic levels.

Q10 - what are the organisms which depends on dead organic matter called?

Ans Saprotrophs.

Q11 - While buying the refrigerator Raman is particular to see if it uses 'CFCs' or not. What is the reason behind? Is 'CFCs' useful or harmful?

Ans - chlorofluorocarbons are used in refrigeration. But they are harmful as they deplete ozone layer that protects the living organisms from harmful ultraviolet rays.

Q12 - Komal refuses to take the polythene bags when she goes to the market. What are the harmful effects of the polythene? What is the alternative for this.

Ans Polythene is nonbiodegradable pollutant. It cannot be degraded by living organisms like bacteria and fungi. They can be replaceable by paper bags and cloth bags.

Q13 - Name two kinds of decomposers?

Ans - Bacteria and Fungi.

Q.14. What will be the effect of depletion of ozone?

Ans - Ozone shields the earth's surface from harmful ultraviolet rays and protects the living organisms from the radiation, which may otherwise cause skin cancer.

Q.15. In a food chain 10,000 joules of energy is available to the producer. How much energy is available to the secondary consumers to transfer it to the tertiary consumers?

Ans - 100 joules are available to the secondary consumer.

Q.16 - What is biomagnification? How does it occur?

Ans - Accumulation of poisonous chemicals along the food chain leading to maximum concentration in the top level of food chain is called biomagnification.

Some harmful chemical like DDT and other pesticides, washed down into the soil or water enter into the food chain. They are absorbed by the plants and along with water and minerals.

As these chemicals are not biodegradable, get accumulated progressively at each trophic level, causing biomagnification.

Q.17 - What are the heterotrophs in a food chain called?

Ans - Consumers.

Q.18. What is a trophic level? What kinds of organisms occupy these trophic levels?

Ans - Each step in the food chain forms a trophic level.

The autotrophs or producers occupy 1st trophic level.

The herbivores or the primary consumers occupy at 2nd trophic level.

Small consumers or secondary consumers occupy at the 3rd trophic level.

Larger carnivores or tertiary consumers occupy at the 4th ^{trophic} level.

Q. 19. What is food web?

Interconnected food chains in an ecosystem form the food web.

Q. 20 - Why are some substances biodegradable and some non biodegradable?

Ans:- Some substances like paper, cotton, tea leaves etc. are broken down to the action of bacteria and other saprophytes are called biodegradable substances.

Whereas some substances like plastics are not broken down by the action of bacteria. They are only acted upon by physical process like heat and pressure, but under ambient condition found in environment. They persist for a long time and called non biodegradable.