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Biology Grade 9 — Chapter 4

Cell Cycle

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Independent practice MCQs from the supplied Class 9 Biology notes pack. Total: 50 questions.

A. Important / Main Topics

1. The cell cycle is the sequence of events involving:

(A) Growth, genome replication, and division
(B) Only cell division
(C) Only DNA replication
(D) Only cell growth

Correct Answer: A

Explanation: The cell cycle is the sequence of events involving Growth, genome replication, and division.

2. The two main phases of the cell cycle are:

(A) G□ and G□
(B) Interphase and Mitotic phase
(C) Prophase and Metaphase
(D) S phase and M phase

Correct Answer: B

Explanation: The two main phases of the cell cycle are Interphase and Mitotic phase.

3. Which phase of interphase is the synthesis phase of DNA?

(A) G□ phase
(B) G□ phase
(C) S phase
(D) M phase

Correct Answer: C

Explanation: The S phase is the synthesis phase of DNA, where the cell replicates its entire genetic material.

4. The major components of the spindle apparatus are:

(A) Microfilaments
(B) Intermediate filaments
(C) Actin
(D) Microtubules

Correct Answer: D

Explanation: Major components of the cytoskeleton (and the spindle apparatus) are microtubules.

5. Mitosis produces:

(A) Two daughter cells with the same chromosome number
(B) Four daughter cells with half the chromosome number
(C) Two daughter cells with half the chromosome number
(D) One daughter cell

Correct Answer: A

Explanation: Mitosis produces two daughter cells with the same number of chromosomes as the parent cell.

6. Which is the longest phase of mitosis?

(A) Metaphase
(B) Prophase
(C) Anaphase
(D) Telophase

Correct Answer: B

Explanation: Prophase is the longest phase of cell division.

7. During which phase of mitosis do chromosomes align at the equator?

(A) Prophase
(B) Anaphase
(C) Metaphase
(D) Telophase

Correct Answer: C

Explanation: In metaphase, chromosomes are aligned at the equator of the spindle.

8. In animal cells, cytokinesis occurs by the formation of a:

(A) Cell plate
(B) Phragmoplast
(C) Middle lamella
(D) Cleavage furrow

Correct Answer: D

Explanation: In animal cells, the cell membrane invaginates to form a cleavage furrow that separates the two daughter cells.

9. Meiosis produces:

(A) Four haploid cells
(B) Two diploid cells
(C) Two haploid cells
(D) Four diploid cells

Correct Answer: A

Explanation: Meiosis gives rise to four daughter cells, each with half the number of chromosomes (haploid).

10. Meiosis occurs in:

(A) Somatic cells
(B) Germ line cells
(C) Epithelial cells
(D) Muscle cells

Correct Answer: B

Explanation: Meiosis occurs in Germ line cells.

11. The pairing of homologous chromosomes during Prophase I is called:

(A) Crossing over
(B) Chiasma
(C) Synapsis
(D) Bivalent

Correct Answer: C

Explanation: The pairing process of homologous chromosomes is called synapsis.

12. The exchange of segments between non-sister chromatids is called:

(A) Synapsis
(B) Chiasma
(C) Independent assortment
(D) Crossing over

Correct Answer: D

Explanation: Crossing over is the exchange of segments of non-sister chromatids during Prophase I.

13. How many chromosomes do human gametes have?

(A) 23
(B) 46
(C) 92
(D) 12

Correct Answer: A

Explanation: 23 — this correctly answers the question.

14. In plants, meiosis takes place during:

(A) Vegetative propagation
(B) Spore formation
(C) Budding
(D) Grafting

Correct Answer: B

Explanation: In plants, meiosis takes place during Spore formation.

15. Which of the following is a difference between mitosis and meiosis?

(A) Mitosis produces four cells; meiosis produces two
(B) Mitosis involves crossing over; meiosis does not
(C) Mitosis produces diploid cells; meiosis produces haploid cells
(D) Mitosis occurs in germ line cells; meiosis occurs in somatic cells

Correct Answer: C

Explanation: Mitosis produces diploid cells; meiosis produces haploid cells — this correctly answers the question.

16. During which phase does the cell grow in size and increase its organelles?

(A) S phase
(B) G□ phase
(C) M phase
(D) G□ phase

Correct Answer: D

Explanation: G□ phase — this correctly answers the question.

17. Sister chromatids are formed during:

(A) S phase
(B) G□ phase
(C) G□ phase
(D) M phase

Correct Answer: A

Explanation: Sister chromatids are formed during S phase.

18. During which phase does the cell prepare for the mitotic phase by forming spindle fibre proteins?

(A) G□ phase
(B) G□ phase
(C) S phase
(D) G□ phase

Correct Answer: B

Explanation: During G□, the cell forms proteins required for spindle fibres and prepares for mitosis.

19. Which cells remain in G□ permanently?

(A) Liver cells
(B) Kidney cells
(C) Neurons
(D) Epithelial cells

Correct Answer: C

Explanation: Neurons — this correctly answers the question.

20. Which cells divide continuously and never enter G□?

(A) Neurons
(B) Liver cells
(C) Kidney cells
(D) Epithelial cells

Correct Answer: D

Explanation: Epithelial cells — this correctly answers the question.

21. During which phase do centromeres split and chromatids separate?

(A) Anaphase
(B) Prophase
(C) Metaphase
(D) Telophase

Correct Answer: A

Explanation: In anaphase, centromeres split and chromatids are pulled to opposite poles.

22. In which phase does the nuclear membrane reform?

(A) Prophase
(B) Telophase
(C) Metaphase
(D) Anaphase

Correct Answer: B

Explanation: In telophase, the nuclear membrane is formed around chromatin at each pole.

23. In plant cells, cytokinesis involves the formation of a:

(A) Cleavage furrow
(B) Centriole
(C) Phragmoplast
(D) Lysosome

Correct Answer: C

Explanation: In plant cells, cytokinesis involves the formation of a Phragmoplast.

24. Which of the following is NOT a significance of mitosis?

(A) Genetic stability
(B) Growth and development
(C) Wound healing
(D) Production of gametes

Correct Answer: D

Explanation: Production of gametes is a function of meiosis, not mitosis.

25. The longest phase of meiosis is:

(A) Prophase I
(B) Prophase II
(C) Metaphase I
(D) Telophase II

Correct Answer: A

Explanation: Prophase I is the longest phase of meiosis.

B. Less Important / Secondary Topics

26. During which phase does no DNA replication occur?

(A) Interphase II
(B) Interphase I
(C) Prophase I
(D) S phase

Correct Answer: A

Explanation: There is no further DNA replication during Interphase II.

27. Which of the following is a source of genetic variation in meiosis?

(A) DNA replication
(B) Crossing over

(C) Cytokinesis
(D) Interphase

Correct Answer: B

Explanation: Crossing over and independent assortment are sources of genetic variation in meiosis.

28. In the malaria study, why was it important that "drinking the water of marshes does not cause malaria" was one of the observations?

(A) It proved mosquitoes cause malaria
(B) It showed quinine is ineffective
(C) It ruled out marsh water as the direct cause, suggesting another agent
(D) It proved Plasmodium is harmless

Correct Answer: C

Explanation: Since malaria was associated with marshes but drinking marsh water did not cause it, the cause must be carried by something else that comes to marshy water. This led to the mosquito hypothesis.

29. Which of the following is true about Meiosis II?

(A) It is a reduction division
(B) It involves crossing over
(C) It produces diploid cells
(D) It is similar to mitosis

Correct Answer: D

Explanation: Meiosis II is similar to mitosis and separates sister chromatids.

30. The stage of mitosis where chromosomes are pulled to opposite poles is:

(A) Anaphase
(B) Prophase
(C) Metaphase
(D) Telophase

Correct Answer: A

Explanation: In anaphase, chromatids are pulled to opposite poles.

31. The process by which a cell divides into two daughter cells is called:

(A) Meiosis
(B) Mitosis
(C) Fertilization
(D) Mutation

Correct Answer: B

Explanation: Mitosis is the cell division that produces two daughter cells.

32. In the context of the cell cycle, G□ refers to:

(A) A phase of active growth
(B) The phase of DNA replication
(C) A resting phase where the cell stops dividing
(D) The phase of nuclear division

Correct Answer: C

Explanation: G□ is a resting phase where the cell exits the cell cycle and stops dividing.

33. Which type of cell division is responsible for asexual reproduction?

(A) Meiosis
(B) Binary fission
(C) Fertilization
(D) Mitosis

Correct Answer: D

Explanation: Mitosis is the basis of asexual reproduction.

34. Which of the following is an example of a cell that can re-enter the cell cycle from G□ when needed?

(A) Liver cell
(B) Neuron
(C) Red blood cell
(D) Muscle cell

Correct Answer: A

Explanation: Cells of the liver and kidneys enter G□ temporarily and can re-enter the cell cycle when needed.

35. Crossing over occurs during:

(A) Mitosis
(B) Meiosis I
(C) Meiosis II
(D) Interphase

Correct Answer: B

Explanation: Crossing over occurs during Meiosis I.

36. A cell has completed meiosis I but meiosis II fails to occur. What will be the result?

(A) Two diploid cells
(B) Four haploid cells
(C) Two haploid cells with sister chromatids still attached
(D) One diploid cell

Correct Answer: C

Explanation: After meiosis I, the cells are haploid (chromosome number reduced by half), but sister chromatids remain attached until meiosis II separates them. If meiosis II fails, the result is two haploid cells with sister chromatids still attached.

37. A student observes a cell under the microscope. The chromosomes are aligned at the equator, and spindle fibres are attached to the centromeres. Which phase of mitosis is this?

(A) Prophase
(B) Anaphase
(C) Telophase
(D) Metaphase

Correct Answer: D

Explanation: In metaphase, chromosomes are aligned at the equator of the spindle, and spindle fibres attach to the centromeres.

38. Why is crossing over important for evolution?

(A) It creates genetic variation
(B) It reduces the chromosome number
(C) It increases the rate of mitosis
(D) It prevents mutations

Correct Answer: A

Explanation: Crossing over creates new combinations of genes, which is a source of genetic variation necessary for evolution.

39. Which of the following best explains why cancer cells divide excessively?

(A) They lack a nucleus
(B) They have a faulty cell cycle control system
(C) They have more chromosomes than normal cells
(D) They lack mitochondria

Correct Answer: B

Explanation: Cancer cells do not have a proper functioning cell cycle control system and therefore divide excessively.

40. During which phase of meiosis do homologous chromosomes separate?

(A) Prophase I
(B) Metaphase I

(C) Anaphase I
(D) Telophase I

Correct Answer: C

Explanation: Anaphase I — this correctly answers the question.

41. A cell that has 46 chromosomes undergoes meiosis. How many chromosomes will each daughter cell have?

(A) 46
(B) 92
(C) 12
(D) 23

Correct Answer: D

Explanation: Meiosis halves the chromosome number. A cell with 46 chromosomes will produce daughter cells with 23 chromosomes.

42. Which of the following statements about the spindle apparatus is correct?

(A) It separates chromatids or chromosomes during cell division
(B) It is permanent and present throughout the cell cycle
(C) It is found only in plant cells
(D) It is made of microfilaments

Correct Answer: A

Explanation: It separates chromatids or chromosomes during cell division — this correctly answers the question.

43. In plant cells, cytokinesis involves the formation of a cell plate from:

(A) Microtubules
(B) Golgi vesicles
(C) Ribosomes
(D) Lysosomes

Correct Answer: B

Explanation: In plant cells, Golgi apparatus forms vesicles that appear in the centre of the phragmoplast and form the middle lamella and primary walls of daughter cells.

44. Which of the following best explains why meiosis is important for sexual reproduction?

(A) It produces genetically identical cells
(B) It increases the chromosome number
(C) It maintains the chromosome number across generations
(D) It prevents fertilization

Correct Answer: C

Explanation: It maintains the chromosome number across generations — this correctly answers the question.

45. A cell has 8 chromosomes. After meiosis, how many chromosomes will each daughter cell have?

(A) 8
(B) 16
(C) 2
(D) 4

Correct Answer: D

Explanation: Meiosis halves the chromosome number. A cell with 8 chromosomes will produce daughter cells with 4 chromosomes.

46. Which of the following statements about mitosis is correct?

(A) It is involved in growth and repair
(B) It produces four daughter cells
(C) It halves the chromosome number
(D) It produces gametes

Correct Answer: A

Explanation: Mitosis is involved in growth, repair, and asexual reproduction. It produces two daughter cells with the same chromosome number.

47. The stage of meiosis where crossing over occurs is:

(A) Metaphase I
(B) Prophase I
(C) Anaphase I
(D) Telophase I

Correct Answer: B

Explanation: The stage of meiosis where crossing over occurs is Prophase I.

48. Which of the following is a key difference between mitosis and meiosis?

(A) Mitosis occurs in germ line cells; meiosis occurs in somatic cells
(B) Mitosis produces haploid cells; meiosis produces diploid cells
(C) Mitosis involves one division; meiosis involves two divisions
(D) Mitosis involves crossing over; meiosis does not

Correct Answer: C

Explanation: Mitosis involves one division; meiosis involves two divisions — this correctly answers the question.

49. A cell that has 40 chromosomes undergoes mitosis. How many chromosomes will each daughter cell have?

(A) 20
(B) 80
(C) 10
(D) 40

Correct Answer: D

Explanation: Mitosis maintains the chromosome number. A cell with 40 chromosomes will produce daughter cells with 40 chromosomes.

50. Which of the following best explains why the offspring produced by meiosis are genetically different from each other?

(A) Crossing over and independent assortment create genetic variation
(B) Meiosis produces identical cells
(C) Meiosis does not involve DNA replication
(D) Meiosis produces diploid cells

Correct Answer: A

Explanation: Crossing over and independent assortment create genetic variation — this correctly answers the question.