



BIOLOGY

BOOKS - PEARSON IIT JEE

FOUNDATION

CELL DIVISION AND CELL CYCLE

Quick Recap

1. Is duration of cell cycle same for all cells?

Explain by giving suitable examples.



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2. Mention the differences between mitosis and meiosis.



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3. Distinguish between the mitotic cell division in plant cell and that in animal cell.



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4. How are gametes produced in haploid organisms?



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Test Your Concepts Fill In The Blanks

1. The phase that occupies maximum part of cell cycle is _____ .



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2. Splitting of centromeres is observed in _____ stage of mitosis cell division.



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3. The cells that undergo meiosis are known as _____.



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4. In animal cells, meiotic cell division occurs during _____ formation.



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5. The pair of synapsed homologous chromosomes is known as _____ .



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6. Mitosis takes place in somatic cells and _____ takes place in _____ cells.



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7. The X-shaped structures formed in diplotene stage are known as _____ .



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8. Diploid cells are formed at the end of _____ .



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9. At the end of meiosis-I, two _____ cells are formed.



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10. The process in which cytoplasm undergoes division in cytokinesis in an animal cell is called _____ .



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11. Daughter chromosomes reach their poles in the _____ stage of the cell division.



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12. Spindle fibres disappear in _____ phase of meiosis-I



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13. _____ is the most appropriate stage to count the number of chromosomes.



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14. Meiotic division of a diploid germ cell results in the formation of daughter _____ cells.



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Test Your Concepts Select The Correct Alternatives

1. Crossing over takes place in which stage of meiosis?

A. Diplotene

B. Leptotene

C. Pachytene

D. Zygotene

Answer: C





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2. In which phase of a cell cycle does the DNA replication take place?

A. Prophase

B. S phase

C. G1 phase

D. G2 phase

Answer: B



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3. Which of the following stages is associated with quiescent stage?

A. Cell undergoes division

B. Cell stops division

C. Formation of homologous chromosomes

D. DNA content of cell increases

Answer: B



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4. In which phase of meiosis-I does the process of disjunction take place?

A. Prophase

B. Metaphase

C. Anaphase

D. Telophase

Answer: C



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5. Identify the first activity that takes place in the metaphase of a cell division

A. Spread of chromosomes throughout the cytoplasm

B. Formation of kinetochore

C. Complete breakdown of nuclear membrane

D. All the above activities take place simultaneously

Answer: C



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6. Which of the following occurs in anaphase stage of cell division?

- A. Formation of dyads
- B. Formation of spindle fibres
- C. Disappearance of spindle fibres
- D. Reappearance of nucleolus

Answer: A



7. Which of the following is true at the end of the mitotic cell division process regarding chromosome number?

A. Chromosome number in a daughter cell is less than that in the parent cell.

B. Chromosome number in a daughter cell is less than or equal to that in the parent cell.

C. Chromosome number in a daughter cell is equal to that in the parent cell.

D. Chromosome number in a daughter cell is greater than or equal to that in the parent cell.

Answer: C



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8. Identify the number of chromosomes in human germ cell.

A. 23

B. 46

C. 92

D. 23 in males and 46 in females

Answer: B



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9. Which stage of mitosis cell division bears V-shaped chromosomes?

A. Prophase

B. Anaphase

C. Metaphase

D. Telophase

Answer: B



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10. Identify the cell which does not undergo meiosis.

A. Bacterial cell

B. Plant cell

C. Animal cell

D. Fungal cell

Answer: A



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11. Identify the location in which exchange of genetic material occurs in the process of crossing over.

A. Chromatids and non-homologous chromosomes.

B. Sister chromatids of the homologous chromosomes.

C. Non-sister chromatids of the homologous chromosomes.

D. Between chromosomes.

Answer: C



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12. In which of the following aspects, meiosis-II differs from mitotic cell division?

- A. Meiosis-II involves crossing over
- B. Meiosis-II is not followed by cytokinesis
- C. Meiosis-II gives rise to four daughter cells from one parent cell.

D. Meiosis-II is not preceded by interphase.

Answer: D



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13. How many daughter cells are formed after meiotic cell division from five mother cells?

A. 40

B. 10

C. 30

D. 20

Answer: D



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14. Identify (i) and (ii) in the following chart?

Parent

cell

→ 2 Daughter cells → 4 Daughter cells
(i) (ii)

A. (i) = $2n$, (ii) = n

B. (i) = n , (ii) = n

C. (i) = n , (ii) = $2n$

D. (i) = $2n$, (ii) = $2n$

Answer: B



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15. Which of the following is correct about bivalent?

(i) Bivalents are tetrads.

(ii) A bivalent means 4 chromatids and 2 centromeres.

(iii) One bivalent consists of 2 homologous chromosomes.

(iv) Bivalents form in zygotene.

A. (i) (ii) (iii) and (iv)

B. (ii) only

C. (iii) and (iv)

D. (iv) only

Answer: B



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16. Identify the correct sequence of cell cycle.

A. $G2 \rightarrow M \rightarrow G1 \rightarrow S$.

B. $S \rightarrow G2 \rightarrow M \rightarrow G1$

C. $G1 \rightarrow S \rightarrow G2 \rightarrow M$

D. $M \rightarrow G1 \rightarrow S \rightarrow S2$

Answer: C



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17. Which is the most appropriate stage to count the number of chromosomes?

A. Prophase

B. Interphase

C. Metaphase

D. Telophase

Answer: C



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Mastering The Concepts Knowledge And Understanding

1. Mention the stages included in a cell cycle.



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2. Give technical terms for the following.

Division which brings about vegetative propagation.



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3. Give technical terms for the following.

The stage in which bivalents are formed.



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4. Give technical terms for the following.

The process during which meiosis occurs in human beings.



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5. Give technical terms for the following.

Points at which two sister chromatids are held together.



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6. Give technical terms for the following.

The process of division of cytoplasm.



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7. Give technical terms for the following.

Proteins and RNA synthesis takes place in this stage.



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8. What are the changes occurring during ana phase of mitotic cell division?



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9. Write short notes on the following.

Synapsis



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10. Write short notes on the following.

Bivalent



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11. Write short notes on the following.

Chiasmata



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12. How are spindle fibres formed during cell division? What is their importance?



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13. All the somatic cells in the body of an individual have exactly identical DNA. Why?



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14. Mitosis helps in cellular regeneration. Give reason.



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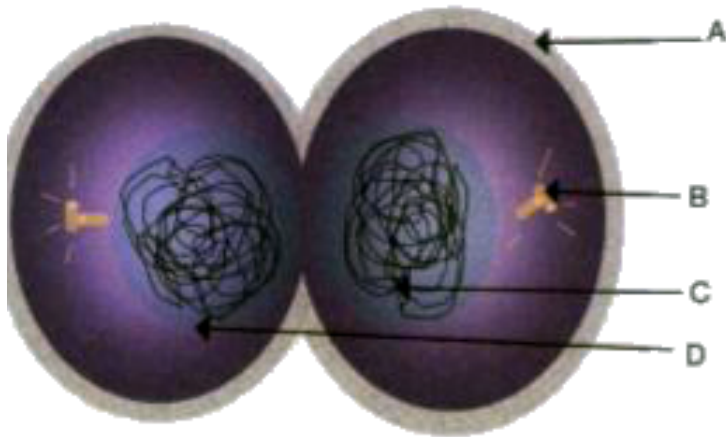
15. Why is mitosis known as equatorial division while meiosis is known as reduction division?



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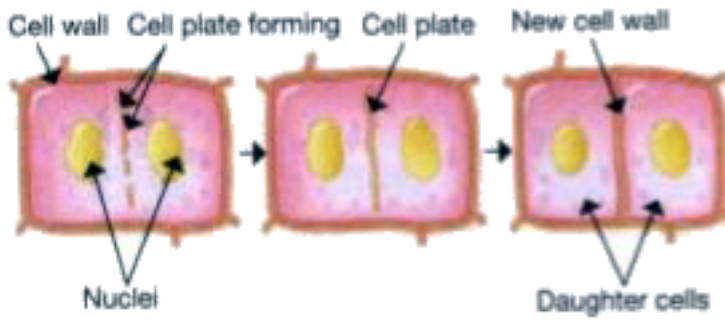
16. Mention the phase of mitosis that is shown in the below figure and label the parts A, B, C and D. Mention the changes taking place in

the given phase.



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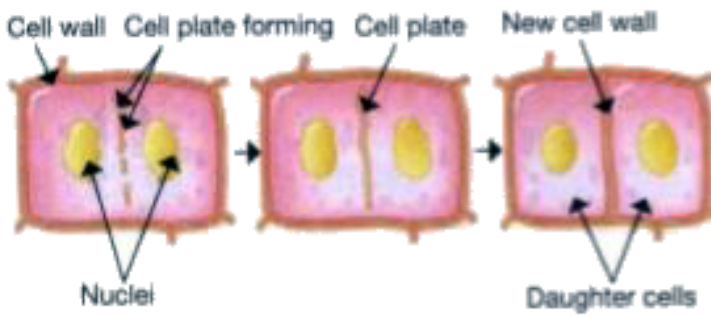
17. Observe the figure and answer the questions that follow.



Name whether this type of cell division takes place in plants or animals and why?

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18. Observe the figure and answer the questions that follow.



Name and explain the phase of cell division that is shown.

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19. Identify the odd one out and justify.

G1 phase, Anaphase, G2 phase, S phase.

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20. Identify the odd one out and justify.

Leptotene, Diakinesis, Zygotene, Cytokinesis



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Mastering The Concepts Application And Analysis

1. Interphase was once considered as resting phase during the cell cycle though it covers almost 95% of time during the entire cell cycle.

Comment on the statement.



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2. Give importance of mitosis in embryo development.



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3. Haploid cells also undergo mitotic cell division. Give reason.



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4. Quiescent stage is the inactive stage. Justify.



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5. Brain damage caused due to disease or trauma is permanent. Give reason.



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6. Is the DNA sequence of the gametes same as the DNA of the germ cell? Give reason in

support of your answer.



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7. Which kind of cell division leads to cancer?

Explain.



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8. After the removal of cancerous tumor by surgical procedure, the organ is treated with chemotherapy or radiotherapy. Explain the

reason with reference to the concept of cell cycle



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Mastering The Concepts Assertions And Reasons

1. Assertion (A): Inactive stage in the cell cycle is quiescent stage.

Reason (R): All the cells pass through quiescent stage.

A. Both A and R are true and R is the correct explanation for A.

B. Both A and R are true, but R is not the correct explanation for A.

C. A is true and R is false.

D. A is false and R is true.

Answer:



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2. Assertion (A): All the cell organelles are seen until the end of prophase.

Reason (R): Chromatids separate but remain in the centre of the cell in anaphase.

A. Both A and R are true and R is the correct explanation for A.

B. Both A and R are true, but R is not the correct explanation for A.

C. A is true and R is false.

D. A is false and R is true.

Answer:



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3. Assertion (A): Haploid cells are formed by meiosis cell division.

Reason (R): Gametes are haploid cells.

A. Both A and R are true and R is the correct explanation for A.

B. Both A and R are true, but R is not the correct explanation for A.

C. A is true and R is false.

D. A is false and R is true.

Answer:



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4. Assertion (A): Recombination and crossing over take place in meiosis I.

Reason (R): In the process of meiosis two stages of DNA replication take place.

- A. Both A and R are true and R is the correct explanation for A.
- B. Both A and R are true, but R is not the correct explanation for A.
- C. A is true and R is false.
- D. A is false and R is true.

Answer:



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5. Assertion (A): Crossing over takes place between two homologous chromosomes.

Reason (R): Crossing over is the exchange of chromosomal fragments between homologous chromosomes.

A. Both A and R are true and R is the correct explanation for A.

B. Both A and R are true, but R is not the correct explanation for A.

C. A is true and R is false.

D. A is false and R is true.

Answer:



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6. Assertion (A): Gametes formed from the same individual have exactly identical DNA.

Reason (R): Homologous chromosomes are formed by DNA replication.

A. Both A and R are true and R is the correct explanation for A.

B. Both A and R are true, but R is not the correct explanation for A.

C. A is true and R is false.

D. A is false and R is true.

Answer:



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7. Assertion (A): The cell division in a plant cell is called an astral division.

Reason (R): Cytokinesis in plant cell takes place by the formation of cell plate.

A. Both A and R are true and R is the correct explanation for A.

B. Both A and R are true, but R is not the correct explanation for A.

C. A is true and R is false.

D. A is false and R is true.

Answer:



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8. Assertion (A): All the cells in an individual possess same DNA.

Reason (R): DNA replication involves complementary base pairing.

A. Both A and R are true and R is the correct explanation for A.

B. Both A and R are true, but R is not the correct explanation for A.

C. A is true and R is false.

D. A is false and R is true.

Answer:



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9. Assertion(A): Mitotic cell division is referred to as homotypic division.

Reason (R): Mitotic cell division retains the number of chromosomes.

A. Both A and R are true and R is the correct explanation for A.

B. Both A and R are true, but R is not the correct explanation for A.

C. A is true and R is false.

D. A is false and R is true.

Answer:



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10. Assertion (A): Karyokinesis is the significant stage in cell division.

Reason (R): Crossing over takes place during karyokinesis.

A. Both A and R are true and R is the correct explanation for A.

B. Both A and R are true, but R is not the correct explanation for A.

C. A is true and R is false.

D. A is false and R is true.

Answer:



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11. Assertion (A): Chromosome number is maintained constant at the end of S phase.

Reason (R): S phase does not involve crossing over phenomenon.

A. Both A and R are true and R is the correct explanation for A.

B. Both A and R are true, but R is not the correct explanation for A.

C. A is true and R is false.

D. A is false and R is true.

Answer:



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Assessment Tests Fill In The Blanks

1. _____ is the basic structural, functional and hereditary unit of all living organisms.



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2. _____ is also referred to as ribosome factory.



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3. DNA is a part of _____ in nucleus.



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4. Adenine and Guanine are called _____
bases.



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5. The membrane by which vacuoles are bound
is _____.



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6. Thymine and Cytosine are called _____ bases.



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7. The kind of structure of a DNA is _____ .



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8. The number of sets of chromosomes in a cell is _____ .



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9. The pair of chromosomes that are similar in structure is called _____ chromosomes.



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10. The life span of human WBC is approximately



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Assessment Tests Select The Correct Alternatives

1. Asexual reproduction takes place by the division of:

A. nucleus only

B. cytoplasm only

C. both nucleus and cytoplasm

D. none of these

Answer: C



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2. In which of the following does direct cell division take place?

A. Horse

B. Bacteria

C. Hydra

D. Monkey

Answer: B



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3. Pairing of homologous chromosomes is known as _____

A. synapsis

B. terminalization

C. fertilization

D. gametization

Answer: A



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4. Which of the cell organelles do not contribute to the greenery of a plant?

(A) Leucoplasts

(B) Chromoplasts

(C) Chloroplasts

A. Only A

B. Both A and B

C. Both B and C

D. Both A and C

Answer: C



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5. Choose among the given correct pairing of nitrogen bases in a DNA.

- (A) Adenine with Guanine
- (B) Adenine with Thymine
- (C) Adenine with Cytosine
- (D) Thymine with Guanine
- (E) Guanine with Cytosine
- (F) Thymine with Cytosine

A. A, and D

B. A, and C

C. Both B and E

D. Both B and D

Answer: C



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6. A cell that comprises two kinds of chromosomes is called _____ .

A. Diploid

B. Haploid

C. Polyploid

D. Biploid

Answer: A



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7. Chromatids of the same chromosome are called _____ chromatids.

A. Synchronous

B. Sister

C. Secondary

D. Primary

Answer: B



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8. Identify the actual dividing phase of mitotic cell division.

A. S phase

B. G1 phase

C. G2 phase

D. M phase

Answer: D



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9. Division of centromere and chromatids takes place between which stages of mitotic cell division?

A. Prophase and metaphase.

B. Metaphase and anaphase.

C. Anaphase and telophase.

D. Telophase and prophase.

Answer: B



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10. The order of phases in mitosis is

A. Metaphase, Prophase, Anaphase and
Telophase

B. Prophase, Metaphase, Telophase,
Anaphase

C. Prophase, Metaphase, Anaphase,
Telophase

D. Anaphase, Prophase, Metaphase,
Telophase

Answer: C



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Assessment Tests

1. Check if the given statement is correct or not, if found incorrect rewrite the correct statement.

The number of chromosomes depends on the size of the organism.



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2. Check if the given statement is correct or not, if found incorrect rewrite the correct

statement.

Autosomes in human cells determine the sex of the human.



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3. Find the odd. term out giving reasons.

Mitochondria, Endoplasmic reticulum,
Chromoplast, Ribosomes



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4. Find the odd. term out giving reasons.

Endoplasmic reticulum, Chloroplast,
Chromoplast, Leucoplast



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5. Find the odd. term out giving reasons.

Chromatin fibre, Ribosome, Mitochondria,
Vacuoles



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6. Write the missing correlated terms.

RNA → Single helix: DNA → _____



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7. Write the missing correlated terms.

Diploid : $2n$:: _____ :: Haploid



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8. Write the missing correlated terms.

Karyokinesis: Nuclear division :: Cytokinesis :



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Assessment Tests Answer The Following Questions

1. What is cell differentiation?



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2. What is a nucleosome?



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