



# BIOLOGY

## BOOKS - MBD

### Cell Cycle and Cell Division

#### Example

1. Define cell reproduction.



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2. Name two processes involved in cell cycle.



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3. What is interphase?



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4. Name three phases of interphase.



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5. Give the phase of DNA replication in interphase.



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6. What is  $G_0$  ?



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7. Name the two parts of cell cycle.



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8. List any two events which occur during  $G_2$  - phase.



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9. During which phase of interphase duplication of mitochondria and plastids occur?



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10. Give the term for nuclear division and cytoplasmic division.



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11. Give an example of anastral type of mitosis.



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12. What is amphiastral mitosis?



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**13.** In which phase of cell division the chromosomes are set free in the cytoplasm?



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**14.** Name the phase of cell division in which the centromeres line up at the equator of the spindle.



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**15.** Why is mitosis called equational division?



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**16.** Who gave the term mitosis?



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**17.** What is kinetochore? What is its function?



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**18.** Name the phase of mitosis of longest and shortest duration.



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**19.** Name two types of spindle fibres.



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**20.** What is peculiar about metaphase of mitosis?



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21. Where do mitosis and meiosis occur in animals and plants?



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22. Name the stage of meiosis in which the paired homologous chromosomes get shortened and thickened.



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**23. What is a diplosome?**



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**24. What is nature of daughter cell produced by meiosis?**



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**25. Who gave the term meiosis?**



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**26.** Give the site of occurrence of meiosis.



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**27.** Define crossing over. What is its significance?



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**28.** What is peculiar about Metaphase -I of meiosis?



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**29.** Why is Meiosis-I called heterotypical division?



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**30.** What is the role of asters in cell division?



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**31.** Mention the relationship between cell plate and middle lamella in plant cells.



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**32.** What is interkinesis?



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**33.** Give difference in the attachment of chromosomes to the spindle fibres in mitosis

and meiosis-I.



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**34.** What is a synaptonemal complex?



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**35.** Define

synapsis



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**36. Define**

synaptonemal complex.



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**37. When does nucleolus reappear during mitosis?**



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**38.** Fill in the blanks:

$G_1$  phase is followed by .....phase.



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**39.** Fill in the blanks:

Cell division that occurs without the formation of spindle is called .....



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**40.** Fill in the blanks:

Anastral mitosis occurs in .....



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**41.** Fill in the blanks:

Metaphase plate is formed by .....



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**42.** Fill in the blanks:

A chromosome with equal arms is called  
.....



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**43.** Fill in the blanks:

.....is the failure of the two sister  
chromatides to separate in mitosis.



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**44.** Fill in the blanks:

Pairing of homologous chromosomes is called.....



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**45.** True or False

Meiosis occurs in all kinds of cell.



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#### 46. True or False

The cells that undergo meiosis are called meiocytes.



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#### 47. True or False

The regions of attachment of chromosome to spindle fibre is called centromere.



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#### 48. True or False

In meiosis haploid condition is achieved by anaphase I stage.



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#### 49. True or False

Mitosis results in cells having half the number of chromosomes.



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### 50. True or False

The second division of meiosis is described as equational.



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### 51. True or False

DNA synthesis occurs during S-phase.



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**52. True or False**

Chiasmata are first observed in pachytene.



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**53. Coin one word for each of following statements:**

Process of inducing mitosis in a cell.



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**54.** Coin one word for each of following statements:

A stage in the early prophase I when leptotene chromosomes converge towards the centrioles in many animals.



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**55.** Coin one word for the following statement:  
Period between two successive division.



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**56.** Coin one word for the following statement:

Interphase stage when cell grows and prepares for division.



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**57.** Coin one word for each of following statements:

The type of separation during nuclear division.



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**58.** Coin one word for each of following statements:

Disc like structure present around centrome.



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**59.** What is the average cell cycle span for a mammalian cell?



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**60.** Distinguish cytokinesis from karyokinesis.



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**61.** Describe the events taking place during interphase.



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**62.** What is  $G_0$  (qiescent phase) of cell cycle?



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**63.** Why is mitosis called equational division?



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**64.** Name the stage of cycle at which one of the following events occur:

Chromosomes are moved to spindle equator.



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**65.** Name the stage of cell cycle at which one of the following events occur: Centromere splits and chromatids separate.



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**66.** Name the stage of cell cycle at which one of the following events occur: Pairing between homologous chromosomes takes place.



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**67.** Name the stage of cell cycle at which one of the following events occur: Crossing over between homologous chromosomes takes place.



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**68.** Describe the following : Draw a diagram to illustrate your answer: synapsis



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**69.** Describe the following briefly

bivalent

Draw a diagram to illustrate your answer.



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**70.** Describe the following briefly

chiasmata

Draw a diagram to illustrate your answer.



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**71.** How does cytokinesis in plant cells differ from that in animal cells?



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**72.** Find out where the four daughter cells from meiosis are equal in size and where they are found unequal in size.



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**73.** Distinguish anaphase of mitosis from anaphase I of meiosis.



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**74.** List the main differences between mitosis and meiosis.



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**75.** What is the significance of meiosis?



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**76.** Discuss with your teacher about: haploid insects and lower plants where cell-division occurs.



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**77.** Discuss with your teacher about: some haploid cells in higher plants where cell-division does not occur.





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**78.** Can there be mitosis without DNA replication in 'S' phase?



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**79.** Can there be DNA replication without cell division?



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**80.** Analyse the events during every stage of cell cycle and notice how the following two parameters change: number of chromosomes (N) per cell



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**81.** Analyse the events during every stage of cell cycle and notice how the following two parameters change: amount of DNA content (C) per cell



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**82.** Between a prokaryote and a eukaryote, which cell has a shorter cell division time?



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**83.** Which of the phases of cell cycle is of longest duration?



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**84.** Name a stain commonly used to colour chromosomes.



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**85.** Which tissue of animals and plants exhibits meiosis?



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**86.** Given that the average duplication time of E.coli is 20 minutes. How much time will two E.coli cells take to become 32 cells?



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**87.** Which part of the human body should one use to demonstrate stages in mitosis?



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**88.** What attributes does a chromatid require to be classified as a chromosome?



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**89.** The diagram shows a bivalent at prophase -I of meiosis. Which of the four chromatids can cross over?



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**90.** If a tissue has at a given time 1024 cells, how many cycles of mitosis had the original parental single cell undergone?



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**91.** An anther has 1200 pollen grains. How many pollen mother cells must have been there to produce them?



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**92.** At what stage of cell cycle does DNA synthesis take place?



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**93.** It is said that the one cycle of cell division in human cells (eukaryotic cells) takes 24 hours. Which phase of the cycle, do you think occupies the maximum part of cell cycle?



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**94.** It is observed that heart cells do not exhibit cell division. Such cells do not divide further and exit .....phase to enter an inactive stage called .....of cell cycle. Fill in the blanks.



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**95.** In which phase of meiosis are the following formed

Synaptonemal complex .....



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**96.** In which phase of meiosis are the following formed? Choose the answers from hint points given:

Recombination nodules.....



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**97.** In which phase of meiosis are the following formed? Choose the answers from hint points given:

Appearance/ activation of enzyme  
recombinase.....



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**98.** In which phase of meiosis are the following  
formed? Choose the answers from hint points  
given:

Termination of chiasmata .....



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**99.** In which phase of meiosis are the following formed? Choose the answers from hint points given:

interkinesis .....



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**100.** In which phase of meiosis are the following formed? Choose the answers from hint points given:

Formation of dyad of cells .....





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**101.** State the role of centriole other than spindle formation.



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**102.** Mitochondria and plastids have their own DNA (genetic material). What is known about their fate during nuclear division like mitosis?



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**103.** A cell has 32 chromosomes. It undergoes mitotic division. What will be the chromosome number ( $N$ ) during metaphase? What would be the DNA content ( $C$ ) during anaphase?



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**104.** While examining the mitotic stage in a tissue, one finds some cells with 16 chromosomes and some with 32 chromosomes. What possible reasons could



you assign to this difference in chromosome number. Do you think cells with 16 chromosomes could have arisen from cells with 32 chromosomes or vice versa?



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**105.** The following events occur during the various phases of the cell cycle. Name the phase against each of the events.

Disintegration of nuclear membrane.....



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**106.** The following events occur during the various phases of the cell cycle. Name the phase against each of the events.

Apperance of nucleolus .....



**Watch Video Solution**

**107.** The following events occur during the various phases of the cell cycle. Name the phase against each of the events.

Division of centromere .....



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**108.** The following events occur during the various phases of the cell cycle. Name the phase against each of the events.

Replication of DNA .....



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**109.** Mitosis results in producing two cells which are similar to each other . What would

be the consequence if each of the following irregularities occur during mitosis?

Nuclear membrane fails to disintegrate



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**110.** Mitosis results in producing two cells which are similar to each other . What would be the consequence if each of the following irregularities occur during mitosis?

Duplication of DNA does not occur



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**111.** Mitosis results in producing two cells which are similar to each other . What would be the consequence if each of the following irregularities occur during mitosis?

Centromeres do not divide



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**112.** Mitosis results in producing two cells which are similar to each other . What would be the consequence if each of the following

irregularities occur during mitosis?

Cytokinesis does not occur.



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**113.** Both unicellular and multicellular organisms undergo mitosis. What are the differences, if any, observed in the process between the two?



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**114.** Name the pathological condition when uncontrolled cell division occurs.



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**115.** Two events take place, During S-phase in animal cells. DNA replication and duplication of centriole. In which parts of the cell do events occurs?



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**116.** Comment of the statement Meiosis enables the conservation of specific chromosome number of each species even though the process per se, results in reduction of chromosome number.



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**117.** How does cytokinesis in plant cells differ from that in animal cells?



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**118.** Comment on the statement 'Telophase is reverse of prophase'.



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**119.** What are the various stages of meiotic prophase-I? Enumerate the chromosomal events during each stage?



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**120.** Differentiate between events of mitosis and meiosis.



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**121.** Write briefly the significance of mitosis and meiosis in multicellular organism.



**Watch Video Solution**

**122.** Name the phases of cell cycle.



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**123.** What is the  $G_1$  phase of the interphase?



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**124.** Name the following scientists who:

studied the equational cell division in animal cell and introduced the term mitosis.



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**125.** Name the following scientists who:

First described mitosis.



**Watch Video Solution**

**126.** Name the following scientists who:

Coined the term meiosis.



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**127.** Which phase follows the S-phase in the cell cycle?



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**128.** In which phase the centromeres split and chromstids move apart?



**Watch Video Solution**

**129.** In which phase crossing over occurs?



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**130.** What term is used for a full set of DNA instructions in a cell?



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**131.** In which phase of cell division the chromosomes are set free in the cytoplasm?



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**132.** By which method cytokinesis occurs in animal cell?



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**133.** Write an example of amphias-tral spindle and an anastral spindle.



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**134.** What is polyteny?





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**135.** What is the significance of pachytene?



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**136.** How many chromosomes are present in the nucleus of the human cell?



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**137.** At what stage of mitosis, chromosomes arrange themselves around the equator?



**Watch Video Solution**

**138.** What a karyokinesis?



**Watch Video Solution**

**139.** What is cytokinesis?



**Watch Video Solution**

**140.** Name the parts of flowering plant where meiosis occurs.



**Watch Video Solution**

**141.** Define chiasmata.



**Watch Video Solution**

**142.** In which phase of interphase, DNA replication occurs?



**Watch Video Solution**

**143.** Which type of cell division occurs in meristematic cells of root apex?



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**144.** What is Genome? How many genomes are there in the haploid and in a diploid cell?



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**145.** What initiates cell division?



**Watch Video Solution**

**146.** Define the cell cycle and illustrate with sketch only.



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**147.** What is S-phase?



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**148.** Show the centrosome cycle with the help of diagrams only.



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**149.** Explain the importance of cell cycle.



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**150.** Describe the unusual method of somatic cell division.



**Watch Video Solution**

**151.** What is Mitosis?



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**152.** Give the sequence of the events occurring during prophase of mitosis.



**Watch Video Solution**

**153.** Give the key features of meiosis.



**Watch Video Solution**

**154.** Give a brief account of meiosis.



**Watch Video Solution**

**155.** What is cytokinesis?



**Watch Video Solution**

**156.** Write a note on crossing over.



**Watch Video Solution**



**157.** Differentiate between

Karyokinesis and cytokinesis.



**Watch Video Solution**

**158.** Differentiate between

Interphase and prophase.



**Watch Video Solution**

**159.** Distinguish between metaphase of mitosis and metaphase I of meiosis.



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**160.** Draw diagram to show the sequence of changes occurring in a cell during meiosis II.



**Watch Video Solution**

**161.** Explain cytokinesis with the help of sketches only.



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**162.** Why is meiosis called the reductional division, whereas mitosis is called equational division?



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**163.** Name the forces which help in chromosomal movement during cell division.



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## Exercise

**1.** What is the average cell cycle span for a mammalian cell?



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2. Name three phases of interphase.



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3. Which part of the human body should one use to demonstrate stages in mitosis?



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4. Which phase of cell cycle is longest duration?



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5. Name a stain commonly used to colour chromosomes.



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6. Distinguish anaphase of mitosis from anaphase I of meiosis.



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7. Draw a diagrammatic view to show cell cycle.



**Watch Video Solution**

8. What is importance of cell cycle?



**Watch Video Solution**

9. Write significance of mitosis.



**Watch Video Solution**

10. Differentiate cytokinesis in plants and animals?



**Watch Video Solution**

11. Explain mitosis briefly.



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12. What is meiosis? Write significance of meiosis.



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**13. Differentiate mitosis and meiosis.**



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