

Value-based Questions (VBQs):

3 Answer the following questions in 80 - 100 words each:

- (a) Despite all obstacles, hindrance and misery, life goes on. Elaborate your view on this topic with reference to the poem 'The Brook'.

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B.Sc - Sem - IV

(Period - 1)
ZOOLOGY HONS

CELL DIVISION

Dept of Zoology (1)

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The phenomenon of division of one mother parent cell into two or four daughter cells is called cell division. It is first time reported by Dr. Naegeli in 1842. In 1858 Dr. Rudolph Virchow described that "omnis cellula a cellula" (A cell is made by other cell). Finally it is described by Dr. E. Strasburger in 1875. Cell division may be of three types: —

(A) MITOSIS CELL DIVISION (B) MEIOSIS CELL DIVISION AND (C) AMITOSIS CELL DIVISION.

(A) MITOSIS CELL DIVISION

"Mitosis is a type of cell division in which one parent cell gives rise to the production of two daughter cells and in daughter cells, the number of chromosomes is maintained as that of parent cell."

(2n) Mitosis Cell division

(2n)

(2n)

1 Parent cell

2 Daughter cells.

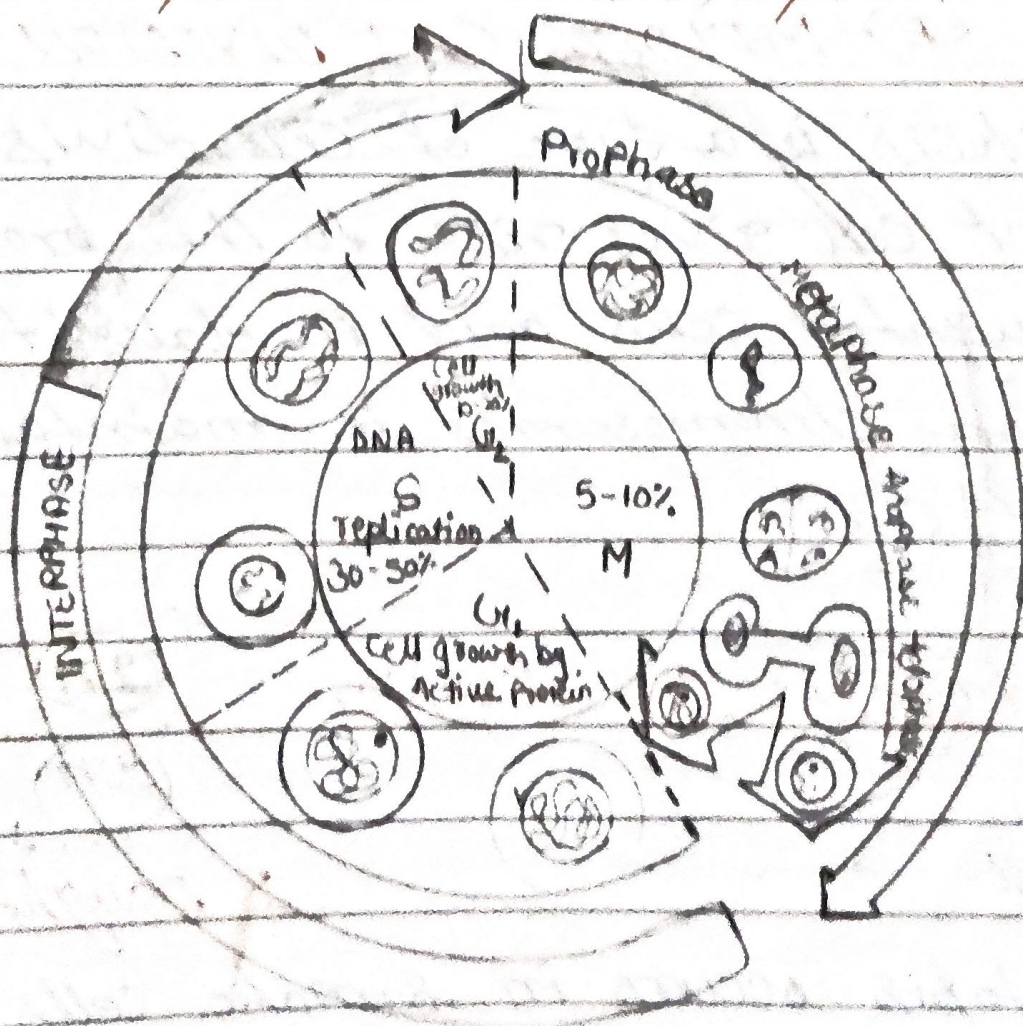
Mitosis occurs in somatic cells, hence it

- (b) Whereas humans are stuck in the vicious circle of life and death, nature remains immortal and eternal. Explain this in the context of the poem, "The Brook".

is also called "somatic cell division." it is ¹first time described by Dr. Flemming in 1879 in animal cell and the term "mitosis" is given by him in 1880.

CELL CYCLE: — The period from the end of one division of a cell to the end of next division is called cell cycle. In normal Eukaryotic cell, its duration may be 10-30 hours. The entire phenomenon of cell cycle may be divided into two phases: —

- (A) Growth phase or Interphase or Resting stage (10-30 hours);
- (B) Division phase or mitosis phase (30 min - 1 hr)



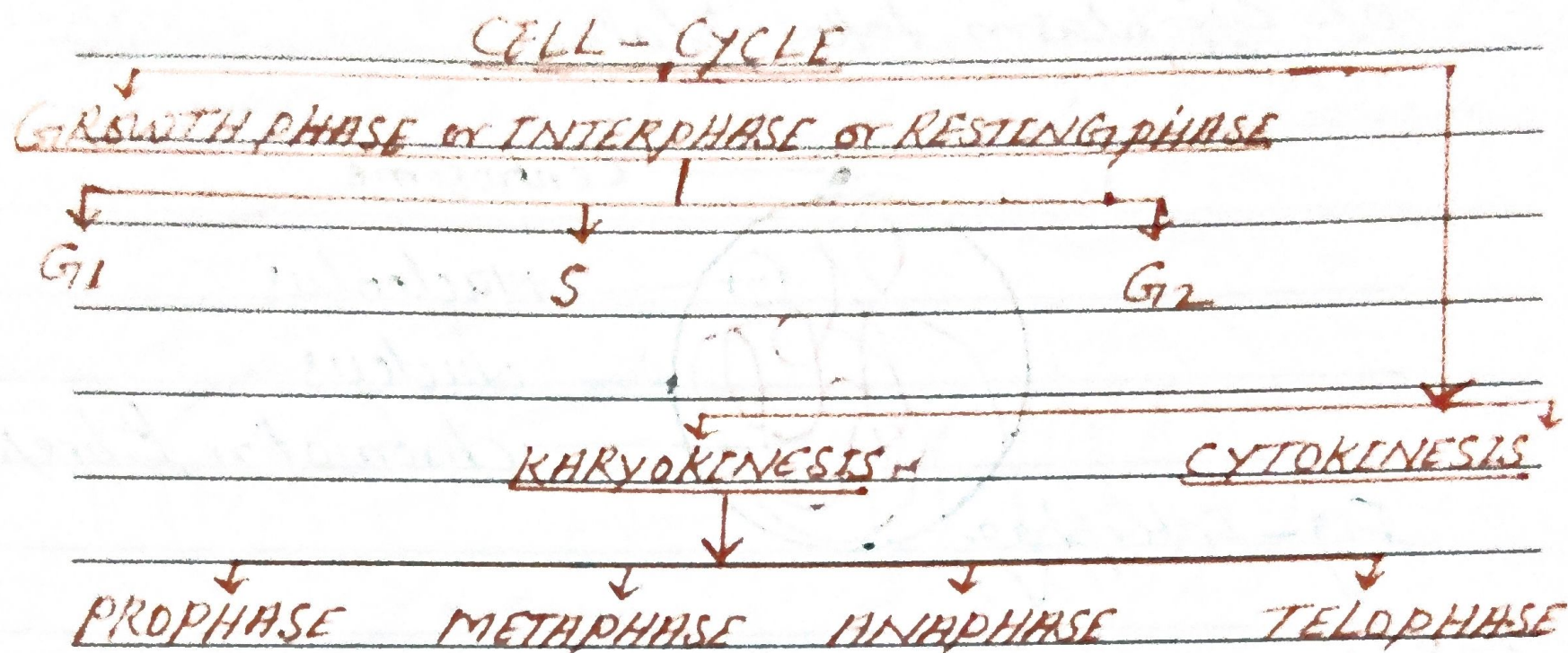
Value-based Questions (VBQs):

3. Answer the following questions in 80 – 100 words each:

(4)

- (a) Do you agree with the decision of Harold's parents to keep Mr. Bramble's profession as a secret? Why or why not? Justify your answer.

3



- (A) INTERPHASE - It is longest and complicated stage of cell cycle.
- (ii) In this stage much hydration is present in cell.
- (iii) Nucleus becomes more prominent.
- (iv) Chromosome appear in the form of chromatin network.

on the basis of internal change, interphase may be divided into three stages:—

- (a) G₁ (First Gap period):— In this period, growth of cell takes place, synthesis of RNA and protein occurs. But synthesis of DNA can not take place.
- (b) S (Synthesis period):— In this period, replication

- (b) The present world is experiencing a loss of dignity of labour due to the recent trend of background and profession. Discuss about this social issue with reference to the story, 'Keeping it from Harold'.

or duplication of DNA occurs.
(4) G₂ (Second Gap Period): — In this period, Growth of cytoplasm takes place.

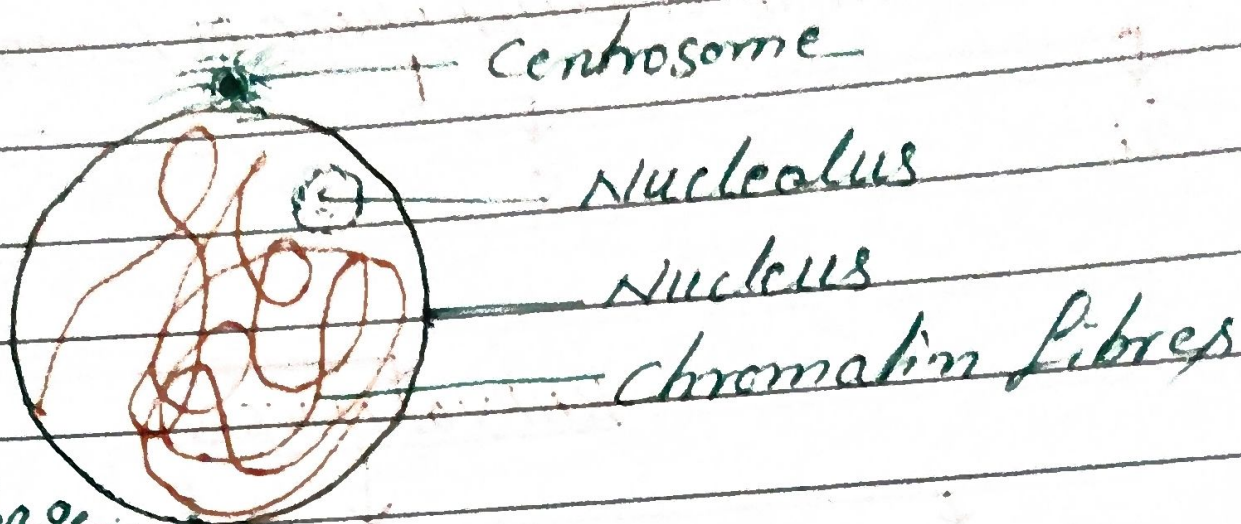


Fig - Interphase

(B) DIVISION PHASE or MITOSIS PHASE: —

This phase of Cell Cycle may be divided into two stages: —

KARYOKINESIS: — In this stage, division of nucleus occurs it may be divided into four phases: — (1) Prophase (2) Metaphase

(3) Anaphase (4) Telophase.

(1) PROPHASE: — (a) In this stage, due to dehydration, chromosomes are clearly visible in the form of elongated, uncoiled, single stranded filamentous thread like structure.

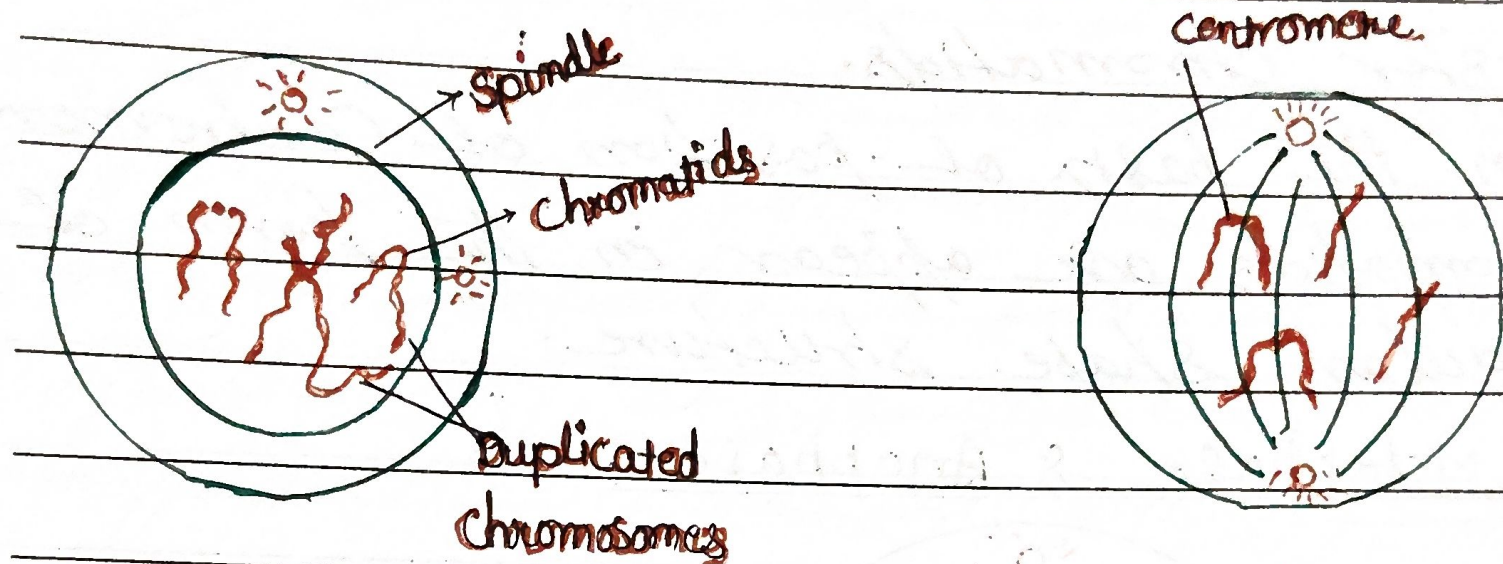
(b) After sometimes due to coiling, double stranded nature of chromosome is poorly visible.

Answer the following questions in 80 – 100 words each:

(4)

(a) Corporal Turnbull punished Private Quelch for intruding and contradicting him. Do you think Private Quelch deserved this punishment? Why or why not?

(c) In late stage, nuclear membrane starts disappearing and each chromosome splitted vertically but attached at the position of Centromere.



<2> METAPHASE: — (a) In this stage, nuclear membrane and nucleolus disappeared.

(b) Chromosome are arranged at the equatorial plate of cell called metaphase plate.

(c) Some Spindle fibres are develop from opposite pole (in plant cell) or Centrosomes (in animal cell), which attached with Centromere. But some fibres continuous with fibres of other end.

<3> ANAPHASE: — (a) Due to contraction of spindle fibres, each chromosome is splitted at the position of Centromeres.

- (b) With the kind of knowledge and intellect that Quelch had, he could have easily achieved his dream. What do you think made him lose his respect and his post? Other than knowledge and ambition, what other values play an important role in gaining success?

As a result two sister chromatids are formed.

- (b) Due to Contraction of Spindle fibres, sister chromatids move towards opposite pole of cell.
(c) Some interzonal fibres are developed between sister chromatids.
(d) on the basis of position of Centromere, chromatids appear in the form of angular shape structure.

Fig of Metaphase & Anaphase

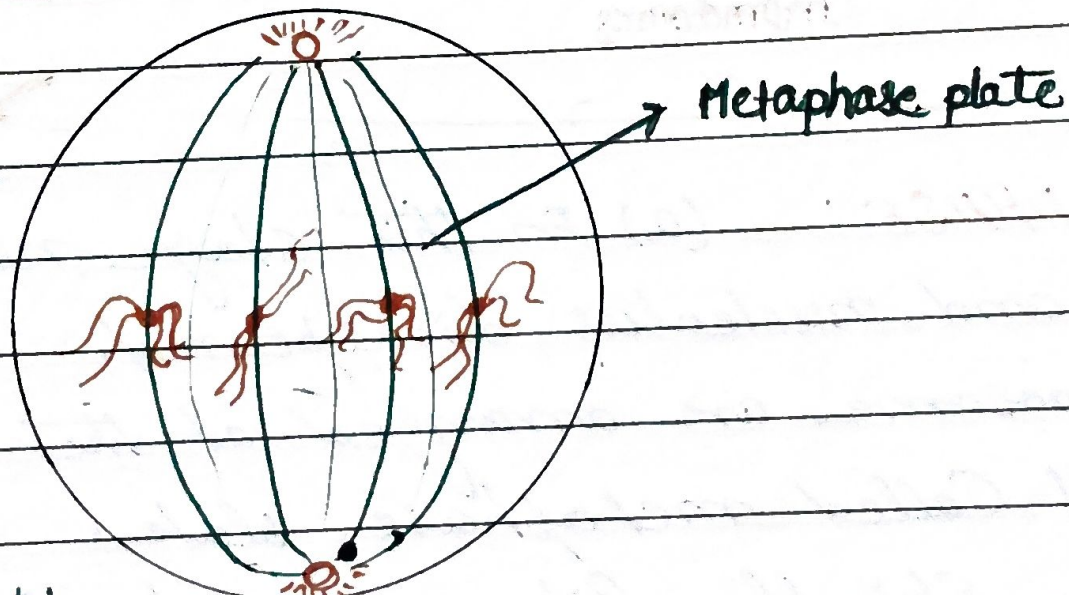
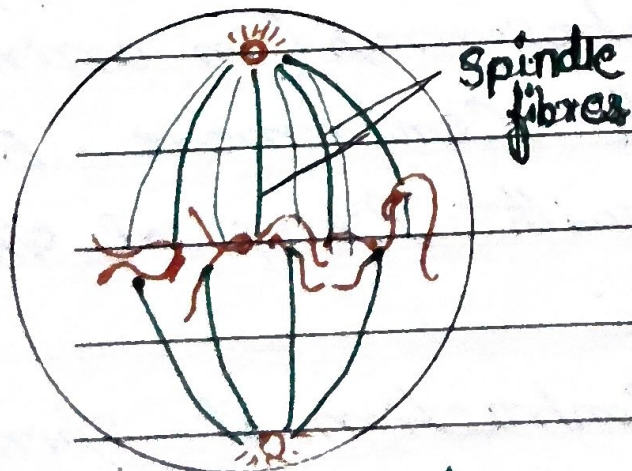
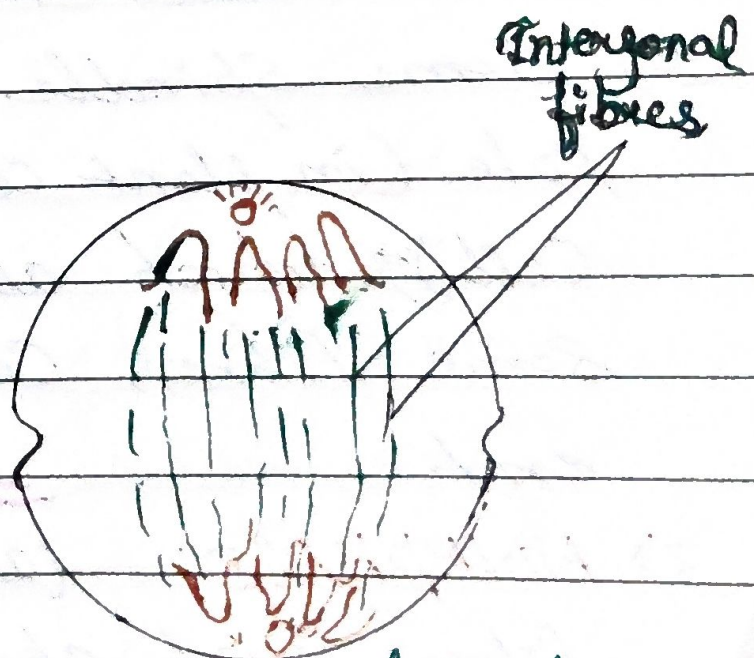


Fig: - Metaphase (a) (a)



(b) Early Anaphase



(c) Late Anaphase

Fig: - Anaphase (b & c).

3. Answer the following questions in 80 – 100 words each:

- (a) The poet took a bold decision of choosing the less explored road. Do you agree with his decision? What path would you have opted for if you were in his place and why?

(4) TELOPHASE: — (a) In this stage, due to contraction of spindle and relaxation of interzonal fibres, sister chromatids reach at opposite pole of cell.

(b) Nuclear membrane and nucleolus reappears.

(c) In early stage, chromosomes are clearly visible but at later stage it loses its shape.

(d) In this way, at the end of telophase, two daughter nuclei are formed.

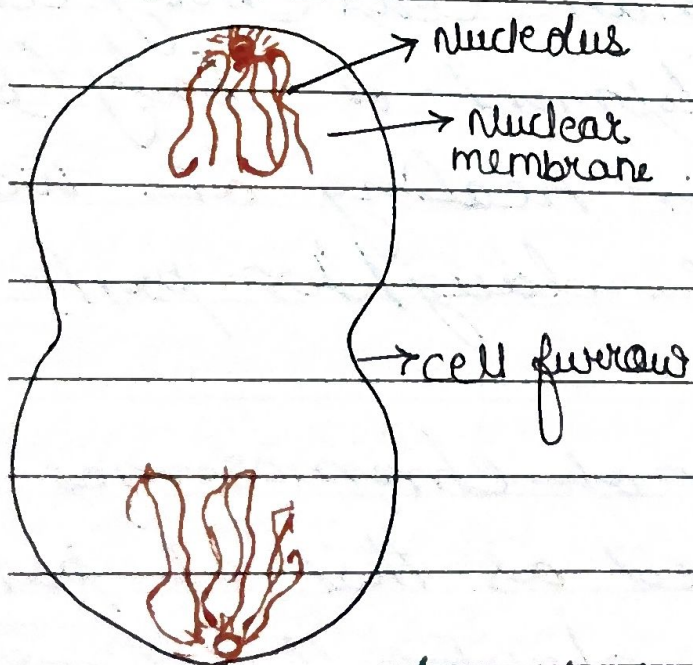


Fig: (a) Early Telophase.

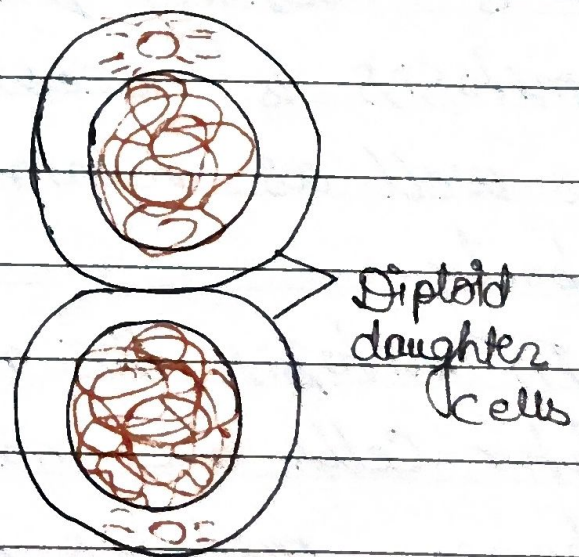


Fig: (b) Late Telophase.

Fig: — (a) & (b) Telophase (Early & late Telophase)

CYTOKINESIS: — The phenomenon of formation of two cells is called cytokinesis. In animal cells

- (b) Social conventions often force us to go by the rules and tread the beaten path. Taking an unconventional route requires immense inner strength and conviction as it is accompanied by a constant fear of failure. What are the factors that affect such decisions? Discuss about this topic with reference to the poem, "The Road not taken".

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after karyokinesis, cell develop at the position of metaphase plate which constricted in middle and hence two daughter cells are formed in plant cell. Firstly some drops of Calcium pectate and magnesium pectate are deposited between two daughter nuclei which very soon fuse together and form cell plate b/w two daughter nuclei, hence two daughter cells are formed.

- (a) mitosis occurs in somatic cells (body cells), hence it is necessary for development of body (soma).
- (b) mitosis is necessary for healing of wounds as well as repairing of daughter part of body.
- (c) In mitosis, the number of chromosomes in daughter cells are maintained as that of parent cells. hence, mitosis brings about the constancy of chromosome number in body cells of same organism.

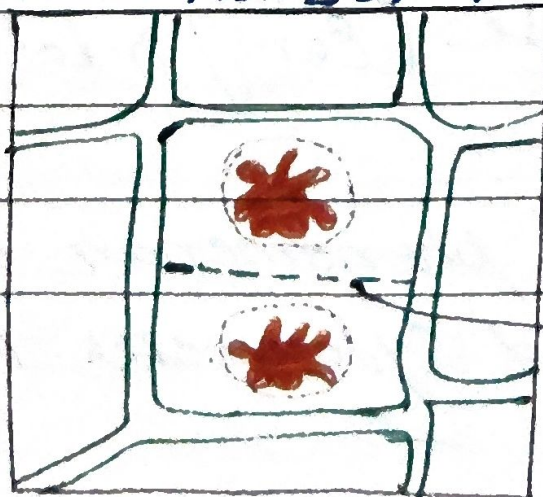


Fig- Cytokinesis
in plant cell