

Chapter: 21

Cell Cycle

MCQs

1. Chromosomal part which uncoils , during interphase is called?
☐ (A) Heterochromatin ☐ (B) Satellite DNA ☐ (C) Chromatids ☒ (D) Euchromatin
2. Nerve cells and eye lens cells remain in stage for life time
☐ (A) G₁ ☐ (B) G₂ ☒ (C) G₀ ☐ (D) S
3. Length of cell cycle in yeast cells is:
☐ (A) 120 minutes ☒ (B) 90 minutes ☐ (C) 60 minutes ☐ (D) 30 minutes
4. Period of non - apparent division is called?
☒ (A) Interphase ☐ (B) Cell cycle ☐ (C) Mitotic phase ☐ (D) Meiosis
5. Post mitotic cell can exit the cell cycle during phase.
☐ (A) S ☒ (B) G - 0 ☐ (C) G - 1 ☐ (D) G - 2
6. The Chromosomes number becomes doubled during.
☐ (A) G₁ - Phase ☐ (B) G₂ - Phase ☒ (C) S - Phase ☐ (D) G₀ - Phase
7. It is the period of extensive metabolic activity.
☐ (A) G₂ - Phase ☒ (B) G₁ - Phase ☐ (C) S - Phase ☐ (D) G₀ - Phase
8. In the case of human cell , cell cycle duration is about.
☐ (A) 23 hours ☒ (B) 24 hours ☐ (C) 22 hours ☐ (D) 21 hours
9. The period of life cycle of cell between two consecutive divisions is termed as:
☐ (A) Resting Phase ☐ (B) G₂ - Phase ☒ (C) Inter Phase ☐ (D) G₁ - Phase
10. In the case of human cell , average cell cycle is about.
☐ (A) 20 hours ☐ (B) 25 hours ☐ (C) 28 hours ☒ (D) 24 hours
11. The centriole lies within the
☐ (A) Karyosome ☒ (B) Centrosome ☐ (C) Chromosome ☐ (D) Nucleosome
12. The microtubules are composed of proteins tubulin and traces of
☐ (A) DNA ☐ (B) NAD ☒ (C) RNA ☐ (D) FAD
13. At cytokinesis in plants , a membrane structure phragmoplast is formed from vesicles which originate from.
☒ (A) Golgi complex ☐ (B) Lysosomes ☐ (C) Endoplasmic reticulum ☐ (D) Centrioles
14. The most critical phase of mitosis , which ensures equal distribution of chromatids in the daughter cells is:
☐ (A) Metaphase ☒ (B) Anaphase ☐ (C) Prophase ☐ (D) Telophase
15. During cell division , the nuclear division is called?.

- (A) Cytokinesis (B) Plasmolysis **(C) Karyokinesis** (D) Diakinesis
16. Chromosomes become double during the phase of Cell Cycle ?
 (A) M - Phase (B) G₁ - Phase **(C) S - Phase** (D) G₂ - Phase
17. The full cell cycle in yeast cells is completed in.
 (A) 24 hours **(B) 90 minutes** (C) 4.5 hours (D) 30 minutes
18. Cell cycle involves.
 (A) Growth of cell (B) Cell division
(C) Growth of cell , replication of DNA cell division (D) Replication of DNA
19. The stage of mitosis at which chromatids separate as independent structures (chromosomes) in the....
 (A) Prophase **(B) Anaphase** (C) Telophase (D) Metaphase
20. The spindle fibers are composed of RNA and protein called?
 (A) Insulin **(B) Tubulin** (C) Actin (D) Myosin
21. The phase of mitosis which ensures equal distribution of chromatids in daughter cell is:
(A) Anaphase (B) Metaphase (C) Prophase (D) Telophase
22. Mitotic apparatus is organized during.
 (A) Metaphase **(B) Prophase** (C) Anaphase (D) Telophase
23. Karyokinesis involves division of
 (A) Cell (B) Cytoplasm (C) Cell membrane **(D) Nucleus**
24. Mitotic apparatus is organized during.
 (A) Telophase (B) Anaphase **(C) Prophase** (D) Metaphase
25. Karyokinesis involves division of
 (A) Fission (B) Sporulation **(C) Conjugation** (D) Budding
26. During cell division the nuclear division is called.
 (A) Cytokinesis **(B) Karyokinesis** (C) Karyotype (D) Plasmolysis
27. Contractile ring in cytokinesis is formed by.
 (A) Tubulin **(B) Actin and Myosin** (C) Keratin (D) Cyclins
28. The microtubule is composed of traces of RNA and protein called.
(A) Tubulin (B) Myosin (C) Troponin (D) Actin
29. Phragmoplast is formed by vesicles originated from
 (A) Chloroplast (B) Mitochondria **(C) Golgi complex** (D) Endoplasmic
30. Each chromosome when visible consists of two unseparated replicas.
 (A) Chiasma (B) Tetrad (C) Homologous chromosomes **(D) Chromatids**
31. The division of whole cell is called?
(A) Cytokinesis (B) Karyokinesis (C) Interphase (D) Kinetochore



32. The spread of tumor cells and establishment of secondary areas of growth is called.
(A) Epistatis (B) Prostasis FSH (C) **Metastasis** (D) Pleiotropy
33. An unwanted clone of cells and establishment of secondary areas of growth is called.
(A) Growth (B) **Tumor** (C) Lump (D) Swelling
34. The tumor which is localized and not transferred to other body parts.
(A) Malignant (B) **Benign** (C) Apoptosis (D) Necrosis
35. Which of the following behaves like normal cells?
(A) Benign tumor (B) **Cancer** (C) Malignant tumor (D) Gall
36. Cancer is caused mainly by mutation in.
(A) Malignant cells (B) **Somatic cells** (C) Sex cells (D) Reproductive cells
37. Cancer is caused by mutation in.
(A) Germ cells (B) Epidermal cells (C) Reproductive cells (D) **Somatic cells**
38. Least number of chiasma are present during.
(A) **Diplotene** (B) Leptotene (C) Diakinesis (D) Pachytene
39. The condensation of chromosomes reaches to its maximum phase during.
(A) Letotene (B) **Diakinesis** (C) Pachytene (D) Zygotene
40. Crossing over during meiosis occurs in stage.
(A) Diplotene (B) **Pachytene** (C) Zygotene (D) Laptotene
41. Meiosis generally takes place in plants during formation of.....
(A) Gametes (B) **Sportes** (C) Zygote (D) Embryo
42. The stage of meiosis that lasts for days , weeks or even years is:
(A) Laptotene (B) **Pachytene** (C) Zygotene (D) Diplotene
43. Each bivalent is consists of four.
(A) Chromosomes (B) Spores (C) Chiasmata (D) **Chromatids**
44. The prophase stage in which the chromosomes becomes visible shorten and thick.
(A) Diplotene (B) Pachytene (C) **Leptotene** (D) Zygotene
45. In which stage of meiosis , the paired chromosomes repel each other and begin to separate.
(A) **Zygotene** (B) Leptotene (C) Pachytene (D) Diplotene
46. Synapsis takes place in.
(A) Diplotene (B) Pachytene (C) Leptotene (D) **Zygotene**
47. Meiosis - II is just like the.
(A) **Mitosis** (B) Amitosis (C) Replacement (D) Regeneration
48. Chiasmata formation takes place during.
(A) **Leptotene** (B) Diakinesis (C) Pachytene (D) Diplotene

49. Meiosis occurs only in.
 (A) Triploid cells (B) Pentaploid cells **(C) Diploid cells** (D) Haploid cells
50. The pairing of homologous chromosomes is completed in.
 (A) Leptotene **(B) Pachytene** (C) Zygotene (D) Diplotene
51. Special type of cell division in which the number of chromosomes in daughter cells is reduced to half as compared to parent cell is called as:
(A) Meiosis (B) Mitosis (C) Parthenogenesis (D) Budding
52. Pairing of homologous chromosomes is called as:
 (A) Synapse (B) Bivalent (C) Tetrad **(D) Synapsis**
53. Pairing of homologous chromosomes for tetrad formation starts at,
 (A) Zygotene (B) Pachytene (C) Diplotene **(D) Leptotene**
54. The autosomal non-disjunction in man in which 21st pair of chromosomes fails to segregate resulting in gamete with 24 chromosomes is called ?
 (A) Klinefelter's syndrome (B) Turner's syndrome
(C) Down's syndrome (D) Jacob's syndrome
55. The syndrome having trisomy at chromosome pair number 21 is:
(A) Down's (B) Tissue culturing (C) Patau's (D) Edward's
56. Individual with Klinefelter's syndrome has sex chromosomes as following.
 (A) XO (B) XXO (C) XXXY **(D) XXY**
57. In non-disjunction chromosomes fail to segregate during.
(A) Anaphase (B) Prophase (C) Metaphase (D) Telophase
58. All are related to Turner's syndrome except.
 (A) Short stature (B) Webbed neck **(C) Broad face** (D) Without ovaries
59. Unequal separation of chromosomes is called?
 (A) Disjunction **(B) Non-disjunction** (C) Separation (D) Metastasis
60. If mother's age is above 45 years, then ratio of Down's syndrome is:
(A) 3/1000 (B) 1/1000 (C) 1/100 (D) 3/100
61. The frequency of occurrence of Down's syndrome is:
(A) 1/40 (B) 1/700 (C) 1/500 (D) 1/200
62. The sex chromosomes of the person affected with Klinefelter's syndrome are:
 (A) SYY (B) XXX **(C) XXY** (D) XY
63. Mongolism is the other name of
 (A) Klinefelter's syndrome (B) Turner's syndrome
(C) Down's syndrome (D) Jacob's syndrome
64. The autosomal non-disjunction in man in which 21 pair of chromosomes fail to segregate resulting in gametes with 24 chromosomes is:

(A) Klinefelter's

(B) Turner's syndrome

(C) Down's syndrome

(D) Jacob's syndrome

65. The pairing of homologous chromosomes is completed in phase of meiosis:

(A) Pachytene

(B) Leptotene

(C) Zygotene

(D) Diplotene

Fill in the blanks.

- Mongolism is also known as
- During homologous chromosomes get close to each other.
- phase precedes G2 phase.
- Polar microtubules during anaphase.
- Mitotic apparatus is formed during of cell division.
- The chromosome number (44+1) denotes Syndrome..
- Intracellular contents are released during the type of cell death called

Answers

1.	Down's Syndrome	2.	Leptotene	3.	S
4.	Elongates	5.	Prophase	6.	Turner's
7.	Necrosis				

Chapter : 21**Cell Cycle Short Questions Answers**1. **Define cell cycle?**

Ans: The cell undergoes a sequence of changes, which involve period of growth, replication of DNA followed by cell division. This sequence of changes is **called cell cycle**.

2. **How much time is required for cell cycle in case of human?**

Ans: In the case of human cell, average cell cycle is about 24 hours.

3. **What do you know about chromatin?**

Ans: Chromatin is a network of very fine threads which can be visualized but using histologic stains of DNA.

4. **In higher plants instead of visible centriole what is present?**

Ans: Higher plants lack visible centrioles, instead they have its analogous region from which the spindle microtubules radiate.

5. **What is metastasis?**

Ans: The cells composing a malignant tumor or cancer, divide more rapidly, mostly invade surrounding tissues, get into the body circulatory system, and set up areas of proliferation, away from their site of original appearance. This spread of tumor cells and establishment of secondary areas of growth is **called metastasis**.

6. **When in plants and animals the meiosis takes place?**

Ans: Meiosis takes place in diploid cells only, in animals at the time of gamete formation, while in plants when spores are produced.

7. **Define crossing over?**

Ans: It is the exchange of segments between non-sister chromatids of homologous chromosomes due to chiasmata formation.

8. **What are the two significant happenings of meiosis?**

Ans: Crossing over and random assortment of chromosomes are two significant happening of meiosis.

9. **How many chromosomes do occur in male affected by Klinefelter's syndrome?**

Ans: Males with 48 chromosomes (44 autosomes + XXXY), with 49 chromosomes (44 autosomes + XXXXY) and male with 47 chromosomes (44 autosomes + XYY) are also observed.

10. **What are symptoms of Turner's syndrome?**

Ans: The affected individuals have one missing X chromosome with only 45 chromosomes (44 autosomes + Y). Individuals have female appearance with short stature, webbed neck, without ovaries and complete absence of germ cells.

11. **What is apoptosis?**

Ans: Internal programme of events and sequence of morphological changes by which cell commits suicide is collectively **called apoptosis** (Greek word that means dropping off or falling off).

12. **Name the different stages of interphase?**

Ans: Interphase can further e divided into G1-phase, S-phase and G2-phase.

13. **What is G1-phase?**

Ans: G1 (Gap 1) is the period of extensive metabolic activity, in which cell normally grows in size, specific enzymes, are synthesized and DNA base units are accumulated for the DNA synthesis.

14. **What is G0?**

Ans: Post-mitotic cell can exit the cell cycle during G1 entering phase called G0, and remain for days, weeks, or in some cases even the life time of the organism without proliferation further.

15. **What is S-phase of cell cycle?**

Ans: Following the G1 is the S-phase (synthesis phase) during which the DNA is synthesized and chromosomes number doubled.

16. **What happens in G2-phase (pre-mitotic phase)?**

Ans: In G2 phase (pre-mitotic phase) the cell prepares for division i.e., energy storage for chromosome movements, mitosis specific proteins, RNA and microtubule subunits (for spindle fibres) synthesis are accomplished.

17. **Define mitosis?**

Ans: It is the type of cell division, which ensures the same number of chromosomes in the daughter cells as that in the parent cells.

18. **What are two conventional phases of Mitosis?**

Ans: Conventional phases of Mitosis:

- ❖ Karyokinesis, which involves the division of nucleus.
- ❖ Cytokinesis that refers to the division of the whole cell.

19. **What is Mitotic apparatus?**

Ans: The specialized micro-tubule structure including aster and spindle is called mitotic apparatus.

20. **Name the microtubules which originate from centrioles?**

Ans: Three sets of microtubules (fibres) originate from each pair of centrioles i.e, astral microtubules, kinetochore microtubules and polar microtubules.

21. **What events occur in Prophase of mitosis?**

Ans: Each chromosome is visible having two sister chromatids, attached at centromere. Towards the end of prophase nuclear envelope disappears and nuclear material is released in the cytoplasm, nucleoli disappear. Mitotic apparatus is organized. Cytoplasm becomes more viscous.

22. **What is kinetochore?**

Ans: The centromere has special area the kinetochore, with specific base arrangement and special proteins where kinetochore fibres of mitotic apparatus attach.

23. **What happens in Telophase of mitosis?**

Ans: The chromosomes decondense, due to unfolding, ultimately disappear as chromatin. Mitotic apparatus disorganize, nuclear membrane and nucleoli reorganize, forming two nuclei at two poles of the cell.

24. **What is Phragmoplast?**

Ans: At cytokinesis, in plants, a membrane structure called phragmoplast is formed from vesicles of Golgi complex. These vesicles line up in the centre of the dividing cell, where they fuse to form phragmoplast at the end of telophase.

25. **Define cancer?**

Ans: Any malignant growth or tumour from an abnormal and uncontrolled division of body cells is known as cancer.

26. **What is Tumour?**

Ans: When such cells produce new cells which continue to proliferation in uncontrolled fashion, an unwanted clone of cells, called Tumour is formed, which can expand indefinitely.

27. **What are two basic types of tumour?**

Ans: **Basic types of tumour:**

- ❖ Benign tumours.
- ❖ Malignant tumours.



28. **What is benign tumours?**

Ans: Benign tumours are of small size and localized (not transferred to other parts) called Benign. The cells in this type usually behave like the normal cells and have little deleterious (harmful) effects.

29. **What is malignant tumour?**

Ans: The cells composing a malignant tumour or cancer, divide more rapidly, mostly invade

surrounding tissues, get into the body's circulatory system, and set up areas of proliferation, away from their site of original appearance.

30. How can you distinguish cancer cells from normal cells?

Ans: Cancer cells can be distinguished from normal cells because they are less differentiated than normal cells, exhibit the characteristics of rapidly growing cells, that is, high nucleus to cytoplasm ratio, prominent nucleoli and many mitosis.

31. What main causes of cancer?

Ans: Cancer is caused mainly by mutations in somatic cells. The cancer results from the accumulation of as few as three to as many as twenty mutations, in genes that regulate cell division.

32. Define meiosis?

Ans: Meiosis is the special type of cell division in which the number of chromosomes in daughter cells reduces to half, as compared to the parent cell.

33. How prophase of meiosis differs from that of mitosis?

Ans: This is very prolonged phase, and differs from the prophase of mitosis, because in this chromosomes behave as homologous pairs. Each diploid cell has two chromosomes of each type, one member from each parent.

34. What are homologous chromosomes?

Ans: The chromosomes which are similar but not necessarily identical are called as homologous chromosomes.

35. Name the sub-stages of prophase I of meiosis?

Ans: Leptotene, zygotene, diplotene and diakinesis.

36. What is synapsis?

Ans: The pairing of homologous chromosomes during zygotene stage is called synapsis.

37. What is bivalent or tetrad?

Ans: Each paired but not fused, complex structure of homologous chromosomes is called as bivalent or tetrad.

38. What is the duration of Pachytene, leptotene and zygotene?

Ans: Pachytene may lasts for days, weeks or even years, whereas leptotene and zygotene can last only for few hours.

39. What is chiasmata?

Ans: The paired homologous chromosomes repel each other and begin to separate but still remain united by their point of interchange which is **called chiasmata**.

40. What happens in Diakinesis?

Ans: The condensation of chromosomes reaches to its maximum. At the same time separation of the homologous chromosomes is completed, but still they are united at one point, more oftenly at ends, Nucleoli disappear.

41. What events occur in metaphase I of meiosis?

Ans: Nuclear membrane disorganize at the beginning of this phase. Spindle fibres originate and the kinetochore fibres attached to the kinetochore of homologous chromosome from each pole and arrange bivalents at the equator.

42. **How does anaphase I of meiosis differs from that of mitosis?**

Ans: In anaphase I of meiosis the sister chromatids are not separated, only homologous chromosomes get separated. while anaphase of mitosis the sister chromatids are separated.

43. **How meiosis maintains chromosome number constant generation after generation?**

Ans: Meiosis usually takes place at the time of sexual cells (gamete) formation, (spore formation in plants) thus reducing the number of chromosomes to half in each, which is restored after fertilization and maintains chromosome number constant generation after generation.

44. **Define non-disjunction?**

Ans: In non-disjunction chromosomes fail to segregate during Anaphase and Telophase and do not finish with equal distribution of chromosome among all the daughter nuclei. This results either increase (or decrease) in the number of chromosomes, causing serious physical, social and mental disorders.

45. **What is autosomal non-disjunction?**

Ans: The non-disjunction in which autosomal chromosomes fail to segregate is **called autosomal non-disjunction.**

46. **What is Down's Syndrome (Mongolism)?**

Ans: It occurs, in man, during which 21st chromosome fails to segregate, resulting gamete with 24 chromosomes. This gamete fertilizes normal gamete the new individual will have 47 ($2n + 1$) chromosomes.

47. **Does Down's syndrome is related to the age of mother?**

Ans: **Yes**, the chances of teenage mother having down's syndrome child is one in many thousands, forty years old mother one in hundred chance and by forty-five the risk is three times greater.

48. **What are apparent symptoms or effects of Down's syndrome?**

Ans: The affected individuals have flat, broad face, squint eyes with the skin fold in the inner corner, and protruding tongue, mental retardation and defective development of central nervous system.

49. **What is sex chromosomal non-disjunction?**

Ans: The non-disjunction in which sex chromosomes fails to segregate is called sex chromosomal non-disjunction.

50. **What is Necrosis?**

Ans: The cell death due to tissue damage is called necrosis, during which the typical cell swells and bursts, releasing the intracellular contents, which can damage neighboring cells and cause inflammation.