Transweb Educational Services Pvt Ltd
B -147, Sector -6 Noida, UP - 201301,
www.askiitians.com
Email: info@askiitians.com
Tel: 1800-2000-838

Class: 11
Subject: Biology
Topic: Cell cycle and Cell division
No. of Questions: 25

Q1. At which stage of meiosis crossing over of genetic material takes place?

Sol. pachytene.

Q2. What is G_o phase?

Sol. A stage when cell cycle is arrested during interphase is called G_o phase

Q3. Name the cell division concerned with cancer?

Sol. Mitosis

Q4. Why is meiosis called reductional division & mitosis called equational division?

Sol. In meiosis, the number of chromosomes is reduced to half so, it is called, reductional division. The gametes are formed in sexually reproducing organisms in germ cell. While in mitosis, number of chromosomes remains constant after division hence, it is called equational division.

Q5. Write three processes which take place in interphase?

Sol. Three processes in interphase:- i) The replication of DNA with the synthesis of histones & nuclear proteins. ii) Division of centriole to new centriole which lie at right to each other. iii) The synthesis of energy- rich compound to provide energy for mitosis.

Q6. Enumerate the significance of mitosis?

Sol. i) The number of chromosomes in mitosis cell division remains constant in daughter cells ii) Asexual reproduction occurs with the help of mitosis. iii) Size of cell is controlled by mitosis. iv) Growth& development of the zygote is maintained through mitosis

Transweb Educational Services Pvt Ltd
B -147, Sector -6 Noida, UP - 201301,
www.askiitians.com
Email: info@askiitians.com
Tel: 1800-2000-838

Q7. Write six differences between mitosis & meiosis?

Sol. MITOSIS

1. Chromosome doubling is followed by separation of daughter chromosomes the cell divides only once.
2. Mitosis occurs in all the somatic cells
3. It is completed in one sequence ofstages
4. Synopsis is absent
5. No crossing over & chaismata formation
6. A cell produces two diploid cells.

MEIOSIS

1. There is doubling of chromosomes once but it is followed by two nuclear divisions. The cell divides twice.
2. It occurs in reproductive or germ cells
3. The whole process completes into twosuccessive divisions
4. Synopsis is present
5. crossing over &chaismata formation occurs
6. A cell produces four haploid cells.

Q8. What are homologous chromosomes? What happens to homologous chromosomes during meiosis?

Sol. Homologous chromosomes are pairs of similar chromosomes having corresponding genes governing the same set of traits. During the heterotypic division of meiosis in leptotene, chromosomes are thread shaped & coiled. During zygotene, the homologous chromosomes start pairing. In pachytene, the chromosomes show thickening & shortening. Diplotene, is marked by cessation of attraction force between two homologous chromosomes uncoiling of homologous chromosomes tends to separate them from each other but remain attached at chiasmata. During diakinesis, the separation of homologous chromosome is complete. Exchange of parts between chromatids of homologous chromosomes may take place. During Anaphase I the centromere of homologous compounds of bivalents repel each other After separation of centromere, the homologous chromosomes begin to move apart. In telophase-I the chromosomes reach poles & become shortened.

Q9. What is mitosis? Give a brief account of mitosis in animal cell?

Sol. Mitosis is an equational cell division in which number of chromosomes in parent & progeny cell remains same. STAGES OF MITOSIS:- 1) PROPHASE:- a) chromosome material condenses to form compact mitotic chromosomes. Chromosomes are seen to be composed of two chromatids attached together at centromere. b) Initiation of assembly of mitotic spindle, the microtubules the protein components of the cell cytoplasm help in the process. 2) METAPHASE:- a) Spindle fibers attach to kinetochores of chromosomes b) Chromosomes are moved to spindle equator & get aligned along metaphase plate through spindle fibers to both poles. 3) ANAPHASE:- a)

Transweb Educational Services Pvt Ltd
B -147, Sector -6 Noida, UP - 201301,
www.askiitians.com
Email: info@askiitians.com
Tel: 1800-2000-838

centromere splits and chromatids separate b) Chromatids move to opposite poles.4) TELOPHASE:- a) Chromosomes cluster at opposite spindle poles & their identity is lost as discrete elements b) Nuclear envelope assembles around the chromosome clusters. c) Nucleolus, Golgi complex & ER reform.

Q10. Name the stage of cell division in which paired homologous chromosomes get shortened & thickened?

Sol. Pachytene.

Q11. Which structure of animal cell forms the asters of spindle?

Sol. Centrosome

Q12. Name the cells in which meiosis occurs?

Sol. Reproductive cells or germ cells.

Q13. What is the importance of chromosomes replication during interphase?

Sol. Interphase is a stage between the successive cell divisions. It is considered as the resting stage of nucleus as it does not show any morphological changes. But physiologically it is a very active stage in the life of a cell as the cell prepares itself for division & many biochemical changes occur during this stage.

Q14. Distinguish between metaphase of mitosis & metaphase I of meiosis?

Sol. METAPHASE OF MITOSIS

1. Each chromosome consist of two chromatids which are held together by centromere
2. The chromosomes line up in one plane to make up the equatorial plate.

METAPHASE OF MEIOSIS: I

1. Homologous chromosomes form bivalent each bivalent consists of four chromatids & two centromeres
2. Bivalents become arranged in the plane of the equator forming equatorial plate.

Q15. How does duration affect the cell cycle in organism?

Sol. The duration depends on type of cell & external factors like temperature, food & oxygen. Time period for G, S, G, & M-phase is species under specific environmental conditions like 20 min. for bacterial cell, 10 hrs for intestinal epithelial cell 20 hrs for onion root tip cell. It shows that time

Transweb Educational Services Pvt Ltd
B -147, Sector -6 Noida, UP - 201301,
www.askiitians.com
Email: info@askiitians.com
Tel: 1800-2000-838

required for every step have been pre-set within cell of organisms.

Q16. What is the significance of meiosis?

Sol. Significance of Meiosis:- a) It reduces number of chromosomes to half in daughter cells.b) It is very essential phenomenon in life cycle of sexually reproducing animals as it restores the fixed number of chromosomes. c) Gametes are formed as a result of meiosis. Each gamete possesses half the number of chromosomes present in somatic cells. d) It avoids the multiplication of chromosomes & thus maintains the stability & constant number of chromosomes of the species. e) During the crossing over, exchange of nuclear material, genetic variations within the species takes place with the result that new combinations of genetic material are formed.

Q17. Differentiate between animal cell mitosis & plant cell mitosis?

Sol. ANIMAL CELL MITOSIS

1. occurs in bone marrow & many epithelia
2. Animal cell becomes spherical before cell division
3. Several hormones induce cell division
4. Centro some present
5. mitotic apparatus contains asters
6. Mid body is formed
7. occurs through cleavage
8. Microfilaments are involved in it
9. Cleavage proceeds centripetally in it

PLANT CELL MITOSIS

1. occurs in meristems
2. Cell shape does not change before division
3. Induced by plant hormone cytokine
4. Centrosome absent
5. mitotic apparatus has no asters
6. Mid body is not formed.
7. Occurs by cell-plate formation
8. Microfilaments are not formed
9. Cell grows centrifugally in it

Q18. Explain the various phases of meiosis II division?

Sol. STAGES OF MELOSIS – II:- i) PROPHASE II:- Meiosis II is initiated immediately after cytokinesis usually before chromosomes have fully elongated. The nuclear membrane disappears by the end of prophase-II. The chromosomes again become compact. ii) METAPHASE-II:- At this stage the chromosomes align at the equator & the microtubules form opposite poles of the spindle get attached to the kinetochores of sister chromatids.iii) ANAPHASE-II:- It begins with the simultaneous splitting of the centromere of each chromosome allowing then to move towards

Transweb Educational Services Pvt Ltd
B -147, Sector -6 Noida, UP - 201301,
www.askiitians.com
Email: info@askiitians.com
Tel: 1800-2000-838

opposite poles of the cell. iv) TELOPHASE-II:- Meiosis ends with telophase-II, in which two groups of chromosomes once again get enclosed by nuclear envelope, cytokinesis follows resulting in the formation of tetrad of cell i.e. four haploid daughter cells.

Q19. What are mitogens?

Sol. Mitogens are chemicals which stimulate mitosis cell division.

Q20. Write one point of difference between chromatin and chromatid.

Sol.

Chromatin	Chromatid
Chromatin is a minute thread-like staining heredity material found in the nucleus of a cell.	Chromatid is defined as a longitudinal half of each chromosome found during prophase.

Q21. Cell division cannot be stopped in which phase of the cell cycle?
(a) G_1-phase
(b) G_2 – phase
(c) S-phase
(d) Prophase

Sol. (c)

Q22. What type of plant is formed when colchicine is used in the process of development of *Raphano brassica*?
(a) Autotetraploid
(b) Haploid
(c) Triploid
(d) Allotetraploid

Sol. (d)

Q23. Synapsis occurs between
(a) mRNA and ribosomes
(b) A male and a female gamete
(c) Two homologous chromosomes
(d) Spindle fibers and centromere

Transweb Educational Services Pvt Ltd
B -147, Sector -6 Noida, UP - 201301,
www.askiitians.com
Email: info@askiitians.com
Tel: 1800-2000-838

Sol. (c)

Q24. If you are provided with root-tips of onion in your class and are asked to count the chromosomes which of the following stages can you most conveniently look into:
(a) Prophase
(b) Anaphase
(c) Telophase
(d) Metaphase

Sol. (d)

Q25. In the somatic cell cycle:
(a) In G_1 phase DNA content is double the amount of DNA present in the original cell
(b) A short interphase is followed by a long mitotic phase
(c) DNA replication takes place in S-phase
(d) G_2 phase follows mitotic phase

Sol. (c)