Class 12 Biology – Chapter-wise Most Important Questions

Annual Exam Preparation 2026–27

Priority for preparation:

- **1 mark:** MCQs, definitions, examples and terminology.
- **2 marks:** Differences, reasons and short explanations.
- **3 marks:** Processes, comparisons and applications.
- **5 marks:** Detailed explanations, labelled diagrams and genetics problems.

These are high-priority practice questions, not guaranteed or leaked exam questions.

UNIT VI – REPRODUCTION (16 Marks)

Chapter 1: Sexual Reproduction in Flowering Plants Very important

3–5 Marks Questions

1. Explain the development of a male gametophyte with a labelled diagram.
2. Describe the development of the female gametophyte (embryo sac) with a labelled diagram.
3. Explain double fertilisation in flowering plants. Why is it called double fertilisation?
4. Describe the process of microsporogenesis and megasporogenesis.
5. Explain the post-fertilisation changes in a flower.
6. Describe the structure of a mature anatropous ovule with a labelled diagram.

2–3 Marks Questions

7. Differentiate between autogamy, geitonogamy and xenogamy.
8. What are outbreeding devices? Explain any three.
9. Differentiate between apomixis and parthenocarpy.
10. What is pollen-pistil interaction?
11. Explain the significance of emasculation and bagging.
12. What are cleistogamous flowers? Give examples.

1 Mark / MCQs

13. What is triple fusion?
14. Name the ploidy of the zygote, primary endosperm nucleus and synergids.
15. What is the function of filiform apparatus?
16. Name the two cells involved in double fertilisation.
17. What is polyembryony?

Important diagrams: T.S. of anther, mature embryo sac, anatropous ovule, pollen germination and double fertilisation.

Chapter 2: Human Reproduction Very important

3–5 Marks Questions

1. Explain spermatogenesis with a suitable labelled diagram.
2. Explain oogenesis and differentiate it from spermatogenesis.
3. Describe the structure of the human male reproductive system with a labelled diagram.
4. Describe the human female reproductive system with a labelled diagram.

5. Explain the menstrual cycle and the hormonal changes during its different phases.
6. Describe the process of fertilisation and implantation in humans.
7. Explain the development of the human embryo up to blastocyst formation.
8. Explain the structure and functions of the placenta.

2–3 Marks Questions

9. Differentiate between primary and secondary spermatocytes.
10. What are Sertoli cells and Leydig cells? Write their functions.
11. What is corpus luteum? Explain its function.
12. Differentiate between morula and blastocyst.
13. What is the role of oxytocin during parturition?
14. Explain the significance of colostrum.

1 Mark / MCQs

15. Where does fertilisation occur in humans?
16. Which hormone stimulates ovulation?
17. What is the normal chromosome number in a human sperm?
18. Name the hormone responsible for milk production.
19. Which part of the blastocyst forms the embryo?

Important diagrams: Male reproductive system, female reproductive system, T.S. of testis, sperm, ovary and blastocyst.

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Chapter 3: Reproductive Health

3–5 Marks Questions

1. Explain different methods of contraception with examples.
2. Describe the various natural, barrier, IUD and surgical methods of contraception.
3. Explain the different assisted reproductive technologies (ART).
4. What are sexually transmitted infections (STIs)? Explain their symptoms and preventive measures.

2–3 Marks Questions

5. Differentiate between vasectomy and tubectomy.
6. What is amniocentesis? Why is its misuse prohibited?
7. What is medical termination of pregnancy (MTP)?
8. Differentiate between IVF, ZIFT and GIFT.
9. Why is reproductive health education important?
10. What are the causes of infertility?

1 Mark / MCQs

11. Expand IVF, IUD, ZIFT and GIFT.
12. Name one copper-releasing IUD.
13. Which contraceptive method prevents implantation?
14. Name two bacterial STIs.
15. Which contraceptive method is irreversible?

UNIT VII – GENETICS AND EVOLUTION (20 Marks)

Chapter 4: Principles of Inheritance and Variation Highest priority

3–5 Marks Questions

1. Explain Mendel's monohybrid cross with a suitable checkerboard.
2. Explain Mendel's dihybrid cross and state the law of independent assortment.
3. Explain incomplete dominance with the example of Snapdragon (Antirrhinum).
4. Explain codominance and multiple allelism with reference to the ABO blood group system.
5. Explain sex determination in humans with a suitable diagram.
6. Describe sex-linked inheritance with reference to haemophilia.
7. Explain chromosomal theory of inheritance.
8. Explain linkage and crossing over.
9. Describe Mendelian disorders and chromosomal disorders in humans.

2–3 Marks Questions

10. Differentiate between homozygous and heterozygous conditions.
11. Differentiate between incomplete dominance and codominance.
12. What is pleiotropy? Give an example.
13. What is polygenic inheritance? Give an example.
14. Explain why a test cross is performed.
15. Differentiate between autosomes and sex chromosomes.
16. Explain Down's syndrome, Turner's syndrome and Klinefelter's syndrome.
17. What is thalassemia?

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Genetics numerical questions – Practise these

18. A heterozygous tall pea plant is crossed with a dwarf plant. Find the genotypic and phenotypic ratios.
19. In a dihybrid cross AaBb × AaBb, calculate the phenotypic ratio.
20. A man with blood group A marries a woman with blood group B. Show the possible blood groups of their children.
21. A carrier woman for haemophilia marries a normal man. Calculate the probability of affected sons and carrier daughters.

1 Mark / MCQs

22. Who is known as the father of genetics?
23. What is the phenotypic ratio of a monohybrid cross?
24. Which blood group is known as the universal recipient for red blood cell transfusion?
25. Which chromosome determines maleness in humans?
26. Name the disorder caused by trisomy of chromosome 21.

Important diagrams: Monohybrid cross, dihybrid cross, sex determination and pedigree analysis.

Chapter 5: Molecular Basis of Inheritance Highest priority

3–5 Marks Questions

1. Explain the Hershey and Chase experiment to prove that DNA is the genetic material.
2. Describe the structure of DNA according to the Watson and Crick model.
3. Explain the process of DNA replication with a labelled diagram.

4. Explain transcription in prokaryotes.
5. Describe the process of translation (protein synthesis).
6. Explain the lac operon model of gene regulation.
7. Explain the packaging of DNA in eukaryotes.
8. Describe the Human Genome Project and its important findings.
9. Explain the principle and steps of DNA fingerprinting.

2–3 Marks Questions

10. Differentiate between DNA and RNA.
11. What are the functions of mRNA, tRNA and rRNA?
12. What is the central dogma of molecular biology?
13. What are Okazaki fragments?
14. Differentiate between leading and lagging strands.
15. What are exons and introns?
16. Explain the role of DNA polymerase and DNA ligase.
17. What is a transcription unit?
18. Why is DNA replication called semiconservative?
19. What is the genetic code? Mention its important characteristics.

1 Mark / MCQs

20. Who proposed the double helix model of DNA?
21. Which enzyme joins Okazaki fragments?
22. What is the start codon?
23. Name the stop codons.
24. Which RNA carries amino acids to ribosomes?
25. What is the full form of VNTR?

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Important diagrams: DNA double helix, DNA replication fork, transcription unit, tRNA structure and lac operon.

Chapter 6: Evolution

3–5 Marks Questions

1. Explain Darwin's theory of natural selection.
2. Explain the Hardy-Weinberg principle and the factors affecting genetic equilibrium.
3. Describe the different types of natural selection with suitable examples.
4. Explain the evidences of biological evolution.
5. Describe adaptive radiation with suitable examples.
6. Explain the major stages in human evolution.

2–3 Marks Questions

7. Differentiate between homologous and analogous organs with examples.
8. What is divergent evolution?
9. What is convergent evolution?
10. Explain industrial melanism with an example.
11. What is genetic drift?
12. Differentiate between gene flow and genetic drift.
13. What is adaptive radiation? Give an example.

14. Explain the origin of life according to the Oparin-Haldane theory.
15. What was the significance of the Miller experiment?

1 Mark / MCQs
16. Who proposed the theory of natural selection?
17. What is the Hardy-Weinberg equation?
18. Name the scientist who performed the famous Miller experiment.
19. What are vestigial organs?
20. Name the ancestor of modern humans commonly called the first human-like hominid in the NCERT evolutionary account.

UNIT VIII – BIOLOGY AND HUMAN WELFARE (12 Marks)

Chapter 7: Human Health and Disease Very important

3–5 Marks Questions

1. Explain the life cycle of Plasmodium with a labelled diagram.
2. Describe the structure and replication of HIV.
3. Explain the causes, symptoms and prevention of AIDS.
4. Describe the different types of immunity.
5. Explain the mechanism of antibody production.
6. Explain cancer, its causes, detection and treatment.
7. Describe the harmful effects of drug and alcohol abuse.

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2–3 Marks Questions
8. Differentiate between innate and acquired immunity.
9. Differentiate between active and passive immunity.
10. What are allergens? Explain allergic reactions.
11. What are autoimmune diseases? Give an example.
12. Differentiate between benign and malignant tumours.
13. What are interferons?
14. Explain the role of B-lymphocytes and T-lymphocytes.
15. Name the causative organisms of typhoid, pneumonia and malaria.
16. What are opioids, cannabinoids and cocaine?

1 Mark / MCQs
17. Which mosquito transmits malaria?
18. Which cells are destroyed by HIV?
19. Name the causative agent of typhoid.
20. What is the full form of AIDS?
21. Which technique is used for cancer detection?
22. Which antibody is present in colostrum?

Important diagrams: Life cycle of Plasmodium, HIV structure and antibody structure.

Chapter 8: Microbes in Human Welfare

3–5 Marks Questions

1. Explain the role of microbes in household food processing with examples.
2. Describe the role of microbes in industrial production.
3. Explain sewage treatment with a flowchart.
4. Describe the production of biogas with a labelled diagram.
5. Explain the role of microbes as biocontrol agents and biofertilisers.
6. Explain the role of microbes in the production of antibiotics.

2–3 Marks Questions

7. What are flocs in sewage treatment?
8. What is BOD? Why is it important?
9. Differentiate between primary and secondary sewage treatment.
10. What are methanogens? Give an example.
11. What is the role of LAB in curd formation?
12. Explain the role of Trichoderma as a biocontrol agent.
13. What is the role of Rhizobium in agriculture?
14. What are mycorrhizae? Explain their benefits.
15. Name the microbes used in the production of alcohol and antibiotics.

1 Mark / MCQs

16. Which microbe produces penicillin?
17. Which bacteria are used in curd formation?
18. Name the bacteria used in biogas production.
19. What is the full form of BOD?
20. Name one biofertiliser.

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UNIT IX – BIOTECHNOLOGY AND ITS APPLICATIONS (12 Marks)

Chapter 9: Biotechnology – Principles and Processes

Very important

3–5 Marks Questions

1. Explain the main steps involved in recombinant DNA technology.
2. Describe the structure and functions of a cloning vector.
3. Explain the role of restriction endonucleases in genetic engineering.
4. Explain the process of PCR with its three major steps.
5. Describe the process of gel electrophoresis.
6. Explain the process of isolation of DNA and its purification.
7. Explain the role of competent host cells in recombinant DNA technology.
8. Describe the process of insertion of recombinant DNA into a host cell.

2–3 Marks Questions

9. Differentiate between exonucleases and endonucleases.
10. What are palindromic nucleotide sequences?
11. What are selectable markers? Give examples.

12. Explain the role of DNA ligase.
13. What is the role of Taq polymerase in PCR?
14. Why are restriction enzymes called molecular scissors?
15. What is the significance of ori in a cloning vector?
16. What are bioreactors? Explain their importance.
17. Differentiate between stirred-tank and sparged stirred-tank bioreactors.

1 Mark / MCQs
18. Expand PCR.
19. Name the enzyme used to join DNA fragments.
20. Which enzyme is used to cut DNA at specific sites?
21. Which bacterium is used to obtain Taq polymerase?
22. What is the full form of GMO?

Important diagrams: Plasmid vector, PCR cycle, gel electrophoresis and stirred-tank bioreactor.

Chapter 10: Biotechnology and its Applications

Very important

3–5 Marks Questions

1. Explain the production of human insulin using recombinant DNA technology.
2. Explain the principle and applications of gene therapy with reference to ADA deficiency.
3. Describe the development of Bt cotton and its role in pest resistance.
4. Explain RNA interference (RNAi) technology with an example.
5. Explain the applications of biotechnology in medicine and agriculture.
6. Describe the production and use of genetically modified organisms.

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2–3 Marks Questions
7. What are biopatents and biopiracy?
8. What is the role of Cry genes in Bt cotton?
9. Differentiate between proinsulin and mature insulin.
10. What are transgenic animals? Give examples.
11. What is gene therapy?
12. Explain the role of RNA interference in controlling nematodes.
13. What is the significance of molecular diagnosis?
14. Mention any three advantages of genetically modified crops.

1 Mark / MCQs
15. What is the full form of ADA?
16. Which bacterium is used to produce Bt toxin?
17. Name the nematode controlled by RNA interference in NCERT.
18. What is the function of the Cry protein?
19. Name the first clinical gene therapy used for ADA deficiency.

UNIT X – ECOLOGY AND ENVIRONMENT (10 Marks)

Chapter 11: Organisms and Populations

3–5 Marks Questions

1. Explain the different types of population interactions with suitable examples.
2. Describe the adaptations of plants and animals to different environmental conditions.
3. Explain population growth curves with suitable diagrams.
4. Explain the age distribution of a population with diagrams.
5. Describe the different responses of organisms to abiotic factors.

2–3 Marks Questions

6. Differentiate between mutualism and commensalism.
7. Differentiate between parasitism and predation.
8. What is population density?
9. Explain carrying capacity.
10. What are the exponential and logistic growth models?
11. Explain Allen's rule and Bergmann's rule.
12. What is diapause?
13. What is hibernation and aestivation?
14. Explain Gause's competitive exclusion principle.
15. What is brood parasitism? Give an example.

1 Mark / MCQs

16. What is the scientific name of the prickly pear cactus?
17. What is the symbol for carrying capacity?
18. Give one example of mutualism.
19. What is commensalism?
20. What is the age pyramid?

Important diagrams: Exponential growth curve, logistic growth curve and age pyramids.

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Chapter 12: Ecosystem

Important

3–5 Marks Questions

1. Explain the structure and functions of an ecosystem.
2. Describe the process of decomposition and its different steps.
3. Explain the energy flow in an ecosystem with a suitable diagram.
4. Describe the ecological pyramids of number, biomass and energy.
5. Explain the productivity of an ecosystem.
6. Describe the process of nutrient cycling with reference to the carbon cycle.
7. Explain the 10% law of energy transfer.

2–3 Marks Questions

8. Differentiate between gross primary productivity and net primary productivity.
9. Differentiate between grazing food chain and detritus food chain.
10. What is ecological succession?
11. What is standing crop and standing state?
12. Explain the role of decomposers in an ecosystem.
13. Why is the pyramid of energy always upright?
14. What is humification?
15. Explain the phosphorus cycle.

1 Mark / MCQs

16. Who proposed the 10% law?
17. What is the main source of energy for an ecosystem?
18. Which pyramid is always upright?
19. Define detritus.
20. Name the process by which nutrients are returned to the soil.

Important diagrams: Energy flow, ecological pyramids, carbon cycle and decomposition.

Chapter 13: Biodiversity and Conservation

3–5 Marks Questions

1. Explain the importance of biodiversity.
2. Describe the causes of biodiversity loss with reference to the evil quartet.
3. Explain the different methods of biodiversity conservation.
4. Differentiate between in-situ and ex-situ conservation with examples.
5. Explain the latitudinal gradient in biodiversity.
6. Describe the species-area relationship with a suitable graph.

2–3 Marks Questions

7. What are biodiversity hotspots? Name any two in India.
8. What is the Red Data Book?
9. Explain the rivet popper hypothesis.
10. What is the significance of sacred groves?
11. Differentiate between endangered and extinct species.
12. What are biosphere reserves?
13. Explain the role of national parks and wildlife sanctuaries.
14. What is the importance of the Amazon rainforest?
15. Explain the concept of the six mass extinctions.

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1 Mark / MCQs

16. What is the full form of IUCN?
17. Name one biodiversity hotspot in India.
18. What is the major cause of biodiversity loss?
19. Who proposed the rivet popper hypothesis?
20. What is endemic species?

Most Important Chapters to Prepare First

According to the CBSE 2026–27 syllabus, the unit-wise weightage is:

Unit	Marks
Reproduction	16
Genetics and Evolution	20
Biology and Human Welfare	12
Biotechnology	12
Ecology and Environment	10
Total	**70**

Top 20 Must-Prepare Topics for the Annual Exam

If you have limited time, prepare these topics first.

1. Double fertilisation
2. Development of embryo sac
3. Spermatogenesis and oogenesis
4. Menstrual cycle
5. Methods of contraception
6. Mendel's monohybrid and dihybrid crosses
7. Incomplete dominance and codominance
8. Sex determination in humans
9. Haemophilia and blood group inheritance
10. DNA replication
11. Transcription and translation
12. Lac operon
13. DNA fingerprinting
14. Hardy-Weinberg principle
15. HIV and AIDS
16. Sewage treatment
17. PCR and recombinant DNA technology
18. Bt cotton and gene therapy
19. Population growth curves
20. Ecological pyramids and biodiversity loss

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