Q1. Which of the following is the correct chronological sequence of human evolution?

A. Homo habilis → Homo erectus → Homo sapiens neanderthalensis → Homo sapiens sapiens
B. Australopithecus → Homo erectus → Homo habilis → Homo sapiens
C. Homo erectus → Australopithecus → Homo habilis → Homo sapiens
D. Australopithecus → Homo habilis → Homo erectus → Homo sapiens

Answer: D
Explanation: Human evolution followed the order: Australopithecus (ape-man) → Homo habilis (handy man) → Homo erectus (upright man) → Homo sapiens (wise man). This is based on fossil dating and anatomical development.

Q2. Match the following evolutionary theories with their proponents:

Column I	Column II
A. Inheritance of acquired traits	1. Darwin
B. Mutation theory	2. Weismann
C. Natural selection	3. Lamarck
D. Germplasm theory	4. Hugo de Vries

Match the pairs correctly:
A-3, B-4, C-1, D-2
A-2, B-4, C-3, D-1
A-4, B-3, C-1, D-2
A-1, B-2, C-4, D-3

Answer: A-3, B-4, C-1, D-2
Explanation:

Lamarck proposed inheritance of acquired traits.

Hugo de Vries proposed the mutation theory.

Darwin gave the theory of natural selection.

Weismann gave the germplasm theory.

Q3. Industrial melanism observed in peppered moths (Biston betularia) is an example of:

A. Genetic drift
B. Mutation
C. Natural selection
D. Acquired inheritance

Answer: C
Explanation: The frequency of melanic (dark) moths increased in polluted areas due to selective advantage (better camouflage), demonstrating natural selection in response to environmental change.

Q4. Which of the following is not a homologous structure?

A. Wings of birds and forelimbs of humans
B. Flippers of whales and arms of humans
C. Wings of insects and wings of bats
D. Forelimbs of lizards and legs of frogs

Answer: C
Explanation: Wings of insects and bats are analogous, not homologous. They have different origins but serve the same function (flying). Homologous organs have similar origin but may differ in function.

Q5. Which of the following statements is correct regarding genetic drift?

A. It always increases genetic variation
B. It is significant in large populations
C. It is a random change in allele frequency
D. It always leads to evolution

Answer: C
Explanation: Genetic drift refers to random changes in allele frequency in a population, especially significant in small populations. It may or may not lead to evolution.

Q6. Which one of the following provides evidence for evolution based on comparative embryology?

A. Presence of pentadactyl limbs in vertebrates
B. Similarities in the early development stages of vertebrate embryos
C. Development of wings in birds and bats

D. Fossils of extinct animals

Answer: B
Explanation: Comparative embryology shows that early embryonic stages of different vertebrates (fish, amphibians, reptiles, birds, mammals) are similar, indicating common ancestry.

Q7. Assertion (A): Darwin failed to explain the cause of variation.
Reason (R): Mutation is the only source of variation.

A. Both A and R are true, and R is the correct explanation of A
B. Both A and R are true, but R is not the correct explanation of A
C. A is true, but R is false
D. A is false, but R is true

Answer: C
Explanation: Darwin did not know the source of variation, but variation can arise from mutation, recombination, and gene flow — not just mutation.

Q8. Which of the following statements is incorrect about fossils?

A. Archaeopteryx is a connecting link between reptiles and birds
B. Fossils can be dated by carbon dating
C. All fossils are formed by preservation in ice
D. Fossils provide evidence of past life forms

Answer: C
Explanation: Fossils can form in various ways like sedimentation, petrification, amber trapping, etc., not only by freezing in ice.

Q9. Which of the following is a molecular evidence for evolution?

A. Homologous organs
B. Analogous organs
C. Similar proteins and genes in different organisms
D. Vestigial organs

Answer: C

Explanation: Similar DNA sequences and proteins (like cytochrome c) across species indicate evolutionary relationships at the molecular level.

Q10. The term “ontogeny recapitulates phylogeny” was proposed by:

A. Ernst Haeckel
B. Charles Darwin
C. Hugo de Vries
D. Gregor Mendel

Answer: A
Explanation: Haeckel proposed that the embryonic development of an organism (ontogeny) repeats the evolutionary history of the species (phylogeny), although it's now considered oversimplified.

Q11. Match the following fossil discoveries with their significance:

A. Archaeopteryx – 1. Connecting link between reptiles and birds
B. Dryopithecus – 2. Ancestor of modern apes and humans
C. Neanderthal man – 3. Used tools and buried dead
D. Homo habilis – 4. First tool user

Options:
A-1, B-2, C-3, D-4
A-2, B-1, C-3, D-4
A-1, B-4, C-2, D-3
A-3, B-2, C-4, D-1

Answer: A-1, B-2, C-3, D-4
Explanation:

Archaeopteryx is the fossil showing traits of both birds and reptiles.

Dryopithecus is a common ancestor of modern apes and humans.

Neanderthal man used tools and performed burial rituals.

Homo habilis is called the "handy man" due to tool usage.

Q12. Which of the following is not a vestigial organ in humans?
A. Nictitating membrane
B. Vermiform appendix
C. Coccyx
D. Pancreas

Answer: D
Explanation: The pancreas is a functional organ with roles in digestion and hormone secretion. The other three are considered vestigial (reduced and functionless in humans).

Q13. According to Darwin, which of the following is the main driver of evolution?

A. Genetic recombination
B. Natural selection
C. Artificial selection
D. Inheritance of acquired characters

Answer: B
Explanation: Darwin emphasized natural selection as the primary force in evolution — the survival of the fittest based on favorable variations.

Q14. Which of the following evolutionary forces introduces new alleles into a population?

A. Genetic drift
B. Gene flow
C. Stabilizing selection
D. Natural selection

Answer: B
Explanation: Gene flow is the movement of genes between populations, introducing new genetic material and increasing variation.

Q15. Assertion (A): Natural selection operates through differential reproductive success.

Reason (R): Organisms with beneficial traits are more likely to survive and reproduce.

A. Both A and R are true, and R is the correct explanation of A

B. Both A and R are true, but R is not the correct explanation of A
C. A is true, but R is false
D. A is false, but R is true

Answer: A
Explanation: Natural selection favors traits that improve reproductive success, and R correctly explains how A happens.

Q16. Which of the following statements is incorrect about speciation?

A. It can result from geographical isolation
B. It always involves a change in chromosome number
C. It may result in reproductive isolation
D. It leads to the formation of new species

Answer: B
Explanation: While polyploidy (change in chromosome number) can cause speciation in plants, it is not a universal requirement for speciation, especially in animals.

Q17. The term "adaptive radiation" refers to:

A. Formation of new species through hybridization
B. Rapid multiplication of new species from a common ancestor
C. Evolution of unrelated species due to similar environments
D. Gradual disappearance of less fit species

Answer: B
Explanation: Adaptive radiation is the diversification of a common ancestor into multiple species adapted to different environments (e.g., Darwin’s finches).

Q18. The fossil record is considered incomplete because:

A. Fossils are always fully preserved
B. All organisms form fossils
C. Only hard parts fossilize under suitable conditions
D. It contains fossils of all organisms ever lived

Answer: C

Explanation: Fossilization usually preserves only hard parts like bones and shells, and requires specific conditions, making the record incomplete.

Q19. Which of the following indicates a convergent evolution?

A. Wings of bats and wings of birds
B. Forelimbs of whales and wings of bats
C. Flippers of penguins and fins of fishes
D. Eyes of octopus and vertebrates

Answer: C
Explanation: Convergent evolution refers to development of similar traits (like fins) in unrelated species (penguins are birds, fishes are not), due to similar environments.

Q20. In a population in Hardy-Weinberg equilibrium, if frequency of allele A is 0.6, what is the frequency of genotype AA?

A. 0.36
B. 0.48
C. 0.6
D. 0.16

Answer: A
Explanation: According to the Hardy-Weinberg equation,
$AA = p^2 = (0.6)^2 = 0.36$

Q21. Match the following hominids with their correct features:

A. Homo erectus – 1. Used fire, large brain
B. Australopithecus – 2. Bipedal, vegetarian
C. Homo sapiens sapiens – 3. Modern man
D. Neanderthal man – 4. Thick-boned, buried dead

Options:
A-1, B-2, C-3, D-4
A-2, B-1, C-3, D-4
A-4, B-3, C-2, D-1
A-3, B-4, C-1, D-2

Answer: A-1, B-2, C-3, D-4
Explanation:

Homo erectus used fire and had a large brain.

Australopithecus was the first bipedal primate, mainly vegetarian.

Homo sapiens sapiens refers to modern man.

Neanderthals were thick-boned and practiced burial.

Q22. Which concept explains the similarity in structure of forelimbs in humans, whales, and bats?

A. Divergent evolution
B. Convergent evolution
C. Adaptive radiation
D. Genetic drift

Answer: A
Explanation: Divergent evolution occurs when a common ancestor gives rise to species with homologous structures adapted to different functions.

Q23. Assertion (A): Industrial melanism supports the idea of natural selection.

Reason (R): The frequency of dark-colored moths increased in polluted areas.

A. Both A and R are true, and R is the correct explanation of A
B. Both A and R are true, but R is not the correct explanation of A
C. A is true, but R is false
D. A is false, but R is true

Answer: A
Explanation: In industrial areas, dark moths survived better due to camouflage on soot-covered trees, showing natural selection in action.

Q24. Which of the following provides direct evidence of organic evolution?

A. Fossils
B. Vestigial organs
C. Embryological similarities
D. Homologous organs

Answer: A
Explanation: Fossils are direct remnants of ancient organisms and give concrete evidence of evolutionary transitions.

Q25. Which one of the following mechanisms does not disturb Hardy-Weinberg equilibrium?

A. Mutation
B. Gene flow
C. Random mating
D. Genetic drift

Answer: C
Explanation: Random mating maintains Hardy-Weinberg equilibrium; the others introduce variation or bias.

Q26. Which of the following is not related to Lamarckism?

A. Use and disuse
B. Inheritance of acquired characters
C. Natural selection
D. Giraffe's long neck as a result of stretching

Answer: C
Explanation: Natural selection is part of Darwin's theory, not Lamarck's. Lamarck focused on use/disuse and inheritance of acquired traits.

Q27. Evolutionary convergence is supported by:

A. Analogous structures
B. Homologous structures
C. Vestigial organs
D. Fossil record

Answer: A

Explanation: Analogous structures (e.g., wings of insects and birds) perform similar functions but have different evolutionary origins.

Q28. The most recent ancestor common to both apes and humans is:

A. Australopithecus
B. Dryopithecus
C. Homo habilis
D. Ramapithecus

Answer: B
Explanation: Dryopithecus is believed to be a common ancestor of apes and humans, based on fossil evidence.

Q29. Which of the following is a postzygotic reproductive barrier?

A. Gametic incompatibility
B. Zygote mortality
C. Temporal isolation
D. Mechanical isolation

Answer: B
Explanation: Zygote mortality is a postzygotic barrier because fertilization occurs but the zygote fails to develop.

Q30. Which of the following statements is true regarding the genetic drift?

A. It affects large populations significantly
B. It always increases genetic diversity
C. It is random change in allele frequencies
D. It results from directional natural selection

Answer: C
Explanation: Genetic drift involves random changes in allele frequencies, especially in small populations.

Q31. Which of the following evidences best supports the theory of organic evolution?

A. Fossils
B. Mendel's laws
C. DNA replication
D. Photosynthesis

Answer: A
Explanation: Fossils provide direct evidence of past life and help trace evolutionary changes over time, showcasing transitional forms.

Q32. Industrial melanism is an example of:

A. Genetic drift
B. Natural selection
C. Mutation
D. Artificial selection

Answer: B
Explanation: Industrial melanism, such as in peppered moths, demonstrates natural selection where darker moths survived better in polluted environments.

Q33. Which of the following are considered vestigial organs in humans?

A. Appendix and body hair
B. Liver and kidneys
C. Eyes and ears
D. Nails and hair

Answer: A
Explanation: The appendix and body hair in humans are examples of vestigial structures that have lost their original function.

Q34. The theory of natural selection was proposed by:

A. Jean-Baptiste Lamarck
B. Gregor Mendel
C. Charles Darwin
D. Hugo de Vries

Answer: C
Explanation: Charles Darwin proposed the theory of natural selection in his book "On the Origin of Species".

Q35. Match the following:

Column I (Fossils)	Column II (Examples)
A. Connecting link	1. Archaeopteryx
B. Homologous organ	2. Forelimb of bat and whale
C. Vestigial organ	3. Human appendix
D. Analogous organ	4. Wings of bat and insect

A. A–1, B–2, C–3, D–4
B. A–2, B–1, C–4, D–3
C. A–3, B–4, C–1, D–2
D. A–1, B–4, C–2, D–3

Answer: A
Explanation:

Connecting link → Archaeopteryx

Homologous organ → Forelimbs with similar structure

Vestigial organ → Appendix

Analogous organ → Wings with different structure but same function

Q36. Which of the following statements is correct regarding genetic drift?

A. It operates more significantly in large populations.
B. It always increases genetic variation.
C. It is a chance event affecting gene frequency.
D. It is the same as natural selection.

Answer: C
Explanation: Genetic drift refers to random changes in allele frequencies, particularly in small populations.

Q37. Which pair is mismatched?

A. Divergent evolution – Homologous organs
B. Convergent evolution – Analogous organs
C. Adaptive radiation – Darwin's finches
D. Saltation – Gradual evolution

Answer: D
Explanation: Saltation refers to sudden, large mutations, not gradual evolution.

Q38. Which of the following does not provide evidence of evolution?

A. Fossils
B. Embryology
C. Analogous organs
D. Acquired characters

Answer: D
Explanation: Acquired characters are not inherited, and thus do not contribute to evolution. Lamarck's theory based on them is discredited.

Q39. Assertion (A): Wings of insects and birds are analogous organs.

Reason (R): They perform similar functions but have different origins and structures.

A. Both A and R are true, and R is the correct explanation of A
B. Both A and R are true, but R is not the correct explanation
C. A is true, R is false
D. Both A and R are false

Answer: A
Explanation: Analogous organs perform similar functions but have different embryonic origins, e.g., wings of insects and birds.

Q40. Which of the following processes leads to speciation?

A. Gene flow

B. Genetic drift
C. Natural selection
D. All of the above

Answer: D
Explanation: All these factors can contribute to reproductive isolation and speciation over time.

Q41. The phenomenon where a population evolves to occupy different niches is called:

A. Adaptive radiation
B. Convergent evolution
C. Speciation
D. Saltation

Answer: A
Explanation: Adaptive radiation involves a single ancestral species evolving into multiple forms to adapt to different niches (e.g., Darwin's finches).

Q42. Which among the following is considered a connecting link between reptiles and birds?

A. Ichthyostega
B. Sphenodon
C. Archaeopteryx
D. Limulus

Answer: C
Explanation: Archaeopteryx shows both reptilian and avian features, making it a classic example of a connecting link.

Q43. Which evidence is considered the most recent and reliable for tracing evolutionary relationships?

A. Fossils
B. Comparative anatomy
C. Molecular evidence
D. Embryological evidence

Answer: C

Explanation: Molecular evidence (like DNA and protein sequences) is the most accurate and recent tool to determine evolutionary relationships.

Q44. Which of the following can be used to estimate the age of fossils?

A. Carbon dating
B. Electron microscope
C. Molecular clock
D. Cytogenetics

Answer: A
Explanation: Radiocarbon dating (Carbon-14) is commonly used to estimate the age of fossils.

Q45. Which concept opposes Darwin's gradualism and suggests evolution through large mutatutations
A. Natural selection
B. Artificial selection
C. Saltation
D. Adaptive radiation

Answer: C
Explanation: Saltation (Hugo de Vries) explains evolution through sudden large mutations, contrasting Darwin's gradual evolution model.