



# Chapter 24 Evolution

## TOPIC WISE MULTIPLE CHOICE QUESTIONS Concept of Evolution Vs Special Creation Evolution from Prokaryotes to Eukaryotes

### KIPS MCQs

- (1) The invagination of plasma membrane leads to:
  - (a) Formation of phragmoplast
  - (b) Formation of organelles
  - (c) Evolution of eukaryotic cell
  - (d) Both b and c
- (2) Evolutionists believed in the theory of:
  - (a) Special creation
  - (b) Natural selection
  - (c) Spontaneous origin
  - (d) None of these
- (3) Among the scientists who believed in special creation:
  - (a) Cuvier
  - (b) Lamarck
  - (c) Linnaeus
  - (d) Wallace
- (4) Enough protective ozone had built up to make life on land possible about \_\_\_\_\_ million years ago.
  - (a) 420
  - (b) 140
  - (c) 350
  - (d) 280
- (5) A group of bacteria which can tolerate temperature upto 120°C is called:
  - (a) Salmonella
  - (b) Archaeobacteria
  - (c) Spirochete
  - (d) Archaeopteryx
- (6) The idea of endosymbiont hypothesis was first proposed by:
  - (a) Linnaeus
  - (b) Lyell
  - (c) Lynn Margullis
  - (d) Malthus
- (7) Prokaryotes may have arisen more than \_\_\_\_\_ billion years ago.
  - (a) 1.5
  - (b) 4.5
  - (c) 3.5
  - (d) 2.5
- (8) Flagella might have arisen through the ingestion of:
  - (a) Cyanobacteria
  - (b) Spirochete
  - (c) Aerobic bacteria
  - (d) Spirillum
- (9) First photosynthetic organism probably used hydrogen sulphide as a source of:
  - (a) Carbon
  - (b) Hydrogen
  - (c) Sulphur
  - (d) Hydrogen and sulphur
- (10) "Principle of population" was presented by:
  - (a) Malthus
  - (b) Cuvier
  - (c) Lyell
  - (d) Darwin
- (11) \_\_\_\_\_ published theory of evolution.
  - (a) Mendel
  - (b) Lamarck
  - (c) Linnaeus
  - (d) Wallace
- (12) Darwin wrote book:
  - (a) Theory of special creation
  - (b) Origin of species
  - (c) Principle of population
  - (d) None of these

- (13) Who recognized first that organisms ranged from relatively simple to very complex structures?  
 (a) Linnaeus (b) Aristotle  
 (c) Malthus (d) Darwin
- (14) Cuvier explained earth history by:  
 (a) Catastrophism (b) Uniformity  
 (c) Creationism (d) Natural selection
- (15) Archaeobacteria can tolerate temperature upto:  
 (a) 120°C (b) 200°C  
 (c) 50°C (d) 37°C
- (16) The first eukaryote appeared about \_\_\_\_\_ years ago.  
 (a) 1.5 billion (b) 3.5 billion  
 (c) 2 billion (d) 420 million

**PAST PAPER MCQs**

- (17) Archaeobacteria tolerate temperature up to:  
 (FSD 2017, SWL 2018, MTN 2021, FSD 2021, LHR 2021, BWP 2022, RWP 2022)  
 (a) 110°C (b) 120°C  
 (c) 130°C (d) 140°C
- (18) Who believed in the theory of special creation? (DGK 2018)  
 (a) Lamark (b) Darwin  
 (c) Carlous linnaeus (d) Lyell
- (19) Who published an essay on “The principle of population”? (SGD 2018, RWP 2021)  
 (a) Lyell (b) Darwin  
 (c) Malthus (d) Mendel
- (20) According to endosymbiont hypothesis, the aerobic bacteria developed into:  
 (SGD 2019, 2021, LHR 2021, 2022)  
 (a) Ribosome (b) Lysosome  
 (c) Mitochondria (d) Plastids
- (21) Among the Scientists who believed in divine creation was \_\_\_\_\_. (LHR 2022)  
 (a) Charles Darwin (b) Carolus Linnaeus  
 (c) Alfred Wallace (d) Jean Lamarck
- (22) An example of natural selection in action is evolution of antibiotic resistance in:  
 (DGK 2017)  
 (a) Algae (b) Fungi  
 (c) Bacteria (d) Viruses
- (23) The scientist who published Principles of Geology was: (MTN 2017)  
 (a) Lamarck (b) Linnaeus  
 (c) Myell (d) Lyell
- (24) The first photosynthetic organisms probably used Hydrogen Sulphide as a source Hydrogen for reducing CO<sub>2</sub> to. (MTN 2018)  
 (a) Sugars (b) H<sub>2</sub>CO<sub>3</sub>  
 (c) RUBP (d) Malate
- (25) The idea of endosymbiont was proposed by: (MTN 2019: BWP 2019)  
 (a) Cuvier (b) Lyell  
 (c) Malthus (d) Margulis
- (26) The prokaryotes may have arisen more than \_\_\_\_\_ billion years go. (SWL 2021)  
 (a) 3.5 (b) 4.5  
 (c) 5.5 (d) 6.5

- (27) According to Endosymbiont Hypothesis, ingestion of Prokaryotes similar to Cyanobacteria could have developed into: (BWP 2021)  
 (a) Mitochondria (b) Chloroplast  
 (c) Nucleus (d) Dictyosomes
- (28) Flagella may have arisen through the ingestion of prokaryotes similar to spiral shaped bacteria called: (MTN 2022)  
 (a) Rhizobium (b) Streptococcus  
 (c) *E. coli* (d) Spirochete

### INHERITANCE OF ACQUIRED CHARACTERS

#### KIPS MCQs

- (29) Which one is not the part of natural selection?  
 (a) Over production (b) Survival of the fittest  
 (c) Struggle for existence (d) Inheritance of acquired characters

#### PAST PAPER MCQs

- (30) Lamarck was in charge of which type of animal's collection: (SGD 2017)  
 (a) Fishes (b) Amphibians  
 (c) Invertebrates (d) Reptiles
- (31) Acquired characteristics of an individual cannot be: (MTN 2018)  
 (a) Inherited (b) Lost  
 (c) Flourished (d) Remained

### CHARLES DARWIN, NEO-DARWINISM

#### KIPS MCQs

- (32) Where did Darwin discover many varieties including finches?  
 (a) Florida (b) Ecuador  
 (c) Hawaiian Islands (d) Galapagos Islands
- (33) In addition to Darwin who also determined that natural selection was a major force in evolution?  
 (a) Cuvier (b) Lyell  
 (c) Wallace (d) Malthus
- (34) Number of type of finches observed by Darwin on Galapagos Island was:  
 (a) 12 (b) 10  
 (c) 13 (d) 15
- (35) Natural selection can amplify or diminish only those variations that are:  
 (a) Non heritable (b) Heritable  
 (c) Both (d) Acquired
- (36) \_\_\_\_\_ developed a theory of natural selection essentially identical to Darwin's.  
 (a) Malthus (b) Cuvier  
 (c) Lyell (d) Wallace
- (37) An important turning point for the evolutionary theory was the birth of  
 (a) Population ecology (b) Genetic drift  
 (c) Population genetics (d) Paleontology
- (38) In his book Darwin proposed a mechanism by which evolution could occur. He called it:  
 (a) Inheritance of acquired characters (b) Genetic mutation  
 (c) Natural selection (d) None of these
- (39) The name of ship in Darwin's voyage to American coastline was:  
 (a) Galapagos (b) Beagle  
 (c) Shrewsbury (d) Titanic

- (40) Adaptations that an organism acquires by its own action are:  
 (a) Non heritable  
 (b) Heritable  
 (c) Both of these  
 (d) Can be heritable through some modification

**PAST PAPER MCQs**

- (41) Among birds, Darwin collected 13 types of. (DGK 2017)  
 (a) Robins (b) Finches  
 (c) Ferrets (d) Pterodactylles
- (42) Book "The Origin of Species" was written by: (SWL 2018)  
 (a) Linnaeus (b) Darwin  
 (c) Lamarck (d) Wallace
- (43) Darwin "Origin of species" was published in: (FSD 2018, 19)  
 (a) 1840 (b) 1859  
 (c) 1865 (d) 1890
- (44) How many types of finches did Darwin collect on Galapagos Island: (LHR 2018, SGD 2022)  
 (a) 13 types (b) 20 types  
 (c) 25 types (d) 30 types

**ENTRY TEST BASED MCQs:**

- (45) The survival of an organism during the struggle for existence is not random, but depends on: (MDCAT 2009)  
 (a) Its genetic constitution (b) Its ability to over-produce  
 (c) Its ability to acquire characters (d) Its ability to over-eat
- (46) According to the theory of natural selection, organisms produce: (MDCAT 2019)  
 (a) More offspring than supported  
 (c) Less offspring than supported  
 (b) Offspring according to the resources available  
 (d) Offspring to create resources

**EVIDENCES OF EVOLUTION (BIOGEOGRAPHY, FOSSILS RECORD)**

**KIPS MCQs**

- (47) Which of the following gives the correct order for the evolution of vertebrates?  
 (a) Fish, reptiles, mammals, amphibians (b) Amphibians, reptiles, fish, mammals  
 (c) Reptiles, fish, mammals, amphibians (d) Fish, amphibians, reptiles, mammals
- (48) Most fossils are found in:  
 (a) Igneous rocks (b) Sedimentary rocks  
 (c) Marine water (d) Clay
- (49) The oldest known fossils are of:  
 (a) Eukaryotes (b) Prokaryotes  
 (c) Cyanobacteria (d) Archaeobacteria

**PAST PAPER MCQs**

- (50) The oldest known fossils are of: (BWP 2017)  
 (a) Fungi (b) Eukaryotes  
 (c) Prokaryotes (d) Plants

## EVIDENCES OF EVOLUTION (COMPARATIVE ANATOMY, COMPARATIVE EMBRYOLOGY, MOLECULAR BIOLOGY)

### KIPS MCQs

- (51) Which of the following is considered to be a human 'vestigial' structure?  
 (a) Appendix (b) Pelvis  
 (c) Chromosomes (d) Eye brows
- (52) Select the correct statement:  
 (a) Mammals and dinosaurs existed together  
 (b) Mammals evolved from amphibians  
 (c) Archaeopteryx was a type of mammal  
 (d) Whales are reptiles that returned to an aquatic environment
- (53) Homologous organs show:  
 (a) Divergent evolution (b) Convergent evolution  
 (c) Straight evolution (d) No relation to evolution
- (54) Evolution is a \_\_\_\_\_ process.  
 (a) Continuous (b) Remodeling  
 (c) Static (d) Both a and b
- (55) \_\_\_\_\_ are historical remnants of structures that had important functions in ancestors but are no longer essential in descendants.  
 (a) Homologous organs (b) Vestigial organs  
 (c) Analogous organs (d) All of the above
- (56) In humans gill pouches have been modified into:  
 (a) External ear (b) Nose  
 (c) Eustachian tubes (d) Eyes
- (57) Similarity in characteristics resulting from common ancestry is known as:  
 (a) Analogy (b) Ethology  
 (c) Homology (d) Physiology
- (58) A respiratory protein found in all aerobic species is:  
 (a) Cytochrome a (b) Cytochrome b  
 (c) Cytochrome c (d) Cytochrome d
- (59) In man the vestigial organs are ear muscles, nictitating membrane and:  
 (a) Coccyx (b) Tail  
 (c) Throat (d) External ear

### PAST PAPER MCQs

- (60) A respiratory protein which is present in all aerobic organisms is? (DGK 2018)  
 (a) Haemoglobin (b) Myoglobin  
 (c) Cytochrome a (d) Cytochrome c
- (61) Which respiratory protein is found in all aerobic species? (GRW 2018)  
 (a) Glial cell line (b) Cytochrome  
 (c) Serine (d) Cysteine
- (62) Which one is not a vestigial organ of human being? (GRW 2019)  
 (a) appendix (b) coccyx  
 (c) nictitating membrane (d) eye lid
- (63) Homologous structures represent: (MTN 2019)  
 (a) Convergent evolution (b) Analogy  
 (c) Divergent evolution (d) Functional dehydrogenase

- (64) The actual remains or traces of organisms that lived in the ancient geological times are called: (LHR 2021)  
 (a) Analogous organs (b) Homologous organs  
 (c) Vestigial organs (d) Fossils
- (65) Vermiform appendix in man is: (DGK 2022)  
 (a) Developed organ (b) Vestigial organ  
 (c) Rudimentary organ (d) Imperfect organ

### GENE POOL AND ALLELE FREQUENCIES

#### KIPS MCQs

- (66) Total aggregate of genes in a population at any time is called its:  
 (a) Gene pool (b) Gene frequency  
 (c) Genetic map (d) Genome
- (67) \_\_\_\_\_ is change in frequency of alleles at a locus by chance.  
 Total aggregate of genes in a population at any time is called its:  
 (a) Gene pool (b) Gene frequency  
 (c) Genetic map (d) Genome
- (68) Inbreeding can be described by followings features:  
 (a) Does not alter allele frequency  
 (b) Lessens proportion of heterozygote  
 (c) Cause frequency of particular genotype to change  
 (d) Both a and b
- (69) The micro-evolutionary process which creates new allele is called:  
 (a) Natural selection (b) Genetic mutation  
 (c) Genetic drift (d) None of these
- (70) The smallest biological unit that can evolve over time is:  
 (a) Cell (b) Individual  
 (c) Population (d) Species

### HARDY-WEINBERG THEOREM

#### KIPS MCQs

- (71) Hardy Weinberg theorem describe a population that is:  
 (a) Non evolving (b) In equilibrium  
 (c) Evolving (d) Both a and b
- (72) Emigration and immigration of members of a population cause disturbance in the:  
 (a) Genetic drift (b) Gene frequencies  
 (c) Genetic mutation (d) Gene pool
- (73) The ultimate source of all changes:  
 (a) Mutation (b) Migration  
 (c) Genetic drift (d) Evolution
- (74) Find out the frequency of heterozygotes if the frequency of dominant allele is 0.8:  
 (a) 0.32 (b) 0.42  
 (c) 0.64 (d) 0.40
- (75) Hardy Weinberg theorem describes a population that is:  
 (a) Non evolving (b) In equilibrium  
 (c) Evolving (d) Both a and b
- (76) The change in frequency of alleles at a locus that occur by chance:  
 (a) Selection (b) Mutation  
 (c) Genetic drift (d) Non random mating

**PAST PAPER MCQs**

- (77) Change in frequency of alleles at a locus that occurs by chance is called. (GRW 2017, SWL 2018, CRW 2019, 2021)  
 (a) Genetic drift (b) Mutation  
 (c) Migration (d) Non-random mating
- (78) Emigration and immigration of members of population cause disturbance in the: (LHR 2017)  
 (a) Genotype (b) Genetic drift  
 (c) Phenotype (d) Gene pool

**ENTRY TEST BASED MCQs**

- (79) Large population size, random mating, no mutation and no emigration or immigration are postulates of: (MDCAT 2017)  
 (a) Hardy-Weinberg equation  
 (b) Mendel's law of independent assortment  
 (c) Mendel's law of segregation  
 (d) Theory presented by Schleiden and Schwann
- (80) Change in frequency of alleles at a locus that occurs by chance is called: (MDCAT 2017-Retake)  
 (a) Mutation (b) Non-random mating  
 (c) Migration (d) Genetic drift
- (81) Which of the following factor causes change in gene frequency: (MDCAT 2017-Retake)  
 (a) Meiosis (b) Mutation  
 (c) Sexual recombination (d) Random mating
- (82) Change in frequency of alleles that occurs by chance is called as: (MDCAT 2019)  
 (a) Natural selection (b) Mutation  
 (c) Migration (d) Genetic drift

**ENDANGERED SPECIES****KIPS MCQs**

- (83) The main cause of extinction is:  
 (a) Migration (b) Loss of habitat  
 (c) Mutation (d) Climate change
- (84) Endangered species of plants recorded so far are about:  
 (a) 600 (b) 500  
 (c) 700 (d) 800
- (85) Species that is in imminent danger of extinction:  
 (a) Extinct species (b) Endangered species  
 (c) Threatened species (d) Preserved species
- (86) Which animal has declared extinct in Pakistan?  
 (a) Leopard (b) Bustard  
 (c) Dolphin (d) Tiger
- (87) Reduction in forest coverage in Ecuador:  
 (a) 75% (b) 85%  
 (c) 95% (d) 100%
- (88) Tropical rain forests have been reduced to \_\_\_\_\_ of their original extent:  
 (a) 44% (b) 55%  
 (c) 54% (d) 25%

- (89) Specie that is in imminent danger of extinction:  
 (a) Extinct species (b) Endangered species  
 (c) Threatened species (d) Preserved species
- (90) In Pakistan Rhino, gavial, and pheasant are included in:  
 (a) Threatened species (b) Endangered species  
 (c) Extinct species (d) None of these

**PAST PAPER MCQs**

- (91) Endangered species of plants have been recorded to more than: (SWL 2017)  
 (a) 300 (b) 400  
 (c) 500 (d) 600
- (92) Which one of the following is endangered in Pakistan: (GRW 2018)  
 (a) Indian rhino (b) Indus dolphin  
 (c) Cheer pheasant (d) Tiger

**ANSWER KEY**

(Topic Wise Multiple Choice Questions)

1	21	41	61	81	101	121	141
2	22	42	62	82	102	122	142
3	23	43	63	83	103	123	143
4	24	44	64	84	104	124	144
5	25	45	65	85	105	125	145
6	26	46	66	86	106	126	146
7	27	47	67	87	107	127	147
8	28	48	68	88	108	128	148
9	29	49	69	89	109	129	149
10	30	50	70	90	110	130	150
11	31	51	71	91	111	131	151
12	32	52	72	92	112	132	152
13	33	53	73	93	113	133	153
14	34	54	74	94	114	134	154
15	35	55	75	95	115	135	155
16	36	56	76	96	116	136	156
17	37	57	77	97	117	137	157
18	38	58	78	98	118	138	
19	39	59	79	99	119	139	
20	40	60	80	100	120	140	



## CONCEPT OF EVOLUTION VS SPECIAL CREATION EVOLUTION FROM PROKARYOTES TO EUKARYOTES

### KIPS SHORT QUESTIONS

**Q:1** What is meant by evolution?

**Ans.** Change over time; organic or biological evolution is a series of change in the genetic composition of a population over time leading to the origin of new species.

**Q:2** What is theory of special creation? Who was believer of this concept?

**Ans.** **Theory of Special Creation.**

According to the theory of special creation, "all living things came into existence in their present forms especially and specifically created by Nature."

**Scientist:**

Among the scientists who believed in divine creation was Carolus Linnaeus.

### PAST PAEPR SHORT QUESTIONS

**Q:3** What is theory of special creation? Give the name of scientist, who believed in it.

(FSD 2018, FSD 2019, FSD 2021, SGD 2019, GRW 2021, SWL 2022)

**Q:4** What are the contributions of Cuvier in evolution?

(SGD 2017)

**Q:5** How did eukaryotes evolve from prokaryotes?

(LHR 2017)

**Q:6** How the oxygen accumulation liberated during photosynthesis changed the environment of earth?

(LHR 2021)

**Q:7** What is membrane invagination hypothesis?

(LHR 2019)

**Q:8** What is endosymbiont hypothesis? Who proposed this hypothesis?

(MTN 2018, GRW 2018, MTN 2021, GRW 2021, 2022, SWL 2022, RWP 2022)

**Q:9** What are hydrothermal vents?

(MTN 2017, FSD 2017, SWL 2018)

## INHERITANCE OF ACQUIRED CHARACTERISTICS

### KIPS SHORT QUESTIONS

**Q:10** What are two important points of Lamarck's theory?

**Ans.**

- Lamarck argued that those parts of the body used extensively to cope with the environment became larger and stronger, while those that are not used deteriorated.
- The second idea Lamarck adopted was called the inheritance of acquired characteristics. In this concept of heredity, the modifications an organism acquires during its lifetime can be passed along to its offspring.

### PAST PAPER SHORT QUESTIONS

**Q:11** What is the concept of inheritance of acquired characteristics?

(SWL 2019)

## CHARLES DARWIN, NEO-DARWINISM

### KIPS SHORT QUESTIONS

**Q:12** Explain Darwin's concept "Descent with modification".

**Ans.** Darwin believed in perceived unity in life, with all organisms related through descent from some common ancestor that lived in the remote past.

**Q:13** What is theory of natural selection?

**Ans.** Darwin suggested that populations of individual species become better adapted to their local environments through natural selection. Those individuals whose inherited characteristics fit them best to their environment are likely to leave more offsprings than the less fit individuals.

**Q:14 Why Neo-Darwinism or modern synthesis is called so?**

**Ans.** It is called synthesis because it integrated discoveries and ideas from many different fields, including palaeontology, taxonomy, biogeography and population genetics.

#### **PAST PAEPR SHORT QUESTIONS**

**Q:15** State descent with modification. (BWP 2022)

**Q:16** What is modern synthesis or Neo-Darwinism? (LEP 2018, GRW 2018, LHR 2021, RWP 2021, SGD 2022)

**Q:17** Give the importance of population genetics in evolution. (FSD 2017)

#### **EVIDENCES OF EVOLUTION (BIOGEOGRAPHY, FOSSILS RECORD)**

##### **KIPS SHORT QUESTIONS**

**Q:18** Define biogeography.

**Ans.** The geographical distribution of species on earth is called biogeography.

**Q:19** What are armadillos? Where did they live?

**Ans.** Armadillos are the armored mammals that live only in America. The evolutionary view of biogeography predicts that contemporary armadillos are modified descendants of earlier species that occupied these continents.

**Q:20** What are fossils?

**Ans.** Fossils are either the actual remains or traces of organisms that lived in ancient geological times. Most fossils are found in sedimentary rocks.

#### **PAST PAPER SHORT QUESTIONS**

**Q:21** Briefly describe, how biogeography provides an evidence for evolution? (GRW 2019, DGK 2022, BWP 2022)

**Q:22** What is biogeography? (SWL 2021)

**Q:23** What are fossils? Where they are found? (RWP 2017, MTN 2021)

**Q:24** Differentiate between divergent and convergent evolutions? (MTN 2022)

#### **COMPARATIVE ANATOMY, COMPARATIVE EMBRYOLOGY, MOLECULAR BIOLOGY**

##### **KIPS SHORT QUESTIONS**

**Q:25** Define comparative anatomy.

**Ans.** Study of similarities and dissimilarities among the species on the basis of their basic internal structure is called comparative anatomy.

**Q:26** What is said by comparative anatomy in the support of evolution?

**Ans.** Comparative anatomy supports that evolution is a remodeling process in which ancestral structures that function in one capacity become modified as they take on new functions.

**Q:27** What are homologous organs? Give examples in plants and animals.

**Ans. Homologous Organs.**

Homologous organs are functionally different but structurally alike.

**Examples:**

Fore limbs of man, bat, horse, whale etc. are example. The flower parts of a flowering plant are homologous. They are considered to have evolved from leaves, to form sepals, petals, stamens and carpals.

**Q:28** What are analogous organs? Give example.

**Ans. Analogous Organs.**

Analogous organs are functionally alike but structurally different.

**Examples:**

Wings of bat, birds and insects etc. are examples.

**Q:29 Define homology.**

**Ans.** Similarity in characteristics resulting from common ancestry is known as homology.

**Q:30 Differentiate between convergent and divergent evolution.**

**Ans.**

Convergent Evolution	Divergent Evolution
Organisms belonging to different ancestor develop some modifications to perform similar functions.	Organisms belonging to same ancestor develop slight modification in structure to perform different functions.
Formation of analogous organs.	Formation of homologous organs.

**Q:31 What do you mean by “ontogeny recapitulates phylogeny”? OR What is Recapitulation?**

**Ans.** According to this concept “during embryonic development organism follow the same evolutionary sequence showing resemblance with closely related organism” OR “the repetition of an evolutionary or other process during development or growth.”

**Q:32 From which structure Eustachian tubes develop. What is function of these tubes?**

**Ans. Development:**

The gill pouches in terrestrial vertebrates are embryonic structures which become modified for other functions, such as the Eustachian tubes.

**Function:** It connects the middle ear with the throat in humans.

**Q:33 How are evolutionary relationships reflected in DNA and protein?**

**Ans.** Closely related species have close resemblance in the sequences of monomers of proteins and genes (DN(a). These closely matched sequences must have been copied from a common ancestor.

**Example:** The proteins and DNA of human and apes are closely matched.

**PAST PAPER SHORT QUESTIONS**

**Q:34 Differentiate between homologous and analogous organs.**

(FSD 2018, FSD 2019, SWL 2021, LHR 2021, GRW 2021, LHR 2022)

**Q:35 Define homologous organs. Give one example.** (GRW 2019, MTN 2019, LHR 2021)

**Q:36 What are analogous organs? Give an example.** (LHR 2019,22)

**Q:37 Explain the term homology with a suitable example.** (BWP 2017, 2021, DGK 2019)

**Q:38 What are vestigial organs? Give one example.**

(SWL 2018, DGK 2017, DGK 2018, LHR 2018, MTN 2018, FSD 2021)

**Q:39 Describe briefly, how molecular biology supports evolution.**

(LHR 2017, LHR 2019, DGK 2019, FSD 2021)

**NATURAL SELECTION & ARTIFICIAL SELECTION**

**KIPS SHORT QUESTIONS**

**Q:40 How does natural selection work?**

**Ans.** Natural selection occurs through an interaction between the environment and the variability inherent in any population. The individuals with characteristics best fit to the environment are likely to leave more offspring than less fit. In this way best fit characters are selected generation after generation that lead to gradual change in a population.

**Q:41 Differentiate between natural selection and artificial selection.**

**Ans**

Natural Selection	Artificial Selection
It is a random process as characters are naturally selected.	It is not random as only desirable characters are artificially selected.
Slow process.	Relatively fast process.
Selection process is controlled by environment.	Selection is controlled by breeders.

**Q:42 What is a population?**

**Ans.** Population is a group of inter-breeding individuals belonging to a particular species and sharing a common geographic area.

**Q:43 What is a gene pool?**

**Ans.** The total aggregate of genes in a population at any one time is called the population's gene pool. It consists of all alleles at all gene loci in all individuals of the population.

**Q:44 What do you mean by fixed allele?**

**Ans.** If all members of a population are homozygous for the same allele, that allele is said to be fixed in the gene pool.

**PAST PAPER SHORT QUESTIONS**

**Q:45** Define natural selection and artificial selection. (GRW 2017, SWL 2018)

**Q:46** Differentiate natural and artificial selection. (DGK 2017, SGD 2018, DGK 2019, SGD 2022)

**Q:47** Define theory of natural selection. (MTN 2021)

**Q:48** Define population and population's gene pool. (GRW 2021)

**Q:49** Give the names of four factors affecting gene frequency. (GRW 2018)

**Q:50** What is a gene frequency? (MTN 2019)

**HARDY-WEINBERG THEOREM****KIPS SHORT QUESTIONS****Q:51 What is the significance of Hardy Weinberg equation?**

**Ans.** Hardy Weinberg equation is used to calculate the frequencies of allele and genotypes in population at equilibrium.

It is actually a mathematical expression to find out either the evolution is going on in a population or not.

**Q:52 Which mating is called a non-random mating? What are its effects?**

**Ans. Non-random Mating:**

In non-random mating, individuals with certain genotype mate with one another more commonly than would be expected on a random basis.

**Effect:**

- Non-random mating causes the frequency of particular genotypes to differ greatly from those predicted by the Hardy Weinberg principle.
- It also lessens the proportion of heterozygotes.

**Q:53 Name the factors, which affect the gene frequency?**

**Ans.**

- Mutation
- Migration
- Genetic drift
- Non-random mating
- Selection

**Q:54 What is genetic drift? What is its effect on allele frequencies?**

**Ans. Genetic Drift:**

It is the change in frequency of alleles at a locus that occurs by chance.

**Effect:** It may lead to loss of particular alleles affecting allele frequency in small population.

**PAST PAPER SHORT QUESTIONS**

**Q:55** Define Hardy, Weinberg theorem.

(MTN 2018, DGK 2018, LHR 2019, MTN 2019, LHR 2022, MTN 2022)

- Q:56** How genetic drift effect gene frequency?  
(MTN 2017, SWL 2018, SWL 2019, RWP 2019, LHR 2021, FD 2022)
- Q:57** What do you mean by nonrandom mating? (LHR 2017)
- Q:58** Only name the factors that affect population. (LGK 2017)
- Q:59** Name any four factors affecting gene frequency (GRW 2018)
- Q:60** What is genetic drift? Give its effects. (SGD 2019, MTN 2021, SGD 2021)
- Q:61** What is the role of migration in changing gene frequency? (BWP 2021, DGK 2022)
- Q:62** Can migration affect the genotype frequency? If yes how? (FSD 2021)

**ENDANGERED SPECIES**

**KIPS SHORT QUESTIONS**

**Q:63** Differentiate between endangered and threatened species.

Ans.

Endangered Species	Threatened Species
The species that are in imminent danger of extinction.	The species that are likely to become endangered in the near future.
Tiger, Asian lion, cheer pheasant.	Indus Dolphin, Houbara bustard.

**Q:64** Give two measures to protect endangered species.

Ans. (1) Protect the landscapes and multiple-use areas. It will allow controlled private activity. Thus it will retain the habitat of wild life.

(2) Zoos and botanical gardens can save endangered species.

**PAST PAPER SHORT QUESTIONS**

- Q:65** What is the difference between endangered species and threatened species?  
(LHR 2017, LHR 2018, RWP 2021, GRW 2022, RWP 2022)
- Q:66** Define endangered species with special reference to Pakistan.  
(GRW 2017, GRW 2018, LHR 2017, LHR 2018, BWP 2019)
- Q:67** Name any four animals, declared extinct in Pakistan. (GRW 2018, RWP 2018, DGK 2019)
- Q:68** Give two measures to protect the endangered species. (MTN 2019)
- Q:69** Write down the measures for the preservation of endangered species. (RWP 2019, SGD 2021)