CUET MCQ Questions and A from UNIT 2 (2)

1. **Hardy-Weinberg equilibrium predicts:**
   A. Constant allele frequencies in large populations
   B. Increasing mutations over generations
   C. Evolutionary changes in small populations
   D. The origin of life
   Answer: A
   Solution: Hardy-Weinberg equilibrium holds if no evolutionary forces act.

2. **The theory of natural selection was proposed by:**
   A. Alfred Wallace
   B. Charles Darwin
   C. Gregor Mendel
   D. Both A and B
   Answer: D
   Solution: Darwin and Wallace independently proposed natural selection.

3. **Fossil evidence for evolution is provided by:**
   A. Biogeography
   B. Comparative anatomy
   C. Paleontology
   D. Embryology
   Answer: C
   Solution: Paleontology studies fossils, offering evidence of evolutionary changes.

4. **Which type of natural selection favors intermediate traits?**
   A. Stabilizing selection
   B. Disruptive selection
   C. Directional selection
   D. Sexual selection
   Answer: A
   Solution: Stabilizing selection eliminates extremes, favoring intermediate phenotypes.

5. **Gene flow involves:**
   A. Migration of genes between populations
   B. Reduction of genetic diversity
   C. Random changes in allele frequencies
   D. Complete isolation of populations
   Answer: A
   Solution: Gene flow occurs when individuals migrate and introduce new alleles into populations.

6. **The bottleneck effect leads to:**
   A. Increased genetic diversity
   B. Decreased genetic diversity
   C. Adaptive radiation
   D. High mutation rates
   Answer: B
   Solution: The bottleneck effect reduces genetic diversity due to population size reduction.

7. **Homologous structures indicate:**
   A. Common ancestry
   B. Similar environmental pressures
   C. Genetic drift
   D. Mutations
   Answer: A
   Solution: Homologous structures have similar origins but may serve different functions.

8. **The molecular clock hypothesis is based on:**
   A. DNA replication
   B. Constant mutation rates
   C. Natural selection
   D. Gene flow
   Answer: B
   Solution: Molecular clocks estimate evolutionary timelines based on mutation rates.

9. **Comparative embryology supports evolution by showing:**
   A. Similar development patterns in related organisms
   B. Fossil evidence of common ancestors
   C. Convergent evolution
   D. Adaptive radiation
   Answer: A
   Solution: Similar embryonic stages in different species suggest common ancestry.

10. **The oldest hominid species belongs to the genus:**
    A. Homo
    B. Australopithecus
    C. Ardipithecus
    D. Pan
    Answer: C
    Solution: *Ardipithecus* is one of the oldest known hominids, dating back 4.4 million years.

11. **Which of the following best describes incomplete dominance?**
    A. Both alleles express equally in the phenotype
    B. Dominant allele completely masks the recessive allele
    C. Phenotype is an intermediate of the parental traits
    D. Alleles exist in multiple forms in a population
    Answer: C
    Solution: In incomplete dominance, the heterozygous phenotype is an intermediate between the two parental phenotypes, e.g., red and white flowers producing pink offspring.

12. **Which blood group system demonstrates codominance?**
    A. ABO
    B. Rh factor
    C. MN blood group
    D. H antigen
    Answer: A
    Solution: In the ABO blood group system, both A and B alleles express themselves equally in the AB phenotype, demonstrating codominance.

13. **Which disorder is an example of a Mendelian disorder?**
    A. Down's syndrome
    B. Thalassemia
    C. Turner's syndrome
    D. Klinefelter's syndrome
    Answer: B
    Solution: Thalassemia is a Mendelian disorder caused by mutations in genes responsible for hemoglobin production.

14. **What genetic mechanism explains linked genes often being inherited together?**
    A. Independent assortment
    B. Recombination
    C. Linkage
    D. Mutation
    Answer: C
    Solution: Linked genes are located close together on the same chromosome, making them less likely to segregate during meiosis.

15. **The sex of honeybees is determined by:**
    A. X-Y system
    B. Haplodiploidy
    C. Z-W system
    D. Environmental factors
    Answer: B
    Solution: In honeybees, females are diploid, while males are haploid, a system known as haplodiploidy.

16. **Which is NOT a sex-linked disorder?**
    A. Haemophilia
    B. Colour blindness
    C. Down's syndrome
    D. Duchenne muscular dystrophy
    Answer: C
    Solution: Down's syndrome is a chromosomal disorder caused by trisomy of chromosome 21, not a sex-linked trait.

17. **Turner's syndrome is characterized by which chromosomal pattern?**
    A. 46, XXY
    B. 45, XO
    C. 47, XXY
    D. 46, XY
    Answer: B
    Solution: Turner's syndrome results from the absence of one X chromosome, leading to a 45, XO karyotype.

18. **Which of the following explains pleiotropy?**
    A. One gene affects multiple phenotypic traits
    B. Multiple genes control a single trait
    C. Genes located on the same chromosome
    D. Independent expression of alleles
    Answer: A
    Solution: Pleiotropy occurs when one gene influences multiple phenotypic traits, e.g., sickle cell anemia affecting oxygen transport and resistance to malaria.

19. **What mechanism underlies genetic recombination?**
    A. Mutation
    B. Independent assortment
    C. Crossing over
    D. Gene flow
    Answer: C
    Solution: Crossing over during meiosis leads to genetic recombination, which increases genetic diversity.

20. **Which experiment proved DNA is the genetic material?**
    A. Griffith's experiment
    B. Hershey and Chase experiment
    C. Meselson and Stahl experiment
    D. Beadle and Tatum experiment
    Answer: B
    Solution: Hershey and Chase used bacteriophages to demonstrate that DNA, not protein, is the genetic material.

21. **DNA replication occurs during which phase of the cell cycle?**
    A. G1 phase
    B. S phase
    C. G2 phase
    D. M phase
    Answer: B
    Solution: DNA replication occurs in the S phase (synthesis phase) of the cell cycle.

22. **What is the role of helicase in DNA replication?**
    A. Joining Okazaki fragments
    B. Synthesizing RNA primers
    C. Unwinding the DNA double helix
    D. Proofreading DNA strands
    Answer: C
    Solution: Helicase unwinds the DNA double helix, creating replication forks for DNA synthesis.

23. **Which region of a gene is not transcribed into RNA?**
    A. Exon
    B. Intron
    C. Promoter
    D. Coding sequence
    Answer: C
    Solution: The promoter is a regulatory region that initiates transcription but is not transcribed itself.

24. **The lac operon is an example of:**
    A. Positive regulation only
    B. Negative regulation only
    C. Both positive and negative regulation
    D. Post-transcriptional regulation
    Answer: C
    Solution: The lac operon is regulated by both positive (CAP-cAMP complex) and negative (lac repressor) mechanisms.

25. **Which enzyme catalyzes the formation of mRNA?**
    A. DNA polymerase
    B. RNA polymerase
    C. Ligase
    D. Helicase
    Answer: B
    Solution: RNA polymerase synthesizes mRNA from a DNA template during transcription.

26. **What type of evidence supports Darwin's theory of evolution?**
    A. Morphological evidence only
    B. Molecular evidence only
    C. Fossil, morphological, and molecular evidence
    D. Fossil evidence only
    Answer: C
    Solution: Darwin's theory is supported by multiple forms of evidence, including fossils, comparative morphology, and molecular biology.

27. **Who proposed the Modern Synthetic Theory of Evolution?**
    A. Charles Darwin
    B. Gregor Mendel
    C. Dobzhansky, Mayr, and Fisher
    D. Lamarck
    Answer: C
    Solution: The Modern Synthetic Theory of Evolution was developed by scientists like Dobzhansky, Mayr, and Fisher, integrating Darwin's natural selection with genetics.

28. **Genetic drift has a greater effect on:**
    A. Large populations
    B. Small populations
    C. Migratory populations
    D. Stationary populations
    Answer: B
    Solution: Genetic drift has a significant effect on small populations due to random fluctuations in allele frequencies.

29. **Which process results in new alleles in a population?**
    A. Genetic drift
    B. Mutation
    C. Gene flow
    D. Natural selection
    Answer: B
    Solution: Mutations create new alleles, introducing genetic variation.

30. **What does the Hardy-Weinberg principle describe?**
    A. Evolutionary mechanism in small populations
    B. Genetic equilibrium in a population
    C. The role of natural selection in evolution
    D. Adaptive radiation in species
    Answer: B
    Solution: The Hardy-Weinberg principle describes genetic equilibrium in large, randomly mating populations without evolutionary forces.

31. **Adaptive radiation occurs due to:**
    A. Genetic drift
    B. Mutation
    C. Availability of new ecological niches
    D. Geographic isolation
    Answer: C
    Solution: Adaptive radiation involves the evolution of species to occupy different ecological niches.

32. **Which scientist provided molecular evidence for evolution?**
    A. Charles Darwin
    B. Alfred Wallace
    C. Linus Pauling
    D. Watson and Crick
    Answer: C
    Solution: Linus Pauling used molecular data to demonstrate evolutionary relationships.

33. **The finches of the Galápagos Islands provide evidence for:**
    A. Genetic drift

B. Artificial selection
C. Natural selection
D. Gene flow
Answer: C
Solution: The variation in beak size and shape of Galápagos finches demonstrates natural selection.

34. **Human evolution involved the first appearance of:**
A. Homo sapiens
B. Homo erectus
C. Australopithecus
D. Homo habilis
Answer: C
Solution: Australopithecus is considered an early ancestor in human evolution.

35. **Which is NOT an example of polygenic inheritance?**
A. Skin color
B. Height
C. Blood type
D. Eye color
Answer: C
Solution: Blood type is determined by multiple alleles, not polygenic inheritance.

36. **The genetic code is said to be degenerate because:**
A. It contains stop codons
B. Multiple codons code for the same amino acid
C. It has specific start codons
D. It is universal across organisms
Answer: B
Solution: The degeneracy of the genetic code refers to multiple codons encoding the same amino acid.

37. **What type of selection favors individuals with average traits?**
A. Disruptive selection
B. Stabilizing selection
C. Directional selection

D. Sexual selection
Answer: B
Solution: Stabilizing selection favors average traits, reducing variation in a population.

38. **What is the role of ribosomes in translation?**
A. Synthesize tRNA
B. Decode mRNA to synthesize proteins
C. Copy DNA into RNA
D. Splice introns from pre-mRNA
Answer: B
Solution: Ribosomes facilitate the translation of mRNA into polypeptides by linking amino acids.

39. **In the human genome project, what percentage of the human genome codes for proteins?**
A. 2%
B. 50%
C. 98%
D. 100%
Answer: A
Solution: Only about 2% of the human genome codes for proteins, the rest being non-coding regions.

40. **In Down's syndrome, how many total chromosomes are present?**
A. 45
B. 46
C. 47
D. 48
Answer: C
Solution: Down's syndrome results from trisomy 21, leading to a total of 47 chromosomes.

41. **Which of the following is an example of incomplete dominance?**
A. ABO blood group inheritance
B. Red, pink, and white flowers in snapdragon plants
C. Sickle cell anemia

D. Color blindness
Answer: B
Solution: In incomplete dominance, the heterozygous phenotype (pink flowers) is intermediate between the dominant (red) and recessive (white) phenotypes.

42. **What are multiple alleles?**
A. Two different genes controlling a single trait
B. More than two alternative forms of a gene in a population
C. Linked genes inherited together
D. Genes located on sex chromosomes
Answer: B
Solution: Multiple alleles refer to the presence of more than two alternative forms of a gene, such as the ABO blood group system.

43. **Which chromosomal disorder is characterized by a genotype of 47 chromosomes, including an extra chromosome 21?**
A. Turner's syndrome
B. Down's syndrome
C. Klinefelter's syndrome
D. Haemophilia
Answer: B
Solution: Down's syndrome results from trisomy of chromosome 21, leading to 47 chromosomes.

44. **In honeybees, sex determination is based on:**
A. Temperature
B. Haplodiploidy
C. Presence of Y chromosome
D. Hormonal differences
Answer: B
Solution: In honeybees, males are haploid (develop from unfertilized eggs) and females are diploid (develop from fertilized eggs).

45. **What is the central dogma of molecular biology?**
A. DNA → RNA → Protein
B. RNA → DNA → Protein

C. DNA → Protein → RNA
D. Protein → RNA → DNA
Answer: A
Solution: The central dogma describes the flow of genetic information from DNA to RNA to protein.

46. **The structural unit of DNA is known as a:**
A. Chromatid
B. Nucleotide
C. Ribosome
D. Operon
Answer: B
Solution: DNA is composed of nucleotides, each consisting of a phosphate group, a sugar (deoxyribose), and a nitrogenous base.

47. **What is the significance of the Hardy-Weinberg principle?**
A. It explains the formation of new species
B. It measures evolutionary changes in a population
C. It predicts allele and genotype frequencies in a non-evolving population
D. It describes the mechanism of natural selection
Answer: C
Solution: The Hardy-Weinberg principle provides a mathematical model to predict allele frequencies in a population that is not undergoing evolution.

48. **Which of the following is an example of co-dominance?**
A. Pink flowers in snapdragons
B. ABO blood group inheritance (AB blood type)
C. Sickle cell anemia
D. Colour blindness
Answer: B
Solution: In co-dominance, both alleles are equally expressed in the phenotype, such as the AB blood type.

49. **Which genetic material experiment provided evidence that DNA is the hereditary material?**
A. Hershey-Chase experiment
B. Griffith’s transformation experiment

C. Meselson-Stahl experiment
D. Watson-Crick model
Answer: A
Solution: The Hershey-Chase experiment using bacteriophages demonstrated that DNA, not protein, is the genetic material.

50. **Which type of natural selection favors individuals with extreme phenotypes at both ends of a trait distribution?**
A. Stabilizing selection
B. Disruptive selection
C. Directional selection
D. Artificial selection
Answer: B
Solution: Disruptive selection promotes survival of individuals with extreme traits, leading to greater variation within a population.

CUET MCQ Questions and Solutions from UNIT 2 (1)

1. What is the main principle of Mendelian inheritance?
A. Genes are transmitted from parents to offspring
B. Traits are determined by environmental factors
C. DNA replication occurs during reproduction
D. Chromosomes do not participate in inheritance
Answer: A
Solution: Mendelian inheritance states that genes are transmitted from parents to offspring through discrete units.

2. In incomplete dominance, the phenotype of the offspring is:
A. Dominant
B. Recessive
C. Intermediate between the two parents
D. Identical to the parent with dominant traits
Answer: C
Solution: In incomplete dominance, neither allele is completely dominant, and the phenotype is a blend of the two parents.

3. What type of inheritance involves blood groups in humans?
A. Polygenic inheritance
B. Co-dominance and multiple alleles
C. Incomplete dominance
D. Chromosomal inheritance
Answer: B
Solution: Blood groups in humans show co-dominance (AB group) and multiple alleles (A, B, O alleles).

4. Which genetic condition is sex-linked?
A. Down's syndrome
B. Colour blindness
C. Turner’s syndrome
D. Klinefelter’s syndrome
Answer: B
Solution: Colour blindness is a sex-linked disorder, typically associated with the X chromosome.

5. What is the chromosomal makeup of Turner's syndrome?
A. XXY
B. XO
C. XXX
D. XY
Answer: B
Solution: Turner's syndrome is caused by a missing X chromosome, resulting in an XO genotype.

6. What is pleiotropy?
A. One gene affecting multiple traits
B. Multiple genes affecting one trait
C. A mutation in a single gene
D. Genes located on the same chromosome
Answer: A
Solution: Pleiotropy occurs when one gene influences multiple phenotypic traits.

7. In humans, sex determination depends on:
A. The X chromosome only
B. The Y chromosome
C. Autosomes
D. The mother's genetic makeup
Answer: B
Solution: The presence of the Y chromosome determines male sex in humans.

8. Which process involves the exchange of genetic material between homologous chromosomes?
A. DNA replication
B. Crossing over
C. Translation
D. Transcription
Answer: B
Solution: Crossing over occurs during meiosis and leads to genetic variation.

9. Haemophilia is an example of:
A. Autosomal recessive inheritance
B. Sex-linked recessive inheritance
C. Autosomal dominant inheritance
D. Polygenic inheritance
Answer: B
Solution: Haemophilia is a sex-linked recessive disorder, primarily affecting males.

10. Which Mendelian disorder results in defective hemoglobin?
A. Down's syndrome
B. Thalassemia
C. Klinefelter's syndrome
D. Haemophilia
Answer: B
Solution: Thalassemia is a Mendelian disorder characterized by abnormal hemoglobin production.

Molecular Basis of Inheritance

11. The structure of DNA was proposed by:
A. Watson and Crick
B. Mendel
C. Darwin
D. Franklin and Wilkins
Answer: A
Solution: Watson and Crick proposed the double-helix model of DNA structure.

12. What is the process of copying DNA into mRNA called?
A. Translation
B. Transcription
C. Replication
D. Crossing over
Answer: B
Solution: Transcription is the process of synthesizing mRNA from a DNA template.

13. What is the central dogma of molecular biology?
A. RNA → DNA → Protein

B. DNA → RNA → Protein
C. Protein → RNA → DNA
D. RNA → Protein → DNA
Answer: B
Solution: The central dogma describes the flow of genetic information from DNA to RNA to protein.

14. Which operon model explains gene regulation in prokaryotes?
A. Trp operon
B. Lac operon
C. Operon complex
D. Chromosome theory
Answer: B
Solution: The Lac operon explains how lactose metabolism genes are regulated in prokaryotes.

15. What is the repeating unit of DNA called?
A. Amino acid
B. Nucleotide
C. Protein
D. Chromosome
Answer: B
Solution: DNA is made up of repeating units called nucleotides.

16. Which enzyme is responsible for DNA replication?
A. DNA ligase
B. DNA polymerase
C. RNA polymerase
D. Helicase
Answer: B
Solution: DNA polymerase synthesizes new DNA strands during replication.

17. What is the full form of RNA?
A. Ribose Nucleotide Acid
B. Ribo Nucleic Acid
C. Ribo Nucleoprotein Acid
D. Ribonucleic Acid

Answer: D
Solution: RNA stands for Ribonucleic Acid.

18. DNA fingerprinting is widely used in:
A. Cloning
B. Forensic science
C. Genetic engineering
D. Agriculture
Answer: B
Solution: DNA fingerprinting is used in forensic science to identify individuals.

19. The human genome project aimed to:
A. Sequence all human DNA
B. Modify genes in humans
C. Study genetic disorders
D. Cure diseases like cancer
Answer: A
Solution: The human genome project focused on sequencing the entire human genome.

20. What is the main role of tRNA in translation?
A. Synthesizing proteins
B. Transporting amino acids to ribosomes
C. Replicating DNA
D. Storing genetic information
Answer: B
Solution: tRNA transports amino acids to the ribosome during protein synthesis.

21. Darwin proposed the theory of:
A. Natural selection
B. Mutation
C. Gene flow
D. Genetic drift
Answer: A
Solution: Darwin's theory of evolution is based on natural selection.

22. The first form of life on Earth is thought to be:
A. Multicellular organisms
B. Unicellular prokaryotes
C. Plants
D. Vertebrates
Answer: B
Solution: Unicellular prokaryotes are believed to be the earliest life forms.

23. Comparative anatomy provides evidence for evolution through:
A. Homologous structures
B. Similar ecosystems
C. Random mutations
D. Natural selection
Answer: A
Solution: Homologous structures indicate common ancestry.

24. Which evolutionary mechanism is caused by random changes in gene frequency?
A. Natural selection
B. Genetic drift
C. Adaptive radiation
D. Gene flow
Answer: B
Solution: Genetic drift refers to random changes in allele frequency in a population.

25. What does Hardy-Weinberg's principle explain?
A. Evolutionary mechanisms
B. Stability of gene frequencies in a population
C. Speciation
D. Natural selection
Answer: B
Solution: The Hardy-Weinberg principle explains genetic equilibrium in populations.

26. Adaptive radiation refers to:
A. Random mutations in species
B. Evolution of different species from a common ancestor
C. Genetic drift in isolated populations

D. Cross-species hybridization
Answer: B
Solution: Adaptive radiation describes the diversification of species from a common ancestor.

27. Human evolution is best evidenced by:
A. Genetic mutations
B. Fossil records
C. Adaptive radiation
D. Recombination
Answer: B
Solution: Fossil records provide strong evidence for human evolution.

28. What is the main cause of genetic variation?
A. Gene flow and recombination
B. Genetic drift
C. Stabilizing selection
D. Natural disasters
Answer: A
Solution: Gene flow and recombination create genetic variation.

29. What type of selection favors individuals with average traits?
A. Directional selection
B. Stabilizing selection
C. Disruptive selection
D. Random selection
Answer: B
Solution: Stabilizing selection favors individuals with average traits, reducing extremes.

30. Molecular evidence for evolution is provided by:
A. Homologous structures
B. Similarities in DNA and protein sequences
C. Fossils
D. Comparative embryology
Answer: B
Solution: Molecular similarities in DNA and proteins suggest common ancestry.

31. What was Mendel's primary experimental organism?
A. Drosophila melanogaster
B. Pisum sativum
C. Zea mays
D. Arabidopsis thaliana
Answer: B
Solution: Mendel used *Pisum sativum* (pea plants) due to its distinct traits and ease of cultivation.

32. In incomplete dominance, the phenotype of the heterozygote is:
A. Identical to one of the parents
B. A blend of both parents' phenotypes
C. Completely different from both parents
D. Similar to the dominant allele
Answer: B
Solution: In incomplete dominance, the heterozygote shows a mix of parental traits, e.g., pink flowers from red and white parents.

33. Co-dominance occurs when:
A. Both alleles are expressed equally in the phenotype
B. One allele masks the other
C. A single allele influences multiple traits
D. Neither allele is expressed
Answer: A
Solution: Co-dominance involves equal expression of both alleles, as seen in AB blood groups.

34. Which blood group is an example of multiple alleles?
A. A
B. AB
C. O
D. All of the above
Answer: D
Solution: The ABO blood group system is governed by three alleles: I^A, I^B, and i.

35. A single gene influencing multiple traits is termed as:
A. Polygenic inheritance
B. Pleiotropy
C. Incomplete dominance
D. Linkage
Answer: B
Solution: Pleiotropy occurs when one gene affects multiple traits, e.g., the gene responsible for sickle-cell anemia.

36. The chromosome theory of inheritance was proposed by:
A. Mendel
B. Watson and Crick
C. Sutton and Boveri
D. Morgan
Answer: C
Solution: Sutton and Boveri connected Mendel's laws to chromosome behavior during meiosis.

37. Which sex determination system is observed in birds?
A. XX-XY
B. ZZ-ZW
C. XO-XX
D. Haplodiploidy
Answer: B
Solution: Birds exhibit the ZZ-ZW system, where males are ZZ and females are ZW.

38. Haemophilia is an example of:
A. Autosomal inheritance
B. Sex-linked recessive inheritance
C. Co-dominance
D. Polygenic inheritance
Answer: B
Solution: Haemophilia is an X-linked recessive disorder, commonly seen in males.

39. Down’s syndrome is caused by:
A. Mutation in the sex chromosome
B. Trisomy of chromosome 21
C. Deletion in chromosome 5

D. Extra X chromosome
Answer: B
Solution: Down's syndrome results from the presence of an extra copy of chromosome 21.

40. Which disorder is characterized by a 44 + XO chromosome complement?
A. Klinefelter's syndrome
B. Turner's syndrome
C. Down's syndrome
D. Patau's syndrome
Answer: B
Solution: Turner's syndrome arises from monosomy of the X chromosome.

41. The search for genetic material led to the conclusion that DNA is the genetic material based on:
A. Mendel's experiments
B. Griffith's transformation experiment
C. Hershey and Chase experiment
D. Both B and C
Answer: D
Solution: Griffith and Hershey-Chase experiments confirmed DNA as the genetic material.

42. DNA replication is described as:
A. Conservative
B. Semi-conservative
C. Dispersive
D. None of the above
Answer: B
Solution: In semi-conservative replication, each daughter DNA contains one original strand and one new strand.

43. Transcription is the process of:
A. DNA replication
B. RNA synthesis from DNA
C. Protein synthesis from RNA
D. Gene splicing

Answer: B
Solution: Transcription is the synthesis of RNA using DNA as a template.

44. Which codon is a start codon in translation?
A. UGA
B. AUG
C. UAA
D. UAG
Answer: B
Solution: AUG is the start codon, coding for methionine.

45. The lac operon is an example of:
A. Positive gene regulation
B. Negative gene regulation
C. Co-dominance
D. Epistasis
Answer: B
Solution: The lac operon is negatively regulated by the repressor protein.

46. What was the main goal of the Human Genome Project?
A. Identify all human proteins
B. Map all human genes and sequences
C. Discover new genetic disorders
D. Develop gene therapy methods
Answer: B
Solution: The Human Genome Project aimed to sequence all human genes and map them.

47. DNA fingerprinting is based on:
A. Chromosome structure
B. DNA sequence variations
C. Protein synthesis
D. RNA interference
Answer: B
Solution: DNA fingerprinting identifies individuals based on unique DNA sequence patterns.

48. Who proposed the Modern Synthetic Theory of Evolution?
A. Charles Darwin
B. Watson and Crick
C. Dobzhansky, Haldane, and others
D. Mendel
Answer: C
Solution: The Modern Synthetic Theory combines natural selection and genetics.

49. Adaptive radiation is best explained by the evolution of:
A. Darwin’s finches
B. Homo sapiens
C. Neanderthals
D. Chimpanzees
Answer: A
Solution: Darwin's finches adapted to different niches, exemplifying adaptive radiation.

50. Mutation and recombination contribute to:
A. Genetic drift
B. Variation in a population
C. Gene flow
D. Bottleneck effect
Answer: B
Solution: Mutation and recombination are sources of genetic variation.