Board – ICSE	Class – 10	Topic – Structure of Chromosome

I. Short type questions:

1. Name the two kinds of cell division found in living organisms.

Ans.: Meiosis and Mitosis

2. What type of cell division does occur in somatic cells of the body?

Ans.: The mitotic cell division occurs in somatic cells of the body.

3. Where does the meiosis occur in our body?

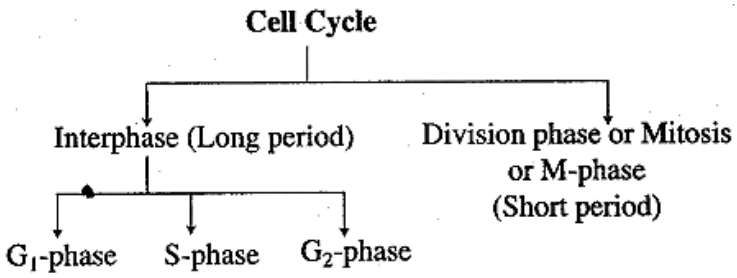
Ans.: In our body meiosis occurs in germ cells i.e. in gonads.

4. What do you mean by cell-cycle?

Ans.: The sequence of events a cell undergoes from the end of one cell division to the end of next cell division is called cell cycle.

5. Write the name of various steps of cell cycle.

Ans.: Cell Cycle



6. Name the structure which initiates cell division?

Ans.: Centriole (Centrosome).

7. Why gametes have a haploid number of chromosomes?

Ans.: The gametes are produced as a result of meiosis hence they have haploid number of chromosomes.

8. Mention three significant changes that occur in a cell during interphase.

Ans.: The three significant changes that occur in a cell during interphase are:

(i) The cell grows in size.

(ii) New DNA is synthesized as per the old DNA templet.

(iii) Synthesis of RNA and protein takes place.

9. What is cytokinesis?

Ans.: Cytokinesis is the division of cytoplasm. During cell division karyokinesis (division of nucleus) is followed by the division of cytoplasm (cytokinesis).

10. Give reason.

1. The mitosis is called equational division.

Ans.: Mitosis is called equational division because during mitosis the cell divides equally into two identical daughter cells.

2. The meiosis is called reductional division.

Ans.: The meiosis is called reductional cell division since four daughter cells are formed having half the number of chromosomes than the parent cell.

11. Differentiate:

1. Mitosis and Meiosis

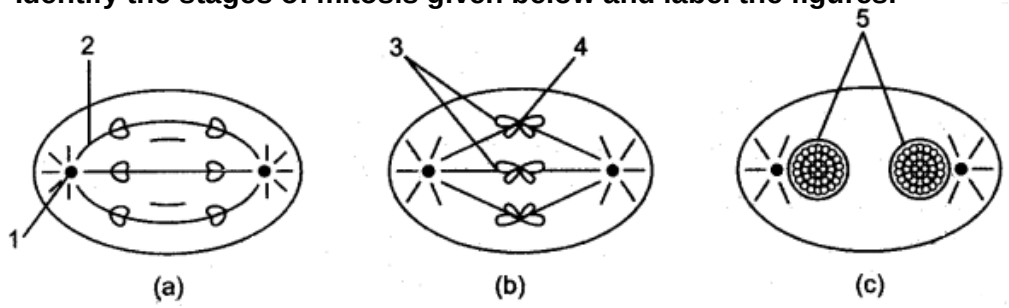
Mitosis	Meiosis
(i) It occurs in somatic cells.	It occurs in reproductive cells.
(ii) It involves a single division resulting into two daughter cells.	It involves two successive divisions resulting in the formation of four daughter cells.
(iii) Prophase is short and simple.	Prophase is of longer duration and complex.
(iv) Number of chromosomes in daughter cells is equal to that of parent cell.	Number of chromosomes in daughter cells is half to that of the parent cells.
(v) Equational division.	Reductional division.
(vi) Mitosis brings about growth, repair and healing.	Meiosis forms gametes and spores and maintains the chromosome number constant from generation to generation.

2. Chromatin and Chromosome.

Chromatin	Chromosome
(i) Uncondensed form of nucleoprotein.	Condensed form of nucleoprotein.
(ii) Seen in interphase stage of cell division.	Seen in M-phase.
(iii) Control of metabolic activities.	Vehicles of heredity.

12. Diagram based questions:

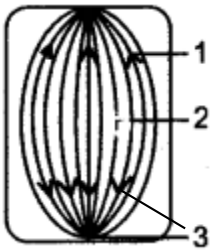
1. Identify the stages of mitosis given below and label the figures.



Ans.:(a) Anaphase, (b) Metaphase, (c) Telophase.

1. Centriole, 2. Spindle fibres, 3.Chromosomes, 4.Centromere. 5. Daughter nuclei.

2. The diagram below represents a certain stage of a cell.



(i) Is it an animal cell or a plant cell? Give one reason in support of your answer.

(ii) Label the parts numbered 1 – 3.

(iii) Which stage (phase) of mitosis is represented in this diagram.

Ans.: (i) It is a plant cell because it has cell wall.

(ii) 1. Chromatids 2.Spindle fibres 3.Centromere

(iii) Anaphase.

3. (i) Draw a neat labeled diagram to show the metaphase stage of mitosis in an animal cell having '6' chromosome.

(ii) How many daughter cells are formed at the end of mitosis and at the end of meiosis?

(iii) With reference to cell division explain the following terms:

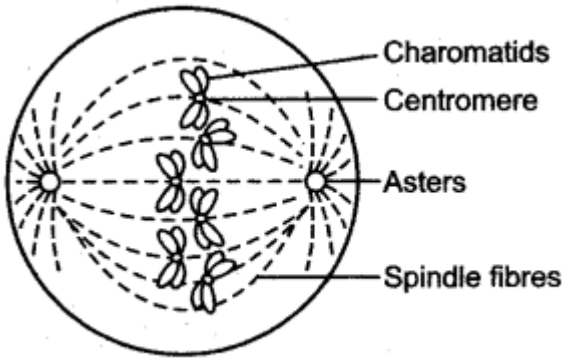
(Chromatid, Centromere, Haploid).

(iv) Name the type of cell division that occurs during:

1. Growth of shoot 2. Formation of pollen grains.

3. Repair of worn out tissues.

Ans.: (i) See diagram.



Metaphase stage in Mitosis

(ii) **Mitosis:** two daughter cells.

Meiosis: four daughter cells.

(iii) **Chromatid:** Duplicated chromosomes consisting of two identical strands; each of these is called a chromatid.

Centromere: It is the point at which the two chromatids remain attached. It is also the point of attachment for spindles.

Haploid: A cell having only one set of chromosome is called haploid.

(v) 1. Mitosis

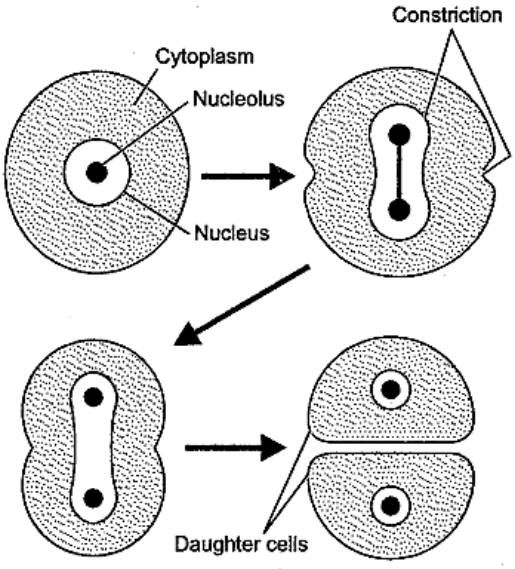
2. Meiosis

3. Mitosis

13. Sketch and label the diagram:

a. Draw a labeled schematic representation of mitosis cell division.

Ans.:



Process of amitosis

14. Name the following:

a. The process by which cell divides into two equal daughter cells.

b. The two kinds of cell division found in living organisms.

c. Mitosis takes place in which cells.

d. Replacement of dead cells is accomplished by which process.

e. The kind of division normally seen at the tip of root and shoot system.

f. Chromosomes arranged at equator.

Ans.: 1. Mitotic Cell division

2. Mitosis, Meiosis

3. Somatic cells

4. Mitosis

5.Mitosis

6. Metaphase

15. Give Technical terms:

a. The stage in mitosis when the nucleolus starts disappearing.

b. The stage at which spindle fibres begin to be formed.

c. The shortest phase of mitosis.

d. The stage when sister chromosomes separate from their paired condition.

e. The period between two successive mitotic divisions.

f. Point at which two sister chromatids are held together.

g. The stage at which chromosomes reach the opposite poles.

Ans.: 1. Prophase

2. Late prophase or early Metaphase

3.Anaphase

4.Anaphase

5.Interphase

6.Centromere

7. Anaphase

16. Multiple Choice questions:

a. Cytokinesis is the division of:

(a) Cell (b) Cytoplasm

(c) Cell wall (d) Nucleus

Ans.: Cytoplasm

b. Karyokinesis is the division of:

(a) Cytoplasm (b) Nucleus

(c) Cell wall (d) Pollen grains

Ans.: Nucleus

c. Cell division occurring in somatic cells is:

(a) Mitosis (b) Meiosis

(c) Diplotene (d) Diakinesis

Ans.: Mitosis

d. In meiosis four daughter cells are produced by two successive divisions in which:

(a) First division is equational and second is reductional

(b) First division is reductional and second is equational

(c) Both divisions are reductional

(d) Both divisions are equational.

Ans.: First division is reductional and second is equational

e. Duplication of DNA occurs in:

(a) G_1-phase (b) G_2-phase

(c) S-phase (d) M-phase

Ans.: S-phase

f. The nuclear membrane disappears in:

(a) Prophase (b) Anaphase

(c) Zygotene (d) Pachytene

Ans.: Prophase.