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Set 3 – Cell Cycle and Cell Division

1. A cell having 20 chromosomes at G_1 phase of the cell cycle will have how many chromatids after S phase?
A) 20 B) 40 C) 10 D) 80

2. If a diploid cell undergoes mitotic division, the daughter cells formed will be —
A) Haploid B) Diploid C) Triploid D) Polyploid

3. During mitosis, each chromosome is attached to the spindle fibers by —
A) Kinetochore B) Centriole C) Centrosome D) Chromatid

4. The mitotic apparatus disappears during —
A) Prophase B) Anaphase C) Telophase D) Cytokinesis

5. The process which leads to separation of daughter chromosomes is —
A) Cytokinesis B) Karyokinesis C) Chromatinization D) Fertilization

6. The stage at which chromosomes are most condensed and best visible under a microscope is —
A) Prophase B) Metaphase C) Anaphase D) Telophase

7. The term "equatorial plate" refers to —
A) Arrangement of chromosomes at metaphase B) Formation of spindle fibers C) Cleavage furrow D) Nuclear plate formation

8. During mitosis, the centromeres split and chromatids move to opposite poles during —
A) Prophase B) Metaphase C) Anaphase D) Telophase

9. The nuclear envelope reforms around chromosomes during —
A) Prophase B) Metaphase C) Anaphase D) Telophase

10. The phase between two mitotic divisions is called —
A) Interphase B) Metaphase C) Cytokinesis D) Telophase

11. G_1, S, and G_2 phases collectively are called —
A) Interphase B) Division phase C) Resting phase D) Growth phase

12. The phase of cell cycle where DNA replication occurs is —
A) G_1 B) S C) G_2 D) M

13. Protein synthesis for spindle fiber formation occurs during —
A) G_1 phase B) S phase C) G_2 phase D) M phase

14. Which of the following correctly represents mitotic sequence?
A) Prophase → Metaphase → Anaphase → Telophase B) Prophase → Telophase → Metaphase C) Metaphase → Prophase → Anaphase D) None

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15. If mitosis occurs in a cell having 8 chromosomes, then the number of chromosomes in each daughter cell will be —
A) 4 B) 8 C) 16 D) 32

16. In meiosis, the number of chromosomes in the daughter cells is —
A) Same as parent cell B) Half of parent cell C) Double D) Variable

17. Meiosis I is reductional because —
A) Homologous chromosomes separate B) Sister chromatids separate C) DNA replicates D) Crossing over occurs

18. The stage of meiosis where chiasmata are first visible is —
A) Pachytene B) Diplotene C) Diakinesis D) Zygotene

19. The structure responsible for genetic recombination during meiosis is —
A) Synaptonemal complex B) Chromosome C) Centriole D) Spindle

20. The stage of meiosis characterized by terminalization of chiasmata is —
A) Pachytene B) Diplotene C) Diakinesis D) Zygotene

21. The number of chromatids per chromosome after S phase is —
A) One B) Two C) Four D) Eight

22. The mitotic division ensures —
A) Genetic stability B) Genetic variation C) Chromosome reduction D) Genetic mutation

23. Meiosis helps in —
A) Constancy of chromosome number B) Variation in population C) Formation of gametes D) All of these

24. The G_2 phase of cell cycle is characterized by —
A) DNA replication B) Protein synthesis C) Cytokinesis D) Crossing over

25. The spindle fiber is composed of —
A) Microtubules B) Actin filaments C) Collagen fibers D) Chromatin

26. In animal cells, cleavage furrow formation during cytokinesis involves —
A) Microtubules B) Microfilaments C) Intermediate filaments D) None

27. Cell plate formation during cytokinesis occurs due to fusion of —
A) Golgi vesicles B) Ribosomes C) Lysosomes D) Endoplasmic reticulum

28. If there are 10 chromosomes in a meiocyte ($2n = 10$), the number of chromosomes in each gamete would be —
A) 5 B) 10 C) 15 D) 20

29. In mitosis, the daughter cells are —
A) Identical to parent cell B) Different from parent cell C) Haploid D) Genetically variable

30. The centromere plays an important role during —
A) Chromosome movement B) Cytokinesis C) Crossing over D) DNA replication

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31. The chromosomal movement toward opposite poles is due to —
A) Contraction of spindle fibers B) Expansion of cytoplasm C) Repulsion of chromatids D) Movement of centrioles

32. The term "bivalent" indicates —
A) Two homologous chromosomes paired together B) Two chromatids C) Two centromeres D) Two nuclei

33. The nuclear envelope completely disappears in —
A) Late prophase B) Early prophase C) Anaphase D) Telophase

34. The crossing over produces —
A) Mutation B) New gene combinations C) Polyploidy D) Gene deletion

35. The point of contact between non-sister chromatids of homologous chromosomes is called —
A) Chiasma B) Centromere C) Chromomere D) Synapse

36. The main event of anaphase I of meiosis is —
A) Separation of homologous chromosomes B) Separation of chromatids C) Reappearance of nucleolus D) Formation of nuclear membrane

37. The chromosomes that take part in crossing over are —
A) Non-sister chromatids of homologous chromosomes B) Sister chromatids C) Non-homologous chromosomes D) All chromatids

38. If 2n = 46, the number of chromosomes at metaphase I is —
A) 46 B) 23 C) 92 D) 69

39. Chromosome number is restored after fertilization because —
A) Fusion of haploid gametes B) Crossing over C) Independent assortment D) Synapsis

40. In meiosis II, centromeres divide at —
A) Anaphase II B) Anaphase I C) Metaphase II D) Telophase II

41. If a cell fails to undergo cytokinesis after nuclear division, it results in —
A) Multinucleated condition B) Polyploidy C) Haploidy D) Cell death

42. The phase of cell cycle where cell stops division permanently is —
A) G_0 B) G_1 C) G_2 D) S

43. Which cell organelle disappears during mitosis?
A) Nucleolus B) Ribosome C) Golgi apparatus D) Endoplasmic reticulum

44. The spindle fibers shorten during —
A) Anaphase B) Metaphase C) Prophase D) Telophase

45. Which of the following ensures genetic variation in sexually reproducing organisms?
A) Independent assortment B) Crossing over C) Random fertilization D) All of these

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46. A cell at the end of G_2 phase has —
A) Double the amount of DNA as compared to G_1 phase B) Half the DNA C) Same amount of DNA D) No DNA

47. Meiosis takes place only in —
A) Germ cells B) Somatic cells C) Muscle cells D) Nerve cells

48. Mitosis and meiosis differ in that meiosis —
A) Occurs in reproductive cells B) Reduces chromosome number C) Leads to genetic variation D) All of these

49. Which of the following ensures equal distribution of chromosomes during cell division?
A) Spindle apparatus B) Nucleolus C) Ribosomes D) Golgi body

50. In mitosis, the phase that follows metaphase is —
A) Anaphase B) Telophase C) Cytokinesis D) Prophase

✅ Answer Key (Set 3)

1-B, 2-B, 3-A, 4-C, 5-B, 6-B, 7-A, 8-C, 9-D, 10-A,
11-A, 12-B, 13-C, 14-A, 15-B, 16-B, 17-A, 18-B, 19-A, 20-C,
21-B, 22-A, 23-D, 24-B, 25-A, 26-B, 27-A, 28-A, 29-A, 30-A,
31-A, 32-A, 33-A, 34-B, 35-A, 36-A, 37-A, 38-A, 39-A, 40-A,
41-A, 42-A, 43-A, 44-A, 45-D, 46-A, 47-A, 48-D, 49-A, 50-A.