



## Chapter 1: Sexual Reproduction in Flowering Plants

### QUICK REVISION: ONE-LINER QUESTIONS AND ANSWERS

1. Kite dumb dumb dumb dumb What is the reproductive part of a flower? - **The flower.**
2. What is the male part of a flower called? - **The Androecium.**
3. The androecium is made of what units? - **Stamens.**
4. A stamen has which two parts? - **The anther and the filament.**
5. What part of the anther makes pollen? - **The microsporangium (or pollen sac).**
6. What is the ploidy of a microspore mother cell? - **Diploid (2n).**
7. How do microspore mother cells form microspores? - **Through meiosis.**
8. What is the ploidy of a pollen grain? - **Haploid (n).**
9. What is the hard outer layer of pollen? - **The exine.**
10. What tough material makes the exine? - **Sporopollenin.**
11. What is the thin inner layer of pollen? - **The intine.**
12. Name the two cells in a mature pollen grain. - **The vegetative cell and generative cell.**
13. Which pollen cell is larger and forms the pollen tube? - **The vegetative cell.**
14. Which pollen cell forms the two male gametes? - **The generative cell.**
15. What is the female part of a flower called? - **The Gynoecium (or pistil).**
16. A pistil has which three parts? - **Stigma, style, and ovary.**
17. Which part of the pistil catches pollen? - **The stigma.**
18. What structure is found inside the ovary? - **The ovule.**
19. After fertilization, what does the ovule become? - **The seed.**
20. What sac inside the ovule holds the egg cell? - **The embryo sac.**
21. What is the ploidy of a megasporangium? - **Diploid (2n).**
22. Meiosis of a megasporangium produces how many megasporangia? - **Four.**
23. How many of the four megasporangia usually survive? - **Only one.**
24. A typical embryo sac has how many cells and nuclei? - **7 cells, 8 nuclei.**
25. Name the three cells at the micropylar end. - **One egg cell and two synergids.**
26. What do we call the egg cell and its two synergids? - **The egg apparatus.**
27. Name the three cells at the opposite (chalazal) end. - **The antipodal cells.**
28. What is the large cell in the middle of the embryo sac? - **The central cell.**
29. What two nuclei are in the central cell? - **The two polar nuclei.**
30. What is the transfer of pollen to a stigma called? - **Pollination.**
31. Pollination within the same flower is called what? - **Autogamy.**
32. Pollination between flowers on the same plant is called what? - **Geitonogamy.**
33. Pollination between flowers on different plants is called what? - **Xenogamy.**
34. What is pollination by wind called? - **Anemophily.**
35. What is pollination by insects called? - **Entomophily.**
36. What is pollination by water called? - **Hydrophily.**
37. Can the male gametes in flowering plants swim? - **No, they are non-motile.**
38. What tube grows from the pollen grain to the ovule? - **The pollen tube.**
39. How many male gametes does the pollen tube deliver? - **Two.**
40. What is the fusion of a male gamete and the egg cell? - **Syngamy (fertilization).**
41. Syngamy results in what new cell? - **The zygote.**
42. What is a zygote's ploidy? - **Diploid (2n).**
43. What is the second fertilization event in angiosperms? - **Triple fusion.**
44. What three nuclei fuse during triple fusion? - **One male gamete and two polar nuclei.**
45. Triple fusion forms what special nucleus? - **The Primary Endosperm Nucleus (PEN).**
46. What is the endosperm's ploidy? - **Triploid (3n).**
47. What do we call syngamy and triple fusion happening together? - **Double fertilization.**
48. What is the main job of the endosperm? - **To feed the growing embryo.**
49. The zygote grows into what structure? - **The embryo.**
50. What part of the ovule becomes the seed coat? - **The integuments.**
51. After fertilization, what does the ovary become? - **The fruit.**
52. What do we call a fruit that forms without fertilization? - **A parthenocarpic fruit.**
53. The banana is a natural example of what? - **Parthenocarpy.**
54. A fruit that develops only from the ovary is a what? - **A true fruit.**
55. A fruit that develops from more than the ovary is a what? - **A false fruit.**
56. The apple is a common example of what kind of fruit? - **A false fruit.**
57. An embryo developing from an unfertilized egg is called what? - **Parthenogenesis.**
58. What is it called when seeds form without any fertilization? - **Apomixis.**
59. What do we call it when a single seed has multiple embryos? - **Polyembryony.**
60. Polyembryony is common in which type of fruit? - **Citrus fruits.**



## Chapter 2: Human Reproduction

### QUICK REVISION: ONE-LINER QUESTIONS AND ANSWERS

1. What is the process of forming gametes called? - **Gametogenesis.**
2. What are the primary male reproductive organs? - **The testes.**
3. Where are the testes located outside the abdominal cavity? - **In the scrotum.**
4. Why is the scrotum located outside the body? - **To maintain a lower temperature for sperm production.**
5. What are the functional units of the testes where sperm are produced? - **The seminiferous tubules.**
6. What are the two main types of cells in the seminiferous tubules? - **Male germ cells (spermatogonia) and Sertoli cells.**
7. What is the function of Sertoli cells? - **To provide nutrition to the developing sperm.**
8. What cells outside the tubules secrete androgens like testosterone? - **Interstitial cells (or Leydig cells).**
9. What hormone directly controls spermatogenesis? - **Androgens (like testosterone).**
10. What is the correct sequence of cells during spermatogenesis? - **Spermatogonia → primary spermatocytes → secondary spermatocytes → spermatids → spermatozoa.**
11. What is the process of sperm formation called? - **Spermatogenesis.**
12. What is the ploidy of spermatogonia and primary spermatocytes? - **Diploid (2n).**
13. What is the ploidy of secondary spermatocytes and spermatids? - **Haploid (n).**
14. What are the three distinct regions of a mature sperm? - **Head, middle piece, and tail.**
15. What cap-like structure covers the anterior part of the sperm head? - **The acrosome.**
16. What is the function of the acrosome? - **It contains enzymes to help fertilize the ovum.**
17. What provides energy for sperm movement and is found in the middle piece? - **Mitochondria.**
18. What are the primary female reproductive organs? - **The ovaries.**
19. What are the two main functions of the ovaries? - **Producing the female gamete (ovum) and secreting female hormones.**
20. What is the process of ovum formation called? - **Oogenesis.**
21. Which female reproductive cell is haploid? - **The secondary oocyte.**
22. What is the ploidy of a human gamete (sperm or ovum)? - **Haploid, containing 23 chromosomes.**
23. What is the ploidy of a human zygote? - **Diploid, containing 46 chromosomes.**
24. Which organelle, essential for cell division, is absent from the ovum's cytoplasm? - **The centrosome.**
25. The female reproductive cycle in primates (humans, monkeys) is called what? - **The menstrual cycle.**
26. What is the term for the first occurrence of menstruation? - **Menarche.**
27. In which uterine layer do the major cyclic changes occur? - **The endometrium.**
28. Which three hormones are the primary regulators of the menstrual cycle? - **LH, FSH, and Estrogen.**
29. What is the release of an ovum from the ovary called? - **Ovulation.**
30. Which hormone surge is the main trigger for ovulation? - **Luteinizing Hormone (LH).**
31. On approximately which day of the menstrual cycle does ovulation occur? - **The 14th day.**
32. After ovulation, the ovum is surrounded by a layer of cells called what? - **The corona radiata.**
33. After ovulation, what does the ruptured Graafian follicle develop into? - **The corpus luteum.**
34. What is the primary hormone secreted by the corpus luteum? - **Progesterone.**
35. What is the main function of progesterone? - **To maintain the endometrium for pregnancy.**
36. What hormone is secreted by the corpus luteum and placenta to relax pelvic ligaments? - **Relaxin.**
37. In which part of the fallopian tube does fertilization typically occur? - **The ampillary region.**
38. What do we call fertilization that occurs inside the female's body? - **Internal fertilization.**
39. What is fertilization that occurs outside the body, as in jellyfish? - **External fertilization.**
40. The attachment of the blastocyst to the uterine wall is called what? - **Implantation.**
41. What organ connects the developing fetus to the uterine wall? - **The placenta.**
42. What structure forms a pore known as the blastopore during embryonic development? - **The gastrula.**
43. From which primary germ layer does the human heart develop? - **The mesoderm.**
44. After how long is the embryo's heart formed? - **After one month of pregnancy.**
45. When do the limbs and digits of the embryo develop? - **By the end of the second month.**
46. Approximately how many eggs does a healthy human female ovulate in her lifetime? - **About 400.**
47. Which animal is a hermaphrodite (has both male and female organs)? - **The earthworm.**
48. Which common insect is not a hermaphrodite? - **The housefly.**
49. What term describes animals that lay eggs, like hens and crocodiles? - **Oviparous.**



## Chapter 3: Reproductive Health

### QUICK REVISION: ONE-LINER QUESTIONS AND ANSWERS

1. What is a state of total well-being in all aspects of reproduction called?  
- **Reproductive health.**
2. What major problem arises from a rapid increase in population?  
- **Overpopulation, leading to scarcity of resources.**
3. What day is celebrated as World Population Day?  
- **July 11th.**
4. According to the 2001 census, what was India's population growth rate?  
- **Approximately 2%.**
5. What is the legal minimum age for marriage for girls and boys in India?  
- **18 years for girls and 21 years for boys.**
6. What are the methods used to prevent unwanted pregnancies called?  
- **Contraception or birth control.**
7. How do oral contraceptive pills primarily prevent pregnancy?  
- **By inhibiting ovulation and implantation.**
8. What is 'Saheli'?  
- **A non-steroidal, 'once-a-week' oral contraceptive pill for females.**
9. What are devices inserted into the uterus to prevent pregnancy called?  
- **Intra-Uterine Devices (IUDs).**
10. Which IUD releases hormones?  
- **LNG-20 (Progestasert).**
11. How does a Copper-T IUD work?  
- **It releases copper ions that suppress sperm motility and fertilizing capacity.**
12. By what primary mechanism does Copper-T prevent pregnancy?  
- **It prevents fertilization.**
13. What is the surgical method of contraception in males called?  
- **Vasectomy.**
14. What is surgically cut or tied during a vasectomy?  
- **The vas deferens.**
15. What is the surgical method of contraception in females called?  
- **Tubectomy.**
16. What is surgically cut or tied during a tubectomy?  
- **The fallopian tubes.**
17. Are vasectomy and tubectomy temporary or permanent methods of contraception?  
- **They are permanent (sterilization) methods.**
18. What does MTP stand for?  
- **Medical Termination of Pregnancy.**
19. What is another term for a voluntary or induced abortion?  
- **MTP.**
20. Up to how many weeks of pregnancy is MTP considered relatively safe?  
- **Up to 12 weeks (the first trimester).**
21. What are diseases transmitted through sexual intercourse called?  
- **Sexually Transmitted Diseases (STDs) or Venereal Diseases (VDs).**
22. Name two common bacterial STDs.  
- **Syphilis and Gonorrhoea.**
23. What is the causative pathogen for Syphilis?  
- **Treponema pallidum.**
24. What is the inability to conceive or produce children called?  
- **Infertility.**
25. What do we call the technologies used to help infertile couples have children?  
- **Assisted Reproductive Technologies (ART).**
26. What is fertilization that occurs outside the body in a lab setting called?  
- **In vitro fertilization (IVF).**
27. A baby conceived through IVF is commonly known as what?  
- **A test-tube baby.**
28. What technique involves transferring an embryo (zygote) into the fallopian tube?  
- **ZIFT (Zygote Intra-Fallopian Transfer).**
29. At what temperature is semen cryopreserved for long-term storage?  
- **In liquid nitrogen (-196°C).**
30. What is the prenatal diagnostic technique used to detect genetic disorders in a fetus?  
- **Amniocentesis.**
31. What is analyzed during amniocentesis?  
- **The amniotic fluid.**
32. Which condition cannot be detected by amniocentesis?  
- **Jaundice.**
33. What is the full form of RCH programs initiated by the government?  
- **Reproductive and Child Health Care.**
34. Besides preventing pregnancy, what is another key function of condoms?  
- **Protection against Sexually Transmitted Diseases (STDs).**
35. The "rhythm method," based on avoiding intercourse during the fertile period, is what kind of contraception?  
- **A natural method.**
36. What is the term for pills taken after unprotected sex to prevent pregnancy?  
- **Emergency contraceptives.**
37. What is the full form of AIDS?  
- **Acquired Immuno Deficiency Syndrome.**
38. What virus causes AIDS?  
- **Human Immunodeficiency Virus (HIV).**
39. Are all STDs completely curable?  
- **No, viral STDs like AIDS and Genital Herpes are not completely curable.**
40. What is the full form of GIFT in the context of ART?  
- **Gamete Intra-Fallopian Transfer.**
41. What ART involves directly injecting a sperm into an ovum in the laboratory?  
- **ICSI (Intracytoplasmic Sperm Injection).**
42. What does the ART technique IUI stand for?  
- **Intra-Uterine Insemination.**
43. Why is there a statutory ban on using amniocentesis for sex determination?  
- **To prevent female foeticide.**
44. What are the three main categories of contraceptive methods?  
- **Natural, Barrier, and Hormonal/Chemical methods.**
45. What is the full form of WHO?  
- **World Health Organization.**
46. What is the term for the natural end of the menstrual cycle in women?  
- **Menopause.**
47. What is the name for creams, jellies, and foams that kill sperm?  
- **Spermicides.**
48. What is the most widely used contraceptive method by males in India?  
- **Condoms.**
49. The transfer of an ovum collected from a donor into the fallopian tube of another female is **GIFT (Gamete Intra-Fallopian Transfer).**



## Chapter 4: Principles of Inheritance and Variation

### QUICK REVISION: ONE-LINER QUESTIONS AND ANSWERS

1. Who is known as the Father of Genetics? - **Gregor Mendel.**
2. What plant did Mendel choose for his experiments? - **The garden pea (*Pisum sativum*).**
3. How many pairs of contrasting traits did Mendel study in pea plants? - **Seven.**
4. The basic units of heredity, which Mendel called 'factors', are now known as what? - **Genes.**
5. What are the alternative forms of a gene called? - **Alleles.**
6. Who first proposed the 'Genotype-Phenotype' concept? - **Wilhelm Johannsen.**
7. Which of Mendel's laws states that in a heterozygous pair, one allele expresses itself over the other? - **The Law of Dominance.**
8. Which of Mendel's laws states that alleles for a trait separate during gamete formation? - **The Law of Segregation.**
9. The Law of Segregation is also known as what? - **The Law of Purity of Gametes.**
10. Which two laws of inheritance were derived from the monohybrid cross? - **The Law of Dominance and the Law of Segregation.**
11. What is the phenotypic ratio of a typical monohybrid cross in the F<sub>2</sub> generation? - **3:1.**
12. What is the genotypic ratio of a typical monohybrid cross in the F<sub>2</sub> generation? - **1:2:1.**
13. Which of Mendel's laws is based on the dihybrid cross? - **The Law of Independent Assortment.**
14. What is the phenotypic ratio of a typical dihybrid cross in the F<sub>2</sub> generation? - **9:3:3:1.**
15. What phenomenon occurs when the F<sub>1</sub> generation has a phenotype intermediate between the two parents? - **Incomplete Dominance.**
16. The pink flowers from a cross between red and white-flowered Antirrhinum plants is an example of what? **Incomplete Dominance.**
17. What is the phenotypic ratio in the F<sub>2</sub> generation for incomplete dominance? - **1:2:1.**
18. What phenomenon occurs when both alleles in a heterozygote express themselves fully? - **Codominance.**
19. Human ABO blood groups are a classic example of which two genetic principles? - **Codominance and Multiple Allelism.**
20. What is it called when a gene exists in more than two allelic forms? - **Multiple Allelism.**
21. Which blood group is the universal donor? - **Blood group O.**
22. Which blood group has no antigens on its red blood cells? - **Blood group O.**
23. Which blood group has no antibodies in its plasma? - **Blood group AB.**
24. If a child has blood group 'O' and the father has 'B', what must the father's genotype be? - **I<sup><</sup>B<sup>></sup>i (heterozygous).**
25. What is it called when a single gene influences multiple phenotypic traits? - **Pleiotropy.**
26. Sickle-cell anemia is a classic example of which genetic phenomenon? - **Pleiotropy.**
27. Who proposed the Chromosomal Theory of Inheritance? - **Sutton and Boveri.**
28. The physical exchange of genetic material between homologous chromosomes is called what? - **Crossing over.**
29. In which stage of meiosis does crossing over occur? - **Pachytene.**
30. The tendency of genes on the same chromosome to be inherited together is called what? - **Linkage.**
31. Linkage is considered an exception to which of Mendel's laws? - **The Law of Independent Assortment.**
32. The number of linkage groups in an organism is equal to what? - **Its haploid number of chromosomes (n).**
33. If an organism has 2n=14 chromosomes, how many linkage groups does it have? - **Seven.**
34. Who created the first recombination maps of chromosomes? - **Alfred Sturtevant.**
35. What is the phenomenon where one gene pair masks the effect of a non-allelic gene pair? - **Epistasis.**
36. What are the sex chromosomes in a human male? - **XY.**
37. What are the sex chromosomes in a human female? - **XX.**
38. Which chromosome determines maleness in humans? - **The Y-chromosome.**
39. In birds, which sex is heterogametic (produces two different types of gametes)? - **The female (ZW).**
40. The gene for hypertrichosis (hair on ears) is located on which chromosome? - **The Y-chromosome.**
41. What is a sudden, heritable change in the genetic material called? - **A mutation.**
42. What is a disease present from birth called? - **A congenital disease.**
43. Haemophilia is what type of genetic disorder? - **An X-linked recessive disorder.**
44. Why is Haemophilia also called "Bleeder's disease"? - **Because it impairs the body's ability to form blood clots.**
45. A person with color blindness cannot distinguish between which two colors? - **Red and green.**
46. Sickle-cell anemia is what type of genetic disorder? - **An autosomal recessive disorder.**
47. Which disease is caused by a defect in hemoglobin? - **Sickle-cell anemia.**
48. What is any change in the number or structure of chromosomes called? - **A chromosomal aberration.**
49. What is the condition of having an abnormal number of chromosomes (e.g., 2n±1, 2n±2) called? - **Aneuploidy.**
50. What is the trisomy of the 21st chromosome known as? - **Down's syndrome.**
51. What is the chromosomal composition of Klinefelter's syndrome? - **47, XXY.**



## Chapter 5: Molecular Basis of Inheritance

### QUICK REVISION: ONE-LINER QUESTIONS AND ANSWERS

1. Polymers of nucleotides are called?  
- **Nucleic acids (DNA and RNA).**
2. The three components of a nucleotide?  
- **A pentose sugar, a nitrogenous base, and a phosphate group.**
3. The two components of a nucleoside?  
- **A pentose sugar and a nitrogenous base.**
4. Pentose sugar found in DNA?  
- **Deoxyribose.**
5. Pentose sugar found in RNA?  
- **Ribose.**
6. The two types of nitrogenous bases? - **Purines and Pyrimidines.**
7. Which nitrogenous bases are purines?  
- **Adenine (A) and Guanine (G).**
8. Pyrimidine bases in DNA?  
- **Thymine (T) and Cytosine (C).**
9. Pyrimidine bases in RNA?  
- **Uracil (U) and Cytosine (C).**
10. Base present in RNA but not DNA?  
- **Uracil (U).**
11. Base present in DNA but not RNA?  
- **Thymine (T).**
12. Who provided DNA's X-ray diffraction data?  
- **Maurice Wilkins and Rosalind Franklin.**
13. Who proposed the double helix model of DNA?  
- **Watson and Crick.**
14. How are the two DNA strands oriented?  
- **Antiparallel and complementary.**
15. What bond holds the two DNA strands together?  
- **Hydrogen bonds.**
16. In DNA, Adenine (A) always pairs with what?  
- **Thymine (T).**
17. Guanine (G) always pairs with what?  
- **Cytosine (C).**
18. What is Chargaff's rule?  
- **The amount of A equals T, and the amount of G equals C.**
19. If DNA has 18% Cytosine, what is Adenine's percentage?  
- **32%.**
20. Why is the distance between DNA strands uniform?  
- **Because a purine always pairs with a pyrimidine.**
21. How many base pairs are in one turn of the B-DNA helix?  
- **Ten.**
22. Whose experiment demonstrated transformation?  
- **Frederick Griffith.**
23. Whose experiment proved DNA is the genetic material?  
- **Hershey and Chase.**
24. In the Hershey-Chase experiment, what was the bacteriophage's genetic material?  
- **DNA.**
25. The process of making an identical copy of DNA is called?  
- **Replication.**
26. In which direction does DNA replication always occur?  
- **The 5' to 3' direction.**
27. Why is DNA replication called semi-conservative?  
- **Because each new molecule has one old strand and one new strand.**
28. Short DNA fragments on the lagging strand are called?  
- **Okazaki fragments.**
29. What is the main enzyme for DNA replication?  
- **DNA polymerase.**
30. What is the central dogma of molecular biology?  
- **DNA → RNA → Protein.**
31. Synthesizing RNA from a DNA template is called?  
- **Transcription.**
32. What is the primary enzyme required for transcription?  
- **RNA polymerase.**
33. Where does transcription occur in eukaryotes?  
- **In the nucleus.**
34. In eukaryotes, which enzyme transcribes tRNA and 5S rRNA?  
- **RNA polymerase III.**
35. The transcriptionally active region of a chromosome is called?  
- **Euchromatin.**
36. Non-coding sequences within a eukaryotic gene are called?  
- **Introns (or Junk DNA).**
37. The expressed, coding sequences are called?  
- **Exons.**
38. The flow of information from RNA back to DNA is called?  
- **Reverse transcription.**
39. A three-base mRNA sequence for an amino acid is a?  
- **Codon.**
40. How many codons are in the genetic code?  
- **64.**
41. What property means one amino acid can have multiple codons?  
- **Degeneracy.**
42. What is the universal start codon?  
- **AUG.**
43. Name one of the three termination (stop) codons.  
- **UAA (or UAG, UGA).**
44. What property means the genetic code is read without punctuation?  
- **It is commaless.**
45. Who proposed the 'One gene, one enzyme' hypothesis?  
- **Beadle and Tatum.**
46. Synthesizing a protein from an mRNA template is called?  
- **Translation.**
47. Which RNA carries an amino acid to the ribosome?  
- **Transfer RNA (tRNA).**
48. What is the three-base sequence on tRNA called?  
- **An anticodon.**
49. What does the "charging" of tRNA refer to?  
- **The linking of an amino acid to its corresponding tRNA.**
50. A unit of gene regulation in prokaryotes is called?  
- **An operon.**
51. Who proposed the lac operon model?  
- **Jacob and Monod.**
52. The operon model represents what process?  
- **Gene regulation.**
53. In the lac operon, what does the 'y' gene code for?  
- **Permease.**
54. Where does the repressor protein bind in the lac operon?  
- **To the operator region.**
55. Mobile genetic elements are called?  
- **Transposons.**
56. The human chromosome with the most genes? The fewest?  
- **Chromosome 1 (most) and Chromosome Y (fewest).**
57. Who initially developed DNA fingerprinting?  
- **Alec Jeffreys.**
58. What is the technical basis of DNA fingerprinting?  
- **Polymorphism in DNA sequences.**



## Chapter 6: Evolution

### QUICK REVISION: ONE-LINER QUESTIONS AND ANSWERS

1. Who proposed that life originated from pre-existing non-living organic molecules?  
- **Oparin and Haldane.**
2. Whose experiment simulated early Earth conditions to test the theory of chemical evolution?  
- **S.L. Miller.**
3. What critical gas was absent from the atmosphere in Miller's experiment?  
- **Oxygen (O<sub>2</sub>).**
4. The gradual change in life forms over millions of years is called?  
- **Evolution (or organic evolution).**
5. Evidence for evolution based on the study of fossils is called?  
- **Paleontological evidence.**
6. In which type of rock are fossils generally found?  
- **Sedimentary rocks.**
7. Organs with the same basic structure but different functions are called?  
- **Homologous organs.**
8. The forelimbs of humans and the wings of birds are examples of what?  
- **Homologous organs.**
9. Homologous structures suggest what type of evolution?  
- **Divergent evolution.**
10. Organs with different structures but similar functions are called?  
- **Analogous organs.**
11. The wings of insects and the wings of birds are examples of what?  
- **Analogous organs.**
12. Analogous structures suggest what type of evolution?  
- **Convergent evolution.**
13. Who proposed the Law of Embryonic Development (Ontogeny recapitulates History)?  
~~Ernst Haeckel popularized), but based on Von Baer's laws.~~
14. The reappearance of an ancestral trait in an organism is called?  
- **Atavism.**
15. A living organism that shows characteristics of two different groups is called a?  
- **Connecting link.**
16. Echidna is a connecting link between which two groups?  
- **Reptiles and Mammals.**
17. Peripatus is a connecting link between which two phyla?  
- **Annelida and Arthropoda.**
18. Archaeopteryx is a fossil connecting link between which two groups?  
- **Reptiles and Birds.**
19. Archaeopteryx fossils are from which geological period?  
- **The Jurassic period.**
20. Who proposed the theory of "Inheritance of Acquired Characters"?  
- **Jean-Baptiste Lamarck.**
21. Who proposed the theory of "Natural Selection"?  
- **Charles Darwin.**
22. The appearance of antibiotic-resistant bacteria is an example of evolution by? - **Natural selection acting on pre-existing variation.**
23. The process where different species evolve from a common ancestor in a specific area is called?  
- **Adaptive radiation.**
24. The evolution of Australian marsupials is a prime example of what?  
- **Adaptive radiation.**
25. Who proposed the "Theory of Mutation"?  
- **Hugo de Vries.**
26. Sudden, large-scale mutations leading to speciation were termed what by de Vries?  
- **Salutation.**
27. What is the main source of variation for evolution?  
- **Mutation.**
28. Random changes in allele frequencies in a small population are known as what?  
- **Genetic drift.**
29. A change in allele frequency when a few individuals establish a new population is called?  
- **The Founder Effect.**
30. What is a key factor in the formation of new species by preventing gene flow?  
- **Isolation (Reproductive isolation).**
31. The Devonian period is known as the "Age of \_\_\_"?  
- **Fishes.**
32. Which early hominid was considered more similar to an ape?  
- **Dryopithecus.**
33. Prehistoric cave art is estimated to have first appeared around when?  
- **18,000 years ago.**
34. Which plant group is known as the "amphibians of the plant kingdom"?  
- **Bryophytes.**
35. Who is a famous paleontologist from India?  
- **Birbal Sahni.**
36. Euglena is considered a connecting link between which two kingdoms?  
- **Plants and Animals.**
37. What are the two key concepts of Darwin's theory of evolution?  
- **Branching Descent and Natural Selection.**
38. What phrase describes the reproductive success of an organism in Darwinian terms?  
- **Survival of the Fittest.**
39. What principle describes the condition of a non-evolving population's gene pool?  
- **The Hardy-Weinberg principle.**
40. What is the transfer of genetic material from one population to another called?  
- **Gene flow or gene migration.**
41. Organs that are reduced and non-functional but were functional in ancestors are called?  
- **Vestigial organs.**
42. Give a common example of a vestigial organ in humans.  
- **The appendix or wisdom teeth.**
43. Which fossil man was the first to make and use stone tools, earning the name 'Handy Man'?  
- **Homo habilis.**
44. Which human ancestor first controlled fire?  
- **Homo erectus.**
45. The hominid species that lived in caves and were the first to bury their dead was?  
- **Neanderthal Man (Homo neanderthalensis).**
46. What is the scientific name for modern man?  
- **Homo sapiens.**
47. The different beaks of finches on the Galapagos Islands are a classic example of what?  
- **Adaptive radiation.**
48. The evolutionary process by which new biological species arise is called?  
- **Speciation.**
49. What type of selection favors the average phenotype and selects against extremes?  
- **Stabilizing selection.**
50. The evolution of industrial melanism in peppered moths is a classic example of what?  
- **Directional selection.**
51. What does the theory "Ontogeny recapitulates phylogeny" suggest?  
- **An organism's development (ontogeny) repeats its evolutionary history (phylogeny).**



## Chapter 7: Human Health and Disease

### QUICK REVISION: ONE-LINER QUESTIONS AND ANSWERS

1. What is a disease-causing organism called? **- A pathogen.**
2. Which diagnostic test is used to confirm Typhoid? **- The Widal test.**
3. What is the pathogen that causes Typhoid fever? **- The bacterium *Salmonella typhi*.**
4. What virus causes the common cold? **- Rhinovirus.**
5. Diphtheria is caused by a pathogen from which group? **- Bacteria.**
6. The BCG vaccine is administered to prevent which disease? **- Tuberculosis (TB).**
7. Tuberculosis is primarily transmitted through what medium? **- The air.**
8. Which mosquito is the vector for malaria? **- The female *Anopheles mosquito*.**
9. What is the infective stage of the malarial parasite (Plasmodium) for humans? **- The sporozoite.**
10. Amoebiasis (amoebic dysentery) is caused by which pathogen? **- The protozoan *Entamoeba histolytica*.**
11. The disease Filariasis (Elephantiasis) is caused by what? **- The helminth worm *Wuchereria bancrofti*.**
12. Rabies is caused by which type of pathogen? **- A virus.**
13. Chickenpox is caused by which virus? **- The Varicella-zoster virus.**
14. Which of these is a viral disease: Tetanus, Rabies, or Kala-azar? **- Rabies.**
15. Which of these is a bacterial disease: Mumps, Diphtheria, or Measles? **- Diphtheria.**
16. The body's ability to fight disease-causing organisms is called? **- Immunity.**
17. A foreign substance that elicits an immune response is called an? **- Antigen.**
18. Y-shaped proteins produced in response to antigens are called? **- Antibodies.**
19. Human antibodies are made of what type of molecule? **- Glycoproteins.**
20. The immunity present from birth is called? **- Innate immunity.**
21. Immunity acquired after birth is called? **- Acquired immunity.**
22. Who discovered the principle of passive immunity? **- Emil von Behring.**
23. The first milk produced by a mother, rich in antibodies, is called? **- Colostrum.**
24. Which antibody is abundantly found in colostrum? **- IgA.**
25. What are the two types of lymphocytes? **- B-lymphocytes and T-lymphocytes.**
26. Where are B-lymphocytes and T-lymphocytes produced? **- In the bone marrow.**
27. Where do T-lymphocytes mature? **- In the thymus.**
28. Which cells differentiate into plasma cells to produce antibodies? **- B-lymphocytes.**
29. Rejection of a transplanted organ is primarily due to which cells? **- Cytotoxic T-cells.**
30. The process of introducing a weakened pathogen to stimulate immunity is called? **- Vaccination.**
31. The DPT vaccine ("Triple antigen") protects against Diphtheria, Pertussis, and what else? **- Tetanus.**
32. The DPT vaccine is NOT used for which disease: Diphtheria, Typhoid, or Tetanus? **- Typhoid.**
33. An exaggerated immune response to certain environmental antigens is called an? **- Allergy.**
34. Which antibody type is associated with allergic reactions? **- IgE.**
35. Which chemicals are released from mast cells during an allergic reaction? **- Histamine and Serotonin.**
36. Hay fever is a common disease caused by what? **- Allergens.**
37. A disease where the body's immune system attacks its own cells is called an? **- Autoimmune disease.**
38. Rheumatoid arthritis is an example of what type of disease? **- An autoimmune disease.**
39. What does the acronym AIDS stand for? **- Acquired Immuno Deficiency Syndrome.**
40. What is the causative agent of AIDS? **- Human Immunodeficiency Virus (HIV).**
41. What type of virus is HIV? **- A retrovirus.**
42. Which specific cells does HIV primarily attack and destroy? **- Helper T-cells.**
43. Which screening test is widely used for detecting AIDS? **- ELISA (Enzyme-Linked Immunosorbent Assay).**
44. The study of cancer is called? **- Oncology.**
45. Genes that can cause cancer are called? **- Oncogenes.**
46. The spread of malignant tumor cells to distant sites is called? **- Metastasis.**
47. Which of the following is a non-infectious disease: AIDS, Malaria, or Cancer? **- Cancer.**
48. From which plant is opium obtained? **- Papaver somniferum (the poppy plant).**
49. Diacetylmorphine is commonly known as what? **- Heroin.**
50. Morphine is classified as what type of drug? **- An opiate narcotic.**
51. What are the main physiological effects of tobacco use due to nicotine? **- Increased heart rate and blood pressure.**
52. Which organ is most affected by excessive alcohol consumption? **- The liver.**
53. What is the study of viruses called? **- Virology.**
54. A virus is fundamentally composed of what two things? **- Protein and nucleic acid.**



## Chapter 8: Microbes in Human Welfare

### QUICK REVISION: ONE-LINER QUESTIONS AND ANSWERS

1. Which bacteria are used to convert milk into curd?  
- **Lactic Acid Bacteria (LAB), such as Lactobacillus.**
2. Converting milk to curd increases the content of which vitamin?  
- **Vitamin B12.**
3. Which microbe is used to make dough for idli, dosa, and bread?  
- **Yeast (specifically Saccharomyces cerevisiae).**
4. The yeast Saccharomyces cerevisiae is commonly known as what?  
- **Brewer's yeast.**
5. Yeast is primarily used in the industrial production of what?  
- **Ethyl alcohol (ethanol).**
6. How does yeast typically reproduce?  
- **Through budding.**
7. Chemicals produced by microbes that can kill or retard the growth of other microbes are called?  
- **Antibiotics.**
8. Who discovered the first antibiotic, penicillin?  
- **Alexander Fleming.**
9. Fleming discovered penicillin while working on which bacterium?  
- **Staphylococcus.**
10. Penicillin is produced by which fungus?  
- **The fungus Penicillium notatum.**
11. Who confirmed penicillin's effectiveness as an antibiotic?  
- **Ernest Chain and Howard Florey.**
12. The antibiotic cephalosporin is obtained from what type of organism?  
- **A fungus.**
13. Which fungus produces citric acid?  
- **Aspergillus niger.**
14. Which microbe is used to produce statins?  
- **The yeast Monascus purpureus.**
15. What is the primary function of statins?  
- **They inhibit cholesterol synthesis.**
16. The enzyme streptokinase is used for what purpose?  
- **As a 'clot-buster' for removing clots from blood vessels.**
17. Cyclosporin A is used for what medical purpose?  
- **As an immunosuppressant agent in organ transplants.**
18. Municipal wastewater is also known as what?  
- **Sewage.**
19. What does BOD stand for?  
- **Biochemical Oxygen Demand.**
20. A higher BOD indicates what about a water body?  
- **Higher pollution levels.**
21. In sewage treatment, the mesh-like structures of bacteria and fungi are called?  
- **Flocs.**
22. The production of biogas involves which group of bacteria?  
- **Methanogens.**
23. What is the main component of biogas?  
- **Methane (CH<sub>4</sub>).**
24. Methanogens produce methane but do NOT produce what gas?  
- **Oxygen (O<sub>2</sub>).**
25. Microbes used to kill insects and pests are called?  
- **Biocontrol agents.**
26. Which bacterium is widely used as a biocontrol agent for insect pests?  
- **Bacillus thuringiensis (Bt).**
27. Which free-living fungus is an effective biocontrol agent for plant pathogens?  
- **Trichoderma.**
28. Organisms used to enrich the nutrient quality of the soil are called?  
- **Biofertilizers.**
29. What is a key characteristic of blue-green algae (cyanobacteria)?  
- **Nitrogen fixation.**
30. Rhizobium is a famous bacterium that performs what function?  
- **Symbiotic nitrogen fixation.**
31. In which plants are Rhizobium bacteria found?  
- **In the root nodules of leguminous plants.**
32. Which cyanobacteria are well-known nitrogen fixers?  
- **Anabaena and Nostoc.**
33. Which fungus forms a symbiotic association with plant roots, known as mycorrhiza?  
- **Glomus.**
34. The process of preserving liquids by heating and then rapidly cooling is called?  
- **Pasteurization.**
35. The practice of farming that avoids the use of chemical fertilizers is called?  
- **Organic farming.**
36. Which of these is NOT a biofertilizer: Azotobacter or Bacillus thuringiensis?  
- **Bacillus thuringiensis (it is a biocontrol agent).**
37. What are live microbial food supplements called?  
- **Probiotics.**
38. Microbes grown for protein-rich food are called?  
- **Single Cell Protein (SCP).**
39. Spirulina and Chlorella are examples of what?  
- **Single Cell Protein (SCP).**
40. The rearing of honeybees for honey is called?  
- **Apiculture or beekeeping.**
41. In a beehive, which bees produce the honey?  
- **The worker honeybees.**
42. The rearing of silkworms for silk production is called?  
- **Sericulture.**
43. The farming of fish is called?  
- **Pisciculture.**
44. The raising of birds like chicken and ducks is called?  
- **Poultry farming.**
45. Which of these is NOT considered part of animal husbandry: pisciculture or organic farming?  
- **Organic farming.**
46. The cultivation of flowering plants is called?  
- **Floriculture.**
47. 'Kalyan Sona' is an improved variety of what crop?  
- **Wheat.**
48. A common viral disease in chickens is?  
- **Ranikhet disease.**
49. 'Lohi' is a well-known breed of what animal?  
- **Sheep.**
50. Which scientist is NOT primarily associated with microbiology: Louis Pasteur or Stephen Hales?  
- **Stephen Hales.**
51. What is the scientific term for the rearing of forest trees?  
- **Silviculture.**



## Chapter 9: Biotechnology: Principles and Processes

### QUICK REVISION: ONE-LINER QUESTIONS AND ANSWERS

1. Techniques that use live organisms to produce useful products are called?  
- **Biotechnology.**
2. The manipulation of an organism's genes is called?  
- **Genetic engineering.**
3. The creation of DNA by combining sequences that wouldn't normally occur together is known as **Recombinant DNA technology.**
4. Enzymes that cut DNA at specific sites are called?  
- **Restriction enzymes (endonucleases).**
5. Restriction enzymes are also famously known as what?  
- **'Molecular scissors'.**
6. The first restriction endonuclease to be isolated was?  
- **Hind II.**
7. Restriction enzymes recognize and cut what specific type of DNA sequence?  
- **A palindromic nucleotide sequence.**
8. The restriction enzyme EcoRI is isolated from which bacterium?  
- **Escherichia coli (E. coli).**
9. The recognition site for the restriction enzyme EcoRI is?  
- **GAATTC.**
10. Which enzyme is used to join or paste DNA fragments together?  
- **DNA ligase.**
11. A DNA molecule used to carry foreign genetic material into another cell is a?  
- **Vector.**
12. Small, circular, extrachromosomal DNA molecules found in bacteria are called?  
- **Plasmids.**
13. Which feature is NOT part of the pBR322 plasmid: ori, T-DNA, or antibiotic resistance genes?  
- **T-DNA.**
14. Which bacterium is known as a "natural genetic engineer" for plants?  
- **Agrobacterium tumefaciens.**
15. The tumor-inducing plasmid found in Agrobacterium tumefaciens is called?  
- **The Ti-plasmid.**
16. Which of these is NOT a cloning vector for bacteria: Plasmid, Bacteriophage, or T-DNA?  
- **T-DNA (used for plants).**
17. To isolate DNA from a bacterial cell, which enzyme is used?  
- **Lysozyme.**
18. To isolate DNA from a fungal cell, which enzyme is used?  
- **Chitinase.**
19. A technique to separate DNA fragments based on size is called?  
- **Gel electrophoresis.**
20. From what is the agarose gel for electrophoresis extracted?  
- **Seaweed.**
21. Why do DNA fragments move towards the anode in gel electrophoresis?  
- **Because DNA is negatively charged.**
22. What does PCR stand for?  
- **Polymerase Chain Reaction.**
23. What is the primary purpose of the PCR technique?  
- **DNA amplification (making multiple copies of a gene).**
24. Which heat-stable DNA polymerase is used in PCR?  
- **Taq polymerase.**
25. From which bacterium is Taq polymerase isolated?  
- **Thermus aquaticus.**
26. Which of these is used to introduce DNA into a host cell: a gene gun or a micropipette?  
- **Both can be used.**
27. The method of directly injecting recombinant DNA into an animal cell's nucleus is called?  
- **Microinjection.**
28. The biolistic or gene gun method is most suitable for transforming which type of cells?  
- **Plant cells.**
29. A gene used to help identify transformed cells is called a?  
- **Selectable marker.**
30. In plasmids like pBR322, what is the role of the ampR gene?  
- **It provides resistance to the antibiotic ampicillin.**
31. If a foreign gene is inserted into the tetracycline resistance gene, what happens to the recipient cell?  
- **It will gain resistance to tetracycline.**
32. Large vessels used for growing microbes to produce products on a large scale are called?  
- **Bioreactors.**
33. The process of growing cells or tissues in a sterile, nutrient-rich medium is called?  
- **Tissue culture.**
34. The entire series of processes after the biosynthetic stage to obtain a finished product is called?  
- **Downstream processing.**
35. The plasmid from which bacterium was used to construct the first recombinant DNA?  
- **Salmonella typhimurium.**
36. Which chemicals are known to induce protoplast fusion?  
- **Polyethylene glycol (PEG) and sodium nitrate.**
37. What is the term for enzymes that cut DNA from the ends?  
- **Exonucleases.**
38. What is the function of the 'ori' site in a plasmid vector?  
- **It is the Origin of Replication, where DNA copying begins.**
39. What are the three main steps of a single PCR cycle?  
- **Denaturation, Annealing, and Extension.**
40. What happens during the 'denaturation' step of PCR?  
- **The two strands of the DNA helix are separated by heating.**
41. What staining agent is used to visualize DNA in gel electrophoresis?  
- **Ethidium bromide.**
42. The process of making a host cell competent to take up foreign DNA is called?  
- **Transformation.**
43. What is a DNA probe?  
- **A single-stranded DNA or RNA fragment used to detect a specific complementary sequence.**
44. The blotting technique used for transferring DNA from a gel to a membrane is called?  
- **Southern Blotting.**
45. To isolate DNA from a plant cell, which enzyme is primarily used?  
- **Cellulase.**
46. What type of bioreactor is most commonly used?  
- **Stirring-type bioreactor.**



## Chapter 10: Biotechnology and its Applications

### QUICK REVISION: ONE-LINER QUESTIONS AND ANSWERS

1. Plants, bacteria, or animals whose genes have been altered are called?  
- **Genetically Modified Organisms (GMOs).**
2. Which bacterium produces a protein that is toxic to certain insects?  
- **Bacillus thuringiensis.**
3. The toxic insecticidal protein produced by Bacillus thuringiensis is called?  
- **Bt toxin (or Cry protein).**
4. The Bt toxin exists as an inactive protoxin but becomes active at what pH?  
- **An alkaline pH (found in the insect's gut).**
5. Which crop is famously protected from bollworms by the Cry gene?  
- **Cotton (creating Bt cotton).**
6. The genes crylAc and crylAb control which pest?  
- **Cotton bollworms.**
7. The gene crylAb controls which specific pest?  
- **The corn borer.**
8. The process of silencing a specific gene using double-stranded RNA is called?  
- **RNA interference (RNAi).**
9. RNAi is used to protect which plant from the nematode Meloidogyne incognita?  
- **Tobacco.**
10. The nematode Meloidogyne incognita infects which part of the tobacco plant?  
- **The roots.**
11. 'Golden Rice' is a transgenic crop developed to be rich in what?  
- **Vitamin A (due to B-carotene).**
12. The transgenic tomato variety with a longer shelf life is named what?  
- **Flavr Savr.**
13. Human insulin produced using biotechnology is often called?  
- **Humulin.**
14. Who first determined the molecular structure of insulin?  
- **Frederick Sanger.**
15. Which polypeptide chain is removed from proinsulin to form mature, functional insulin?  
- **The C-peptide.**
16. The first clinical gene therapy was performed to treat what deficiency?  
- **Adenosine Deaminase (ADA) deficiency, which causes SCID.**
17. The use of molecular biology for medical diagnosis is called?  
- **Molecular diagnostics.**
18. Which technique is used for early detection of HIV infection?  
- **PCR (Polymerase Chain Reaction).**
19. Which diagnostic test is based on the principle of antigen-antibody interaction?  
- **ELISA (Enzyme-Linked Immunosorbent Assay).**
20. Animals that have had their DNA manipulated to express a foreign gene are called?  
- **Transgenic animals.**
21. The first transgenic cow, capable of producing human protein-enriched milk, was named?  
- **Rosie.**
22. Transgenic mice are often used for what primary purpose?  
- **To test the safety of vaccines.**
23. What is the protein alpha-1-antitrypsin used to treat?  
- **Emphysema.**
24. The unauthorized use of bio-resources by organizations without proper authorization is called?  
- **Biopiracy.**
25. Which Indian organization makes decisions regarding the validity of GM research? **GEAC (Genetic Engineering Approval Committee).**
26. The ability of a single plant cell to regenerate into a whole plant is called?  
- **Totipotency.**
27. The production of a large number of plants in a short time through tissue culture is called?  
- **Micropropagation.**
28. Micropropagation involves what type of reproduction?  
- **Asexual reproduction.**
29. Artificial seeds are produced from what?  
- **Somatic embryos.**
30. The chemical used to induce the fusion of protoplasts in culture is?  
- **PEG (Polyethylene glycol).**
31. The large-scale culturing of fish and other aquatic animals is called?  
- **Pisciculture.**
32. What food source is particularly rich in protein: fish flour or wheat?  
- **Fish flour.**
33. A dramatic increase in food production, especially wheat and rice, is known as the?  
- **Green Revolution.**
34. 'Sonali' and 'Kalyan Sona' are high-yielding varieties of what crop?  
- **Rice.**
35. 'Talchung Native-1' is a variety of what crop?  
- **Rice.**
36. Developing yellow mosaic virus-resistant mung beans was achieved through what technique?  
- **Mutation breeding.**
37. 'Hisardale' is a new breed of sheep developed through what breeding technique?  
- **Cross-breeding.**
38. 'Jaffrabandi', 'Murrah', and 'Mehsana' are all breeds of what animal?  
- **Buffalo.**
39. The first animal to be successfully cloned was?  
- **A sheep named Dolly.**
40. How many varieties of Basmati rice are grown in India?  
- **27.**
41. What are plants called that are genetically identical to the original plant from which they were grown?  
- **Somoclones.**
42. What is the main purpose of gene therapy?  
- **To correct a defective gene in a person's cells.**
43. What is the full form of MOET in animal breeding?  
- **Multiple Ovulation Embryo Transfer technology.**
44. The transgenic protein 'hirudin' (an anticoagulant) was produced in the seeds of which plant?  
- **Brassica napus.**
45. What does GMO stand for?  
- **Genetically Modified Organism.**
46. What is a "transgene"?  
- **A gene that has been transferred from one organism to another.**
47. What is a man-made allopolyploid cereal crop created by crossing wheat and rye?  
- **Triticale.**
48. A plant containing a gene that provides resistance to herbicides is called what?  
- **A herbicide-resistant plant.**
49. The hormone insulin is naturally produced by which organ?  
- **The pancreas.**



## Chapter 11: Organisms and Populations

### QUICK REVISION: ONE-LINER QUESTIONS AND ANSWERS

1. The study of interactions among organisms and their environment is called?  
- **Ecology.**
2. Who is known as the Father of Ecology in India?  
- **Ramdeo Misra.**
3. As one moves from the equator towards the poles, what happens to the temperature?  
- **It decreases.**
4. As one moves up in altitude, what happens to the temperature?  
- **It decreases.**
5. What is the ability of an organism to adjust to its environment called?  
- **Adaptation.**
6. Plants that are adapted to live in dry, desert conditions are called?  
- **Xerophytes.**
7. Opuntia (prickly pear cactus) and Acacia are examples of what type of plant?  
- **Xerophytes.**
8. A key adaptation of xerophytes to reduce water loss is?  
- **Sunken stomata and thick cuticles.**
9. Plants that are adapted to live in water are called?  
- **Hydrophytes.**
10. Trapa (water chestnut) and Hydrilla are examples of what type of plant?  
- **Hydrophytes.**
11. A key characteristic of hydrophytes is the reduction of what tissues?  
- **Vascular and mechanical tissues.**
12. Plants that grow on rocks are called?  
- **Lithophytes.**
13. Plants that grow in mangrove areas are called?  
- **Halophytes (e.g., Rhizophora).**
14. A group of individuals of the same species living in a given area is  
- **Population.**
15. The number of births in a population during a given period is called?  
- **Natality.**
16. The number of deaths in a population during a given period is called?  
- **Mortality.**
17. The ratio of the birth rate to the death rate in a population is called the?  
- **Vital Index.**
18. An age pyramid with a broad base, showing a high number of pre-reproductive individuals, indicates **an expanding population.**
19. At which level does natural selection operate to evolve desired traits?  
- **The population level.**
20. An interaction between two species where both are benefited is called?  
- **Mutualism.**
21. The relationship between fungi and algae in a lichen is an example of what?  
- **Mutualism.**
22. An interaction where one species benefits and the other is unaffected is called?  
- **Commensalism.**
23. The interaction between a clownfish and a sea anemone is an example of what?  
- **Commensalism.**
24. An interaction where one species harms another to obtain nutrients is called?  
- **Parasitism.**
25. An obligate root parasite that produces the world's largest flower  
- **Rafflesia.**
26. An interaction where one species kills and eats another is called?  
- **Predation.**
27. An interaction where both competing species are harmed is called?  
- **Competition.**
28. What principle states that two closely related species competing for the same resources can't coexist? **Exclusion Principle.**
29. The process by which species avoid competition by choosing different resources is called?  
- **Resource partitioning.**
30. Which organism is a well-known indicator of SO<sub>2</sub> (sulfur dioxide) pollution?  
- **Lichens.**
31. Which of these plants are insectivorous: Drosera, Nepenthes, or Hydrilla?  
- **Drosera and Nepenthes.**
32. What is the ability of soil to hold water called?  
- **Water holding capacity.**
33. Which plant produces poisonous cardiac glycosides as a defense mechanism?  
- **Calotropis.**
34. The internal buds produced by sponges for asexual reproduction are called?  
- **Gemmules.**
35. Pacific salmon fish and bamboo are known for what reproductive strategy?  
- **They reproduce only once in their lifetime.**
36. In which plant groups is water necessary for fertilization?  
- **Algae, Bryophytes, and Pteridophytes.**
37. The plant tissue responsible for water transport is called?  
- **Xylem.**
38. Mycorrhiza is a symbiotic association between fungi and plant roots; what is an example of an endomycorrhizal fungus?  
- **Glomus.**
39. What is the movement of individuals into a population called?  
- **Immigration.**
40. What is the movement of individuals out of a population called?  
- **Emigration.**
41. What shape describes the population growth curve when resources are unlimited?  
- **J-shaped (Exponential growth).**
42. What shape describes the population growth curve when resources are limited?  
- **S-shaped (Sigmoid or Logistic growth).**
43. What does the term 'K' represent in the logistic growth model?  
- **Carrying capacity.**
44. Organisms that can tolerate a wide range of temperatures are called?  
- **Eurythermal.**
45. Organisms that can tolerate a narrow range of temperatures are called?  
- **Stenothermal.**
46. What is an ectoparasite?  
- **A parasite that lives on the outer surface of its host (e.g., lice).**
47. What is an endoparasite?  
- **A parasite that lives inside the body of its host (e.g., tapeworm).**
48. The interaction where one species is harmed and the other is unaffected is called?  
- **Amensalism.**
49. A moth was used as a biological control agent to control which invasive plant in Australia?  
- **Opuntia (prickly pear cactus).**
50. What is the most ecologically relevant environmental factor?  
- **Temperature.**
51. What is the primary role of a predator in an ecosystem?  
- **To transfer energy and keep prey populations under control.**
52. The physical space where an organism lives is its?  
- **Habitat.**



## Chapter 12: Ecosystem

### QUICK REVISION: ONE-LINER QUESTIONS AND ANSWERS

1. Who first used the term 'Ecosystem'? **- A.G. Tansley.**
2. What are the two main components of an ecosystem? **- Biotic (living) and Abiotic (non-living).**
3. Organisms that produce their own food are called? **- Producers (or autotrophs).**
4. Green plants convert what form of energy into chemical energy? **- Light energy.**
5. Organisms that feed on other organisms are called? **- Consumers (or heterotrophs).**
6. Bacteria and fungi that feed on dead organic matter are called? **- Decomposers (or saprotrophs).**
7. A sequence of organisms eating one another is a? **- Food chain.**
8. Which is a correct food chain: "Goat, Cow, Grass" or "Grass, Goat, Lion"? **- Grass, Goat, and Lion.**
9. A network of interconnected food chains is a? **- Food web.**
10. Each step or level in a food chain is a? **- Trophic level.**
11. Green plants belong to which trophic level? **- The first trophic level (T1).**
12. The rate of biomass production by producers is? **- Primary productivity.**
13. The total rate of photosynthesis is called? **- Gross Primary Productivity (GPP).**
14. The rate of biomass formation by consumers is? **- Secondary productivity.**
15. How does energy flow through an ecosystem? **- It is unidirectional.**
16. What percentage of energy is transferred between trophic levels? **- 10 percent.**
17. A graphical representation of trophic structure is an? **- Ecological pyramid.**
18. Which ecological pyramid is always upright? **- The pyramid of energy.**
19. The gradual change in species composition of an area is? **- Ecological succession.**
20. The first species to colonize a bare area are? **- Pioneer species.**
21. In a dry succession (xerosere), what are the pioneer species? **- Lichens.**
22. In a wet succession (hydrosere), what are the pioneer species? **- Phytoplankton.**
23. The final, stable community in succession is the? **- Climax community.**
24. The nature of a climax community is determined by what? **- The climate.**
25. The process of breaking down dead organic matter is called? **- Decomposition.**
26. Which is NOT a process of decomposition: Leaching or Anabolism? **- Anabolism.**
27. A food chain starting with dead organic matter is a? **- Detritus food chain.**
28. The process of nutrients washing down into the soil is? **- Leaching.**
29. The cycling of nutrients like carbon and phosphorus is called? **- Nutrient cycling.**
30. The natural aging of a lake due to nutrient enrichment is? **- Eutrophication.**
31. The main cause of acid rain? **- Air pollution from NO<sub>2</sub> and SO<sub>2</sub>.**
32. Which organism is an indicator of SO<sub>2</sub> pollution? **- Lichens.**
33. A generally safe sound intensity level for humans is? **- 20-30 decibels.**
34. According to WHO, what is a safe noise pollution standard? **- Around 20-30 decibels.**
35. Where do phytoplankton grow most abundantly in a lake? **- In the limnetic zone.**
36. What is the term for the total living matter at a trophic level? **- Standing crop.**
37. What are animals that eat only plants called? **- Herbivores.**
38. What are animals that eat other animals called? **- Carnivores.**
39. What is PAR? **- Photosynthetically Active Radiation.**
40. How much PAR do plants capture for photosynthesis? **- About 2-10%.**
41. The breakdown of detritus into smaller particles is called? **- Fragmentation.**
42. The process of forming a dark, amorphous substance from detritus is? **- Humification.**
43. The process where microbes degrade humus to release inorganic nutrients is? **- Mineralization.**
44. Which major nutrient cycle is considered a gaseous cycle? **- The carbon cycle.**
45. Which major nutrient cycle is considered a sedimentary cycle? **- The phosphorus cycle.**
46. Which zone in a lake is the shallow, well-lit water close to the shore? **- The littoral zone.**
47. What are the primary consumers in most aquatic ecosystems? **- Zooplankton.**
48. A parasitic plant that feeds on other plants is considered what type of consumer? **- A primary consumer.**
49. What is a Rhizocarpon an example of? **- A crustose lichen.**
50. What is a major source of atmospheric carbon dioxide? **- Combustion of fossil fuels.**



## Chapter 13: Biodiversity and Conservation

### QUICK REVISION: ONE-LINER QUESTIONS AND ANSWERS

1. The variety of life on Earth at all levels is called? **- Biodiversity.**
2. According to Robert May's estimate, what is the global species diversity? **- About 7 million.**
3. India's share of the world's species diversity is approximately what percentage? **- 8.1%.**
4. Which group of organisms has the highest number of species in nature? **- Insects.**
5. What is a region with very high levels of species richness and endemism called? **- A biodiversity hotspot.**
6. How many biodiversity hotspots have been identified in the world? **- 34.**
7. The complete disappearance of a species from Earth is called? **- Extinction.**
8. The Dodo is an example of what kind of species? **- An extinct species.**
9. Which species became extinct due to over-exploitation by humans? **- Steller's sea cow.**
10. The extinction of cichlid fish in Lake Victoria was caused by what? **- Alien species invasion (introduction of the Nile Perch).**
11. A species facing a very high risk of extinction in the wild is called? **- An endangered species.**
12. Nepenthes (pitcher plant) is an example of what kind of plant species? **- An endangered plant species.**
13. What is the book that maintains a record of rare and endangered species? **- The Red Data Book.**
14. The protection and preservation of wildlife and natural resources is called? **- Conservation.**
15. Conservation of species within their natural habitats is called? **- In-situ conservation.**
16. National Parks, Sanctuaries, and Biosphere Reserves are examples of what type of conservation? **- In-situ conservation.**
17. What is protected in a National Park? **- Both flora (plants) and fauna (animals) of the entire ecosystem.**
18. Conservation of species outside their natural habitats is called? **- Ex-situ conservation.**
19. Zoological parks and botanical gardens are examples of what type of conservation? **- Ex-situ conservation.**
20. The technique of preserving genetic material at very low temperatures is called? **- Cryopreservation.**
21. What are tracts of forest set aside and protected in the name of God or deities called? **- Sacred groves.**
22. The Gir National Park is famous for which animal? **- The Asiatic lion.**
23. The Kanha National Park is famous for which animal? **- The tiger.**
24. The Rhino Sanctuary in Kaziranga National Park is located in which state? **- Assam.**
25. Periyar Sanctuary in Kerala provides protection to which animal? **- The elephant.**
26. Ranthambore National Park is located in which state? **- Rajasthan.**
27. The increase in the average temperature of the Earth is known as? **- Global warming.**
28. What is the primary cause of global warming? **- The greenhouse effect.**
29. Which of these is NOT a greenhouse gas: Methane, Nitrogen, or CO<sub>2</sub>? **- Nitrogen.**
30. Greenhouse gases are effective at absorbing what type of radiation? **- Infrared radiation.**
31. The thinning of the protective ozone layer in the stratosphere is known as? **- Ozone depletion.**
32. What is the main cause of ozone depletion? **- Chlorofluorocarbons (CFCs).**
33. The depletion of the ozone layer leads to an increase in what type of radiation on Earth? **- UV-B radiation.**
34. Absorption of UV-B radiation is a major cause of what condition in humans? **- Snow blindness and skin cancer.**
35. The thickness of the ozone layer is measured in which units? **- Dobson Units (DU).**
36. What is the primary cause of acid rain? **- Emissions of sulfur dioxide (SO<sub>2</sub>) and nitrogen oxides.**
37. A mixture of smoke and fog is called? **- Smog.**
38. Photochemical smog is formed from ozone, PAN, and what other pollutant? **- Nitrogen dioxide (NO<sub>2</sub>).**
39. At what noise level is sound generally considered to be pollution? **- Above 80-99 decibels (dB).**
40. Why is Carbon Monoxide (CO) more toxic than Carbon Dioxide (CO<sub>2</sub>)? **- It reduces the oxygen-carrying capacity of hemoglobin.**
41. What is a common example of a non-biodegradable pollutant? **- DDT or plastics.**
42. Which invasive aquatic plant is known as the 'Terror of Bengal'? **- Water hyacinth (Eichhornia crassipes).**
43. What date is celebrated as World Environment Day? **- June 5th.**
44. What date is celebrated as International Day for Biological Diversity? **- May 22nd.**
45. The World Summit on Sustainable Development in 2002 was held in which city? **- Johannesburg.**
46. What was the toxic gas responsible for the Bhopal gas tragedy? **- Methyl isocyanate (MIC).**
47. What is India's National Aquatic Animal? **- The River Dolphin.**
48. A pollutant that can cause mutations is called a? **- Mutagenic pollutant (e.g., chlorinated hydrocarbons).**
49. The famous 'Chipko Movement' was started for what purpose? **- To protect trees from being cut down.**
50. What is a major cause for the extinction of wild animals? **- Habitat loss and fragmentation.**