Mitosis and Meiosis Test Bank

1. How many chromosomes are typically found in human somatic cells?

A) 23

B) 46

C) 22

D) 44

E) 48

2. Which phase of the cell cycle involves the condensation and visibility of chromosomes?

A) G1 phase

B) S phase

C) G2 phase

D) Interphase

E) Mitosis

3. What is the main function of meiosis?

A) Repairing damaged tissue

B) Producing identical daughter cells

C) Increasing genetic diversity

D) Forming recombinant DNA

E) Halting cell division

4. During which phase of mitosis do the nuclear envelope and nucleolus disappear?

A) Prophase

B) Metaphase

C) Anaphase

D) Telophase

E) Interphase

5. What is the outcome of cytokinesis in mitosis?

A) Formation of gametes

B) Division of genetic materials

C) Division of the cytoplasm

D) Synthesis of proteins

E) Repair of damaged chromosomes

6. How many rounds of cell division occur during meiosis?

A) One

B) Two

C) Three

D) Four

E) None

7. What is the significance of crossing over during meiosis?

A) It leads to the formation of diploid cells

B) It decreases genetic variability

C) It occurs during telophase

D) It results in the production of identical daughter cells

E) It increases genetic diversity among offspring

8. During which phase of meiosis are homologous pairs of chromosomes seperated?

A) Prophase I

B) Metaphase II

C) Anaphase I

D) Telophase I

E) Anaphase II

9. What is the primary role of centrioles during mitosis?

A) Formation of recombinant DNA

B) Synthesis of proteins

C) Division of the cytoplasm

D) Formation of spindle fibers

E) Condensation of chromatin

10. During metaphase of mitosis in a species with a normal chromosome count of 60, how many chromosomes will be aligned along the equatorial plane?

A) 30

B) 60

C) 120

D) 90

E) 15

11. What occurs during metaphase of meiosis?

A) Homologous chromosomes separate

B) Chromosomes condense

C) Chromatids separate and move to opposite poles

D) Nuclear envelopes reassemble

E) Chromosomes line up across the center of the cell

12. Which phase of the cell cycle involves cell growth and preparation for division?

A) Mitosis

B) S phase

C) G2 phase

D) Interphase

E) Anaphase

13. During which phase of meiosis do homologous chromosomes line up across the center of the cell?

A) Prophase I

B) Metaphase I

C) Metaphase II

D) Telophase I

E) Prophase II

14. In an organism undergoing anaphase I of meiosis, with a normal chromosome count of 100, how many chromosomes will be found in each resulting daughter cell?

A) 75

B) 25

C) 100

D) 50

E) 10

15. What is the main purpose of recombinant DNA technology?

A) Production of identical clones

B) Increasing genetic homogeneity

C) Manipulation and modification of DNA

D) Decreasing genetic diversity

E) Halting cell division

16. Which phase of the cell cycle involves the synthesis of DNA?

A) G1 phase

B) S phase

C) G2 phase

D) Mitosis

E) Cytokinesis

17. During which phase of mitosis do chromatids separate and move to opposite poles?

A) Prophase

B) Metaphase

C) Anaphase

D) Telophase

E) Interphase

18. What is the main function of the cell cycle?

A) Production of gametes

B) Repairing damaged tissue

C) Synthesis of proteins

D) Growth and cell division

E) Formation of recombinant DNA

19. What cell cycle stage is the longest?

A) Division of genetic materials

B) Formation of recombinant DNA

C) Interphase

D) G2 phase

E) S phase

20. During which phase of meiosis do sister chromatids separate?

A) Prophase I

B) Metaphase I

C) Anaphase I

D) Telophase I

E) Anaphase II

21. What is the significance of genetic diversity in offspring?

A) It increases the likelihood of genetic disorders

B) It decreases the adaptability of species

C) It decreases the chance of survival

D) It enhances the adaptability of species

E) It leads to uniformity among individuals

22. Which phase of meiosis results in the formation of haploid cells?

A) Meiosis I

B) Meiosis II

C) Prophase I

D) Metaphase II

E) Anaphase I

23. What is the role of spindle fibers during mitosis?

A) Formation of recombinant DNA

B) Synthesis of proteins

C) Division of the cytoplasm

D) Separation chromatids to opposite poles

E) Condensation of chromatin

24. What is the primary outcome of meiosis?

A) Production of identical daughter cells

B) Repairing damaged tissue

C) Formation of diploid cells

D) Synthesis of proteins

E) Production of haploid cells

25. What is a function of mitosis?

A) Producing gametes

B) Repairing damaged tissue

C) Increasing genetic diversity

D) Synthesizing DNA

E) Forming recombinant DNA

26. During which phase of mitosis do chromosomes become visible and condense?

A) Prophase

B) Metaphase

C) Anaphase

D) Telophase

E) Interphase

27. What is the term used to describe the structure formed by a pair of homologous chromosomes during prophase I of meiosis?

A) Sister chromatids

B) Non-sister chromatids

C) Dihomologous chromosomes

D) Tetrad

E) Diploid chromosomes

28. What happens during telophase of mitosis?

A) Chromosomes condense

B) New nuclear envelopes form around chromosomes

C) Spindle fibers form

D) Chromatids separate and move to opposite poles

E) Chromosomes line up across the center of the cell

29. Which of the following cells are NOT examples that possibly enter G0 phase:

A) Skin cells

B) Liver cells

C) Neurons

D) Muscle cells

E) None of the above

30. What is the main difference between mitosis and meiosis?

A) Mitosis produces diploid cells, while meiosis produces haploid cells.

B) Meiosis produces diploid cells, while mitosis produces haploid cells.

C) Mitosis involves two rounds of cell division, while meiosis involves one round.

D) Meiosis involves the synthesis of DNA, while mitosis does not.

E) Mitosis occurs in somatic cells, while meiosis occurs in germ cells.

31. What significant event occurs during late prophase I of meiosis?

A) Formation of homologous pairs

B) Alignment of homologous chromosomes along the equatorial plane

C) Separation of homologous chromosomes

D) Exchange of genetic material between non-sister chromatids

E) Formation of spindle fibers

32. During telophase II of meiosis in a plant species with a normal chromosome count of 42, how many chromosomes will be present in each daughter cell?

A) 42

B) 21

C) 84

D) 63

E) 10

33. During which phase of meiosis does the nuclear envelope reassemble around the chromosomes?

A) Prophase I

B) Metaphase I

C) Telophase I

D) Telophase II

E) C+D

34. In eukaryotic cells, which protein do chromosomes coil around during cell division?

A) DNA polymerase

B) RNA polymerase

C) Histones

D) Ribosomes

E) Polymerase II

35. In Metaphase I, what are homologous pairs of chromosomes held by?

A) Centromere

B) Chromatid

C) Histones

D) Chiasmata

E) Telomeres

36. Which of the following is a feature unique to prophase I of meiosis and not observed in prophase of mitosis?

A) Condensation of chromatin

B) Alignment of chromosomes at the metaphase plate

C) Synapsis and crossing over

D) Breakdown of the nuclear envelope

E) Formation of spindle fibers

37. Which of the following events occurs during telophase I of meiosis but not during telophase of mitosis?

A) Nuclear envelope reforms around chromosomes

B) Chromosomes condense

C) Cytokinesis occurs, dividing the cell into two daughter cells

D) Sister chromatids separate

E) Homologous chromosomes decondense

38. Which of the following statements accurately describes the relationship between mitosis and meiosis?

A) Mitosis produces haploid daughter cells, while meiosis produces diploid daughter cells

B) Mitosis occurs only in somatic cells, while meiosis occurs only in gametes

C) Mitosis results in genetic variation among daughter cells, while meiosis results in genetically identical daughter cells

D) Mitosis involves one round of cell division, while meiosis involves two rounds of cell division

E) Mitosis is responsible for growth and tissue repair, while meiosis is responsible for asexual reproduction

39. What is the role of the spindle fibers in both mitosis and meiosis?

A) It promotes the condensation of chromatin

B) It helps align chromosomes at the metaphase plate

C) It prevents the formation of homologous chromosomes

D) It facilitates cytokinesis

E) It regulates the cell cycle checkpoints

40. What is the primary difference between anaphase I and anaphase II of meiosis?

A) Anaphase I separates homologous chromosomes, while anaphase II separates sister chromatids

B) Anaphase I occurs in diploid cells, while anaphase II occurs in haploid cells

C) Anaphase I results in four daughter cells, while anaphase II results in two daughter cells

D) Anaphase I is followed by telophase II, while anaphase II is followed by telophase I

E) Anaphase I involves the formation of spindle fibers, while anaphase II involves the formation of the nuclear envelope

41. Which of the following is a characteristic of both mitosis and meiosis?

A) Reduction in chromosome number

B) Production of genetically identical daughter cells

C) Production of gametes

D) Synapsis and crossing over

E) Two rounds of cell division

42. What is the significance of the G1, S, and G2 phases of the cell cycle in the context of mitosis and meiosis?

A) They ensure proper alignment of chromosomes during metaphase

B) They regulate the timing of cell division

C) They facilitate the separation of homologous chromosomes

D) They promote the condensation of chromatin

E) They occur only in prophase of mitosis

43. What role do microtubules play in the regulation of the cell cycle?

A) Microtubules form the cleavage furrow during cytokinesis.

B) Microtubules inhibit the formation of the mitotic spindle.

C) Microtubules prevent the activation of kinases.

D) Microtubules facilitate the movement of chromosomes during mitosis

E) Microtubules induce apoptosis.

44. Which of the following accurately describes the role of the G0 phase in the cell cycle?

A) G0 phase is a resting phase following mitosis.

B) G0 phase is a preparation phase for mitosis.

C) G0 phase is a phase of active cell division.

D) G0 phase is a phase of DNA replication.

E) G0 phase is a phase of cytokinesis.

45. At which stage of cell division sister chromatids are referred to as chromosomes?

A) Telophase of mitosis

B) Anaphase of meiosis I

C) Anaphase of mitosis

D) Telophase of meiosis II

E) Interphase

46. Arrange the following structures in order of increasing size:

A) Chromosomes, DNA, Chromatin, Chromatids

B) Chromatids, Chromatin, DNA, Chromosomes

C) Chromatin, Chromatids, DNA, Chromosomes

D) DNA, Chromatin, Chromatids, Chromosomes

E) DNA, Chromosomes, Chromatids, Chromatin

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Answer Key

1. B
2. E
3. C
4. A
5. C
6. B
7. E
8. C
9. D
10. B
11. E
12. C
13. B
14. D
15. C
16. B
17. C
18. D
19. C
20. E
21. D
22. B
23. D
24. E
25. B
26. A
27. D
28. B
29. A
30. A
31.E
32.B
33.E
34.C
35.D
36.C
37.E
38.D
39.B
40.A
41.C
42.B
43.D
44.A
45.C
46.D