CLASS 11 BIOLOGY EXTRA QUESTIONS

Class 11 Biology Chapter 10 Cell Cycle and Cell Division – Extra Questions with Answers

Extra practice questions for Class 11 Biology Chapter 10 (Cell Cycle and Cell Division), beyond the textbook. These Class 11 Biology Chapter 10 important questions are handy for last-minute exam practice.

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Very Short Answer Questions (1 mark)

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Class 11 Biology Chapter 10 – Solutions and Notes

Extra practice questions for Class 11 Biology Chapter 10 (Cell Cycle and Cell Division), beyond the textbook. These Class 11 Biology Chapter 10 important questions are handy for last-minute exam practice.

Very Short Answer Questions (1 mark)

Q1. In which phase of interphase does DNA replication occur?
Ans: S phase.

Q2. How many daughter cells are produced by mitosis?
Ans: Two, genetically identical to the parent.

Q3. How many daughter cells are produced by meiosis?
Ans: Four, genetically variable and haploid.

Q4. What is crossing over?
Ans: The exchange of genetic material between non-sister chromatids of homologous chromosomes during prophase I of meiosis.

Q5. What is cytokinesis?
Ans: The division of the cytoplasm following nuclear division, resulting in two separate daughter cells.

Short Answer Questions (2–3 marks)

Q6. List the four phases of mitosis in order.
Ans: Prophase, metaphase, anaphase, telophase (PMAT).

Q7. Differentiate between Meiosis I and Meiosis II.
Ans: Meiosis I is reductional (homologous chromosomes separate, chromosome number is halved); Meiosis II is equational (sister chromatids separate, similar to mitosis, no further reduction in chromosome number).

Q8. Why is meiosis also called reductional division?
Ans: Because it reduces the chromosome number by half, converting a diploid (2n) parent cell into haploid (n) daughter cells, necessary for maintaining a constant chromosome number across sexually reproducing generations.

Higher-Order Thinking / Application Questions

Q9. Explain why meiosis is essential for sexual reproduction, connecting your answer to what would happen to a species' chromosome number across generations if gametes were produced by mitosis instead of meiosis.
Ans: In sexually reproducing organisms, offspring are formed by the fusion of two gametes (one from each parent) during fertilization, and this fusion combines the genetic material (chromosomes) from both gametes into a single zygote. If gametes were produced by mitosis (which conserves the diploid chromosome number, producing daughter cells genetically identical to and with the same ploidy as the parent cell), each gamete would carry a full diploid (2n) set of chromosomes rather than a reduced haploid (n) set. When two such diploid gametes fused during fertilization, the resulting zygote would have double the normal diploid chromosome number (4n) instead of the correct 2n. This doubling would repeat with each subsequent generation (8n, 16n, and so on), rapidly leading to an unsustainable, ever-increasing chromosome number that would likely cause severe developmental abnormalities and eventual extinction of the species. Meiosis solves this problem by halving the chromosome number during gamete formation (diploid parent cell → haploid gametes), so that when two haploid gametes fuse at fertilization, the original

diploid (2n) chromosome number is correctly restored in the zygote, maintaining a constant, stable chromosome number across successive generations — this is why meiosis is absolutely essential for the long-term genetic stability of sexually reproducing species.

Q10. Explain how crossing over during prophase I of meiosis, combined with independent assortment of chromosomes, contributes to genetic variation among offspring, even among siblings from the same parents.
Ans: During prophase I of meiosis, homologous chromosomes (one inherited from each parent) pair up closely (synapsis) to form structures called bivalents/tetrads, and at this stage, non-sister chromatids of the homologous chromosomes can physically exchange corresponding segments of genetic material through a process called crossing over (facilitated by structures called chiasmata). This exchange creates new combinations of alleles on each chromatid that did not exist on either original parental chromosome, generating genetically novel/'recombinant' chromosomes. Additionally, during metaphase I, the orientation of each pair of homologous chromosomes at the cell's equator is random and independent of how other homologous pairs are oriented (independent assortment), meaning that when homologous chromosomes separate to opposite poles during anaphase I, each resulting daughter cell receives a random, independent mixture of maternal and paternal chromosomes (for humans, with 23 pairs, this alone allows for $2^{23} \approx 8.4$ million possible chromosome combinations). Together, crossing over (creating novel allele combinations within individual chromosomes) and independent assortment (creating novel combinations of whole chromosomes) ensure that the gametes produced by meiosis are genetically highly diverse, which is why siblings (even from the same two parents) are never genetically identical to each other (except in the special case of identical twins, which arise from a different mechanism after fertilization) — this genetic variation generated by meiosis is a key driver of the genetic diversity within sexually reproducing populations, which is important for evolution and adaptation.

Class 11 Biology Chapter 10 – Solutions and Notes

For complete step-by-step answers and a quick summary, check the Class 11 Biology Chapter 10 Solutions and Class 11 Biology Chapter 10 Revision Notes.

See also: Chapter 1 | Chapter 2 | Chapter 3 | Chapter 4 | Chapter 5 | Chapter 6 | Chapter 7 | Chapter 8 | Chapter 9 | Chapter 10

Practice more: Chapter 1 | Chapter 2 | Chapter 3 | Chapter 4 | Chapter 5 | Chapter 6 | Chapter 7 | Chapter 8 | Chapter 9

Quick revision: Chapter 1 | Chapter 2 | Chapter 3 | Chapter 4 | Chapter 5 | Chapter 6 | Chapter 7 | Chapter 8 | Chapter 9