



BIOLOGY

BOOKS - EVERGREEN BIOLOGY

(ENGLISH)

STRUCTURE OF CHROMOSOMES , CELL CYCLE AND CELL DIVISION

Choose The Correct Answer

1. Which statement is true of both chromosomes and genes?

A. Each codes for a specific protein.

B. Each may be copied and passed on in mitosis.

C. Each may be either dominant or recessive.

D. Each may exist as two or more alleles.

Answer: B



2. Which of these structures, involved in cell division, is present in animal cells but not higher plant cells?

A. Centriole

B. Centromere

C. Chromatid

D. Chromosome

Answer: A



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3. At which stage in mitosis and meiosis do chromosomes always line up at the equator of the spindle?

A. Prophase

B. Telophase

C. Anaphase

D. Metaphase

Answer: D



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4. Spindle fibres play an important role in mitosis and meiosis. Which biological molecule are spindle fibres composed of?

A. Polysaccharide

B. Protein

C. nucleic acid

D. Lipid

Answer: B



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5. How many mitotic divisions of a meristematic cell in a root tip are needed to produce 256 daughter cells?

A. 8

B. 16

C. 32

D. 64

Answer: A



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6. Abnormal and uncontrolled mitosis in an organ will result in:

A. New organ

B. Zygote

C. Cancer

D. gamete

Answer: C



7. A cell has five pairs of chromosomes. After mitotic division, the number of chromosomes in the daughter cells will be:

- A. Five
- B. Ten
- C. Twenty
- D. Forty

Answer: B



8. The major event that occurs during the anaphase of mitosis, which brings about the equal distribution of chromosomes, is:

- A. Splitting of the centromeres
- B. Splitting of the chromatids
- C. Replication of the genetic material
- D. Condensation of the chromatin

Answer: A



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9. Which phase comes between G_1 and G_2 phase?

A. G_0 phase

B. M-phase

C. S-phase

D. Interphase

Answer: C



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10. Equatorial plane is formed in:

A. Anaphase

B. Metaphase

C. Telophase

D. Interphase

Answer: B



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11. What defines a diploid nucleus?

A. A nucleus containing two unpaired chromosomes.

B. A nucleus with two alternative forms of a gene.

C. A nucleus with two separate threads of DNA.

D. A nucleus containing two sets of chromosomes.

Answer: D



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12. How does a haploid nucleus differ from a diploid nucleus of the same species?

- A. It has different genes.
- B. It has fewer chromosomes.
- C. It has more alleles.
- D. It is the result of fertilisation.

Answer: B



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13. What is produced when a cell undergoes mitosis once?

A. Four new cells which are different from each other and from their parent cell.

B. Four new cells which are identical to each other and to their parent cell.

C. Two new cells which are different from each other and from their parent cell

D. Two new cells which are identical to each other and to their parent cell.

Answer: D



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14. When a cell divides, these events occur.

(i) The DNA inside the cell is duplicated exactly.

(ii) Daughter cells are produced with the same

chromosome number as the parent cell. Which type of division has occurred?

A. Meiosis producing genetically different cells.

B. Meiosis producing genetically identical cells.

C. Mitosis producing genetically different cells.

D. Mitosis producing genetically identical cells.

Answer: D



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15. Some features of cell division are listed.

- (i) Haploid cells are produced
- (ii) New cells are genetically identical
- (iii) Reduction division
- (iv) Results in variation

Which features would be associated with meiosis?

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

B. (i),(ii) and (iv)

C. (i),(iii) and (iv)

D. (ii),(iii) and (iv)

Answer: C



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16. Which of the following descriptions of mitosis is/are correct?

(i) DNA synthesis occurs at the beginning of

prophase.

(ii) The nuclear envelope breaks down in prophase and reforms in telophase.

(iii) The division of centromeres occurs in anaphase.

A. 1,2 and 3

B. Only 1 and 2

C. Only 2 and 3

D. Only 1

Answer: C



17. Which of the following is incorrect regarding structure of DNA?

(i) Nucleotide is composed of pentose sugar, nitrogenous bases and phosphate group.

(ii) Adenine pairs with Thymine and Guanine pairs with Cytosine.

(iii) $A=T$, $C=G$

(iv) DNA strand winds around the nucleosome, which consists of eight pairs of histone

proteins.

(v) Genes are the fundamental unit of DNA.

A. (ii) and (iii) only

B. (i),(ii), (v) only

C. (iii) and (iv) only

D. None of them

Answer: C



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18. Cell division by meiosis of a parent cell with 23 pairs of chromosomes will result in:

A. 2 cells, each with 23 pairs of chromosomes.

B. 2 cells, each with 23 single chromosomes.

C. 4 cells, each with 23 pairs of chromosomes.

D. 4 cells, each with 23 single chromosomes.

Answer: D



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19. What is not a function of meiosis?

- A. Producing genetically different cells
- B. Producing nuclei in ovules
- C. Producing sperm cells

D. Repairing damaged tissues

Answer: D



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20. 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

Answer: D



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21. Which of the following cellular structures always disappears during mitosis and meiosis?

A. Plasma membrane

B. Nucleolus and nuclear envelope

C. Plastids

D. None of these

Answer: B



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22. The stage in which daughter chromosomes move toward the poles of the spindle is:

A. Anaphase

B. Metaphase

C. Prophase

D. Telophase

Answer: A



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23. Which statement describes human cells formed by meiosis?

- A. They are genetically identical and they become gametes.
- B. They are genetically identical and they become tissues.
- C. They are not genetically identical and they become gametes.
- D. They are not genetically identical and they become tissues.

Answer: C



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24. Which of the events listed below is not observed during mitosis?

A. Chromatin condensation

B. Movement of centrioles to opposite poles

C. Appearance of chromosomes with two chromatids joined together at the centromere.

D. Crossing over

Answer: D



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25. Identify the wrong statement about meiosis:

- A. Pairing of homologous chromosomes.
- B. Four haploid cells are formed.
- C. At the end of meiosis the number of chromosomes are reduced to half.

D. Two cycle of DNA replication occurs.

Answer: D



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26. Select the correct statement about G_1 phase:

A. Cell is metabolically inactive

B. DNA in the cell does not replicate

C. It is not a phase of synthesis of macromolecules

D. Cell stops growing

Answer: B



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27. Which kind of cell division taking place in each of the following options is incorrect?

A. At the tip of the root : Mitosis

B. To produce pollen grains : Meiosis

C. To add girth to the stem: Mitosis

D. To produce egg: Mitosis

Answer: D



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28. The following features are shown by the dividing cell in a stage of mitosis: the nuclear membrane reappears, spindle fibres disappear,

chromatids become thin, daughter nuclei are formed. Which stage is being discussed here?

- A. Prophase
- B. Metaphase
- C. Anaphase
- D. Telophase

Answer: D



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1. Explain the Chromosomes

A. Thread-like structure found in DNA that carry genetic information of an organism in the form of genes.

B. Ring-like structure found in RNA that carry genetic information of an organism in the form of genes.

C. Thread-like structure found in both DNA and RNA that carry genetic information

of an organism in the form of genes.

D. Thread-like structure found in RNA that carry genetic information of an organism in the form of genes.

Answer: A



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2. Explain the Centromeres

A. It is a part of nucleus through which chromosomes are linked.

B. It is a part of chromosome through which chromatids are linked.

C. It is a part of DNA through which chromatids are linked.

D. It is a part of RNA through which chromosomes are linked.

Answer: B



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3. Explain the Mitosis

A. A process of cell replication during which one cell gives rise to two non-identical daughter cells.

B. A process of fission of cell during which one cell gives rise to three genetically identical daughter cells.

C. A process of nuclear division during which one cell gives rise to two genetically identical daughter cells.

D. A process of cell division during which one cell gives rise to four genetically identical daughter cells.

Answer: C



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4. Explain the Meiosis

A. A process where a single cell divides twice to produce four cells containing half the original amount of genetic information.

B. A process where a nucleus divides twice to produce four cells containing the original amount of genetic information

C. A process where a cell divides thrice to produce four cells containing half the original amount of genetic information

D. A process where a DNA divides twice to produce eight cells containing half the original amount of genetic information,

Answer: A



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5. Explain the Gene

A. Physical and functional unit of heredity

that carries DNA material from one generation to the next.

B. Physical and functional unit of heredity

that carries chromosomes from one generation to the next.

C. Physical and functional unit of heredity

that carries gametes from one

generation to the next.

D. Physical and functional unit of heredity

that carries genetic information from

one generation to the next.

Answer: D



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6. State the exact location of the Spindle fibres

A. Between the two centrioles

B. Between the two centrosomes

C. Between chromatid and centromere

D. Between two centromeres

Answer: A



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7. State the exact location of the Chromosomes

A. In the cytoplasm of plant and animal cell.

B. In the centrosome of plant and animal cell.

C. In the RNA of plant and animal cell.

D. In the nucleus of plant and animal cell.

Answer: D



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8. State the exact location of the Cytoplasm

A. Inside the cell between the nucleolus and the centromere

B. Inside the cell between the nucleus and the cell membrane

C. Inside the cell between the mitochondria and the cell membrane.

D. Inside the cell near to the cell membrane

Answer: B



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9. State the exact location of the Nucleus

A. Centre of the cytoplasm

B. Between the cell membrane and cytoplasm

C. Equator of the cell

D. Between nucleolus and cell membrane

Answer: A



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10. State the exact location of the Ribosomes

A. Scattered inside the cell

B. Scattered inside the plasma membrane

C. Scattered inside the nucleus

D. Scattered in the cytoplasm

Answer: D



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11. State the function of the Genes

A. Help in carrying gametes

B. Encode fats and lipids

C. Encode particular protein

D. Help in DNA replication

Answer: C



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12. State the function of the Chromosomes

A. The carriers of heredity

B. The controlling centre of the cell

C. The site for various chemical reactions

D. Intracellular digestion

Answer: A



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13. State the function of the Spindle Fibres

A. Helps to divide the nucleus equally in the daughter cells from the parent cell.

B. Helps to divide the cytoplasm in the daughter cells from the parent cell.

C. Helps to divide the chromosome equally in the daughter cells from the parent cell.

D. Helps to divide the centrosome equally in the daughter cells from the parent cell.

Answer: C



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14. State the function of the DNA

- A. Controls functioning of RNA
- B. Controls biosynthetic processes of cell.
- C. Stores all of the genetic information
- D. Controls mitotic and meiotic division.

Answer: C



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15. State the function of the Golgi Apparatus

A. Synthesis of respiratory enzymes

B. Synthesis and secretion of enzymes,
hormones etc.

C. Synthesis of protein

D. Regulates cell function

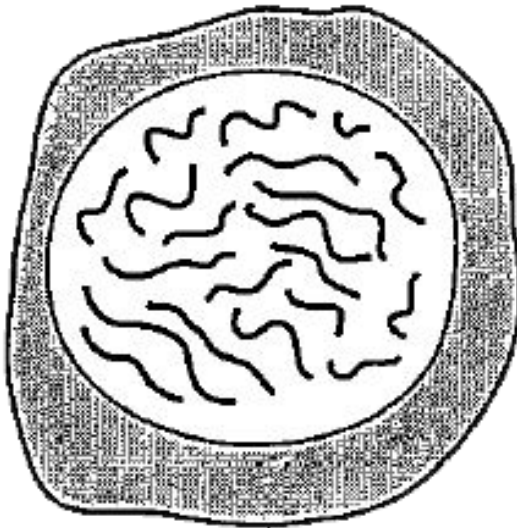
Answer: B



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Diagram Based Questions

1. The diagram shows a cell of an organism formed by reduction division. The nucleus contains 20 chromosomes. What is the diploid number for this organism?



A. 10

B. 20

C. 40

D. 46

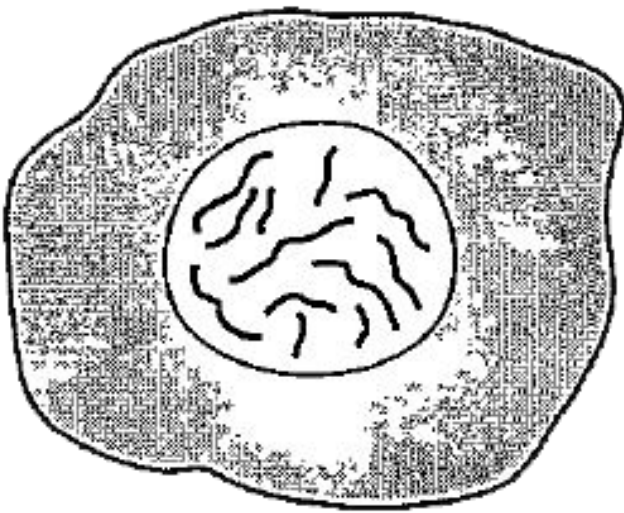
Answer: C



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2. The diagram shows a cell of an organism.

The nucleus contains 12 chromosomes.



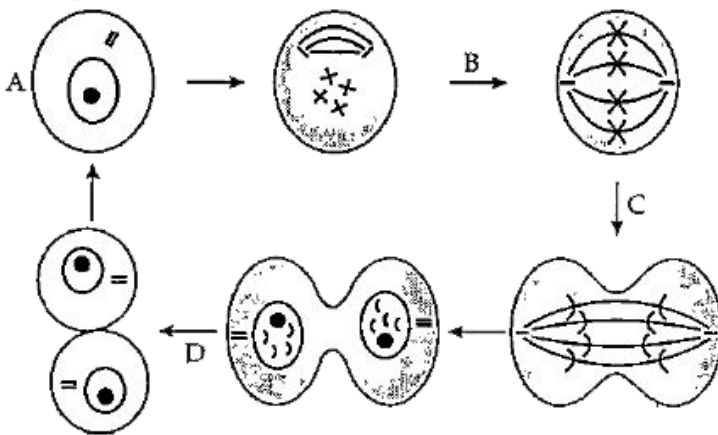
After it divides by mitosis, how many chromosomes would be present in one of the daughter cells?

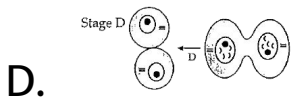
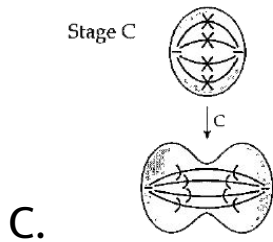
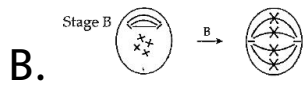
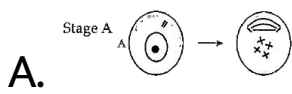
- A. 6
- B. 12
- C. 18
- D. 24

Answer: B

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3. The diagram shows a cell before and during mitosis. At which stage are the chromosomes copied?



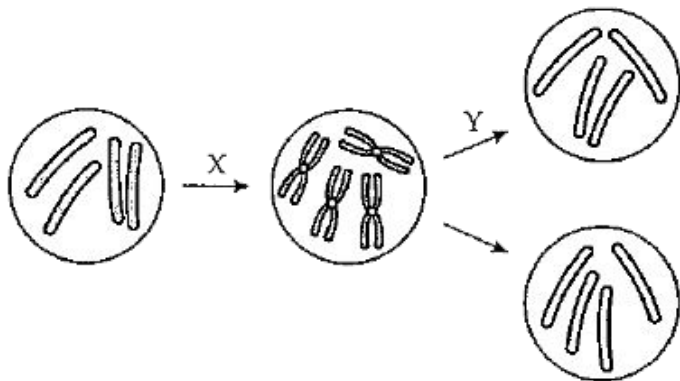


Answer: A



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4. The diagram shows the formation of new diploid cells.



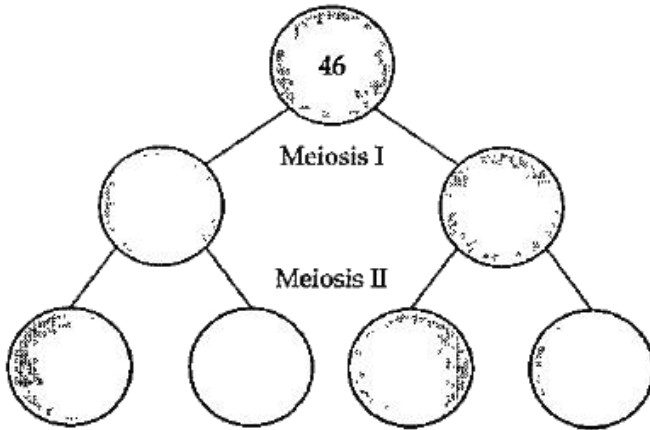
What do arrows X and Y represent ?

| | X | Y |
|-----|----------------------------|----------------------------|
| (a) | Duplication of chromosomes | meiosis |
| (b) | Duplication of chromosomes | mitosis |
| (c) | Meiosis | duplication of chromosomes |
| (d) | Mitosis | duplication of chromosomes |



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5. The diagram shows stages of meiosis in a human testis :



- A. After meiosis I After meiosis II
46 46
- B. After meiosis I After meiosis II
46 23
- C. After meiosis I After meiosis II
23 46

| | | |
|----|-----------------|------------------|
| D. | After meiosis I | After meiosis II |
| | 23 | 23 |

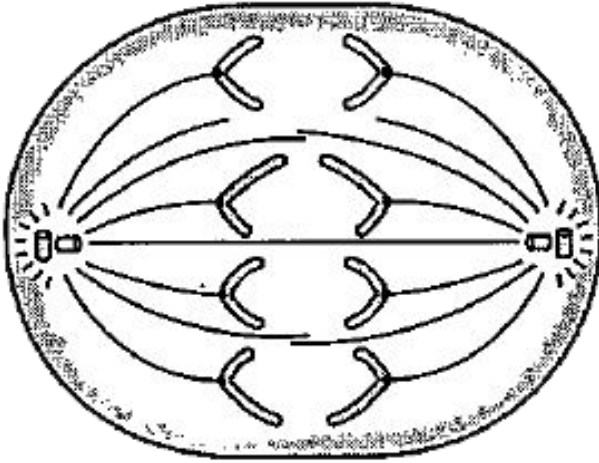
Answer: D



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6. Given below is a diagram representing a stage during the mitotic cell division. Which one of the following option is the correct

stage as per the description?



A. Anaphase, as chromatids are being pulled towards the opposite poles.

B. Metaphase, as chromosomes are in the equatorial plane.

C. Anaphase, as chromosome gets attached to spindle by its centromere.

D. Telophase, as the chromatids has reached the two poles.

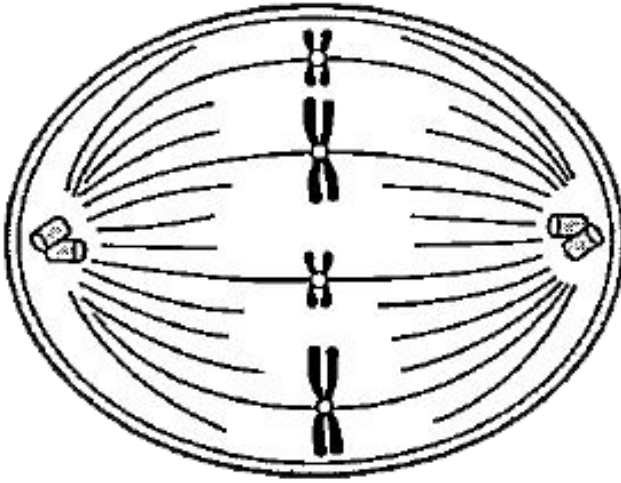
Answer: A



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7. The diagram given below represents a stage during cell division. Which stage is depicted and name the stage that comes before the

stage shown?



A. Metaphase, Prophase

B. Metaphase, Anaphase

C. Anaphase, Metaphase

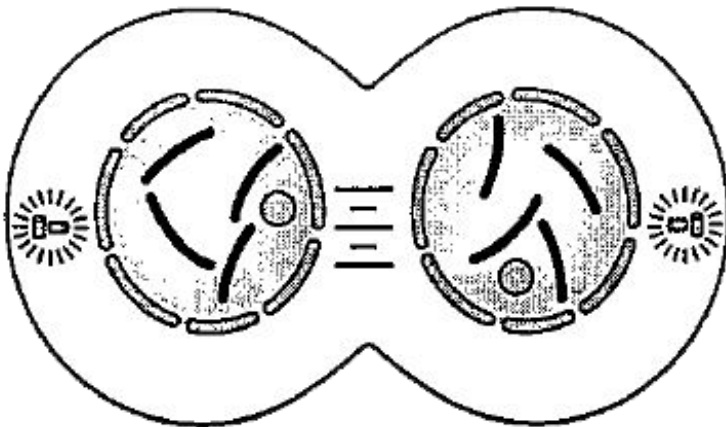
D. Anaphase, Telophase

Answer: A



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8. Given below is a diagram representing a stage during the mitotic cell division. Which one of the following option is the correct stage?



A. Prophase

B. Metaphase

C. Anaphase

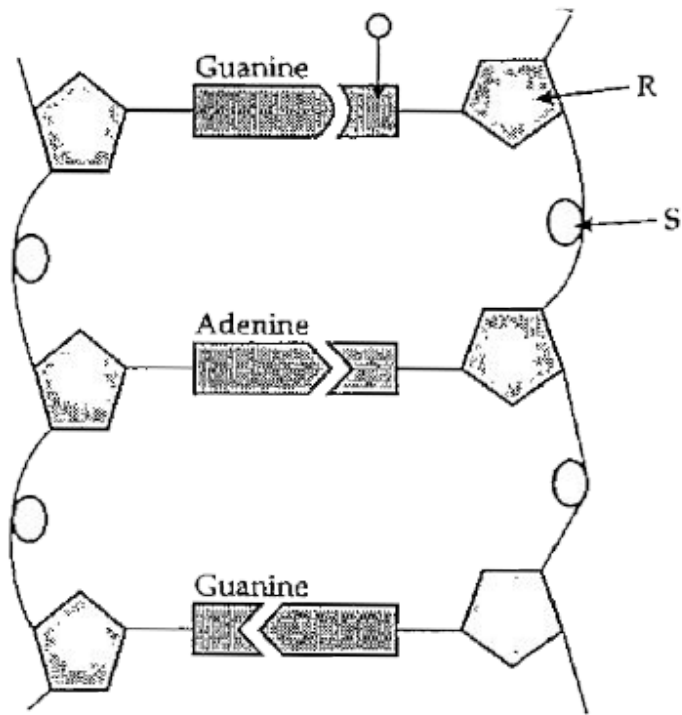
D. Telophase

Answer: D



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9. In the following diagram of a section of a DNA molecule, what is the part labelled Q?



- A. Adenine
- B. Cytosine
- C. Thymine
- D. Uracil

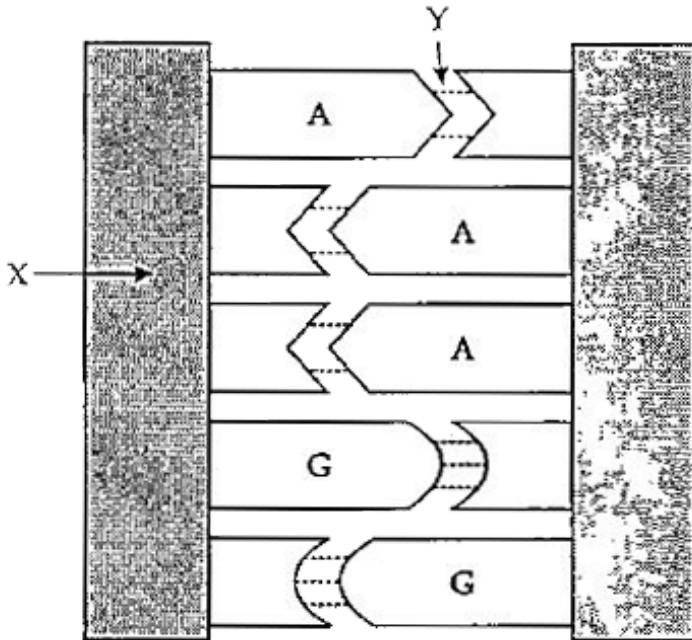
Answer: B



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10. In the diagram given below of a section of a DNA molecule, which are the two

components of part X?



A. Ribose and Phosphate

B. Guanine and Phosphate

C. Deoxyribose and Thymine

D. Deoxyribose and Phosphate

Answer: D



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Assertion Reason

1. Assertion: G_1 phase is the interval between mitosis and initiation of DNA replication.

Reason: The cell is metabolically inactive during G_1 phase.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true, but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both Assertion and Reason are false.

Answer: C



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2. Assertion: Every chromosome, during metaphase has two chromatids.

Reason : Synthesis of DNA takes places in the S-phase of interphase.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true, but reason is not the correct

explanation of assertion.

C. If assertion is true but reason is false.

D. If both Assertion and Reason are false.

Answer: A



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3. Assertion : Mitosis maintains the genetic similarity of somatic cells.

Reason: Chromosomes do not undergo crossing over.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true, but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both Assertion and Reason are false.

Answer: A



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4. Assertion : Karyokinesis occurs in M-phase.

Reason: Cell division stops in M-phase.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true, but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both Assertion and Reason are false.

Answer: D



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5. Assertion: During anaphase, centromere of each chromosomes splits and chromatids separate.

Reason: Chromatids move to opposite poles.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true, but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both Assertion and Reason are false.

Answer: B



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6. Assertion : In animal cells, cytokinesis is marked by the appearance of a furrow in plasma membrane.

Reason: In plant cells, the formation of the new cell wall starts with the formation of simple precursor called cell plate.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true, but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both Assertion and Reason are false.

Answer: B



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7. Assertion: The M phase represents the phase when the actual cell division occurs.

Reason: Interphase represents the phase between two successive M phase.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true, but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both Assertion and Reason are false.

Answer: B



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8. Assertion: Interphase occupies 75-95% of the total generation time.

Reason: Interphase (I-phase) is the long non dividing phase.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true, but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both Assertion and Reason are false.

Answer: B



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9. Assertion: Genes are specific sequences of nucleotides on a chromosome.

Reason: A nucleotide is made up of nitrogenous base, a phosphate group and a pentose sugar.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true, but reason is not the correct explanation of assertion.

C. If assertion is true but reason is false.

D. If both Assertion and Reason are false.

Answer: B



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10. Assertion: The two strands in double strand helix structure of DNA are complementary to each other.

Reason: Disulphide bonds are formed between specific pairs of bases.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true, but reason is not the correct

explanation of assertion.

C. If assertion is true but reason is false.

D. If both Assertion and Reason are false.

Answer: C



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