BIOLOGY

BOOKS - PRADEEP BIOLOGY (HINGLISH)

CELL CYCLE AND CELL DIVISION

Curiosity Questions

1. Which cell of our body do not divide?

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2. How can you determine that a dividing cell you are seeing under a microscope is of an animal or a plant?

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3. What is the most suitable time to determine the number of chromosomes and study their morphology?

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4. How do the children of the same parents come tp differ among themelves and also from the parents in certain features?

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5. How are the condensed chomosomes obtained for the study of their morphology?

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Notable Question

1. What does a kinetochore consist of?

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Ncert Exercises With Answer

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

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2. Distinguish cytokinesis from karyokinesis.

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3. Describe the events taking place during interphase.

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4. What is G_0 (quiescent phase) of cell cycle?

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5. Why is mitosis called equational division ?

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6. Name the stage of cell cycle at which one of the following events occur:

(i) Chromosomes are moved to spindle equator

(ii) Centromere splits and chromatids separate

(iii) Pairing between homologous

chromosomes takes place

(iv) Crossing over between homologous chromosomes takes place

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7. Describe the following: (a) synapsis (b) bivalent (c) chiasmata

Draw a diagram to illustrate your answer.

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

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9. Find examples where the four daughter cells from meiosis are equal in size and where they are found unequal in size.

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

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11. List the main differences between mitosis and meiosis.

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12. What is the significance of meiosis?

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13. Discuss about

(i) haploid insects and lower plants where cell-division occurs, and

(ii) some haploid cells in higher plants where cell-division does not occur.

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14. Can there be mitosis without DNA replication in S phase?

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15. Can there be DNA replication without cell division?

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16. Analyse the events during every stage of cell cycle and notice how the following two parameters change

(i) Number of chromosomes (N) per cell

(ii) Amount of DNA content (C) per cell

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Additional Questions Very Short Type Answer Questions

1. Suggest the term used for a full set of DNA instruction in a cell.

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2. Name the phases of cell cycle.

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3. In which phase of the interphase DNA replication occurs?

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4. Name the three types of cell division.

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5. Who first described mitosis?

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6. What is karyokinesis?

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7. what is cytokinesis?

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

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9. Name the phase of cell division in which the certromeres line up at the equator of the spindle.

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10. Name the phase in which the chromatids move apart in meiosis.

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11. Mention the phases of meiosis in which (i) the chromosome number is reduced to haploid state and (ii)the amount of DNA is reduced to haploid state.

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12. By which method cytokinesis occurs in an animal cell?

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13. Name the method by which cytokinesis takes place in a plant cell?

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14. Which organisms have intranuclear mitosis?

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15. Give an example of anastral type of mitosis.

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16. What is amphiastral mitosis?

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17. What is polyteny?

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18. Name the type of chromosomes the salivary gland cells of drosophila have.

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19. Give an alternative term for meisosis.

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20. What is the life cycle with diploid adult and gametic meiosisn called?

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

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22. What is endomitosis (Endoduplication)?

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23. What is a polutene chromosomes?

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24. What are the spindle fibres and astral rays composed of?

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25. Name the stage of meisis in ehich the paired homologous chromosomes get

shortened and thickened.

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26. What is a diplosome?

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27. Name the components of an aster.

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28. Which processes change the long ,fine chromatin fibres into chromosomes?

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29. What is congressiopn of chromosomes?

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30. What is a phragmoplast?

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Short Type Questions

1. Who proposed that(i)new cells arise from the preexisting cells,and(ii)new buclei from the preexisting nuclei?

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2. What is the role of asters in cell division?

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

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4. In what features the chromosomes differ among theselves?

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5. What is a synaptonemal complex?

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6. what is meant by generation time?

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7. Explain the term kinetochore.

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8. Name the components of a mitotic apparatus in an animal cell,which of them a

plant cell lacks?

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9. What are homologous chromosomes?

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10. Which are haploid,gametes or spores?

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11. Why should the daughter cells inherit cytoplasm also besides the nucleus from the parent cell?

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12. What brings about cleavage of an animal cell after telophase?

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13. What does it show that the cell's entire energy is devoted to the process of division in the M phase?

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

15. In which phase of meiosis are the following formed ? Choose the answers from hint points given below.

(a) Synaptonemal complex .....

(b) Recombination nodules ....

(c) Appearance/activation of enzyme recombinase....

(d) Termination of chiasmata.... (e) Interkinesis....

(f) formation of dyad of cells....

Hint (a) Zygotene, (b) Pachytene,

(c) Pachytene, (d) Diakinesis,

(e) After Telophase-I/before prophase of meosis-II,

(f) Telophase-I/after meiosis-I

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Short Answer Questions

1. Why is cell division necessary?

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2. Write a note on mitotic apparatus.

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3. Give an account of mitotic metaphase or anaphase.

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4. Describe the telophase of mitosis.

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5. Discuss the significance of mitosis

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6. Give an account of the common modifications of mitosis.

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7. How is mitosis controlled?

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8. Discuss the prophase of meiosis.

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9. What are diplontic and haplontic life cycles?

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10. How do mitotoc and meiotic anaphase differ?

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11. What marks the transition between-

(i)Ztgotene and pachytene.(ii)pachytene and early diplotene.(iii)Mitotic metaphase and anaphase

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12. What marks the diffrences between-

(i)S phase andG_2 Phase.(ii)Metaphase II.

(iii)Zygotene and pachtene

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13. Why is the so-called resting stage the interphase,considered the most active stage of cell cycle?

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14. Supply a specific scientific term for each of the following?

(a)The period between two successive mitotic division.(b)Process of cell division by which the chromosome number is halved.(c)point at which two sister chromatids are held together. (d)Phase in the cell cycle when protein and RNA are synthesised.(e)Nuclear division.

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15. Name explain the three stages of cell cycle associated with interphase.

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16. Describe the changes occuriong in the nucleus during prophase of mitosis.

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17. What is the significance of meiosis?

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18. Which processes change the long ,fine chromatin fibres into chromosomes?

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19. What is promrtaphse?

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20. Explain the term spireme stage.

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21. Fill in the blanks:

(i)Duration of the cell cycle i.e. period between two successive cell divisions is called.....

(ii)Interphase has three periods....., s phase and.....

(iii)Mitosis is also termed.....division while meiosis is called.....division.

(iv)Karyokinesis may be divided into four stages:....., metaphase,.....and telophase.

(v)Animal cells typically divide by.....while plant cells divide by.....

(vi)Mitosis without asters is known as.....

(vii)A kinetochore consists of.....and specific sections of .....at the centromere.

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22. Fill in the blanks with suitable words:

(a)Somatic cells multiple by.....(b)Mitosis

results in the formation of nuclei havind .....number of chromosomes.(c)The second division of meiosis by described as.....division. (d)The region of the attachment of chromosomes to spindle fibre is called.....(e)In meiosis,haploid conidition is reached by..... stage.

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23. Match the items in column I with appropriate items (one or more) of column II:

Column I	Column II
(*i*) Amitosis	(*a*) Equational division
(*ii*) Mitosis	(*b*) Haplontic cycle
(*iii*) Free nuclear division	(*c*) Direct-division
(*iv*) Gametic meiosis	(*d*) *Opalina.*
(*v*) Zygotic meiosis	(*e*) Diplontic cycle
	(*f*) Indirect division

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24. Match the words listed in column I with suitable words froms the column II

Column I	Column II
(*i*) Diplontic cycle	(*i*) Meiocytes
(*ii*) Karyokinesis	(*ii*) Gametic meiosis
(*iii*) Haplontic cycle	(*iii*) Plant cells
(*iv*) Cytokinesis	(*iv*) Nuclear division
(*v*) Meiosis	(*v*) Zygotic meiosis
(*vi*) Cell plate	(*vi*) Cytoplasmic division.

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25. Which of the following statements is associated with

A prophase

B metaphase,

C anaphase,

D telophase,

E interphase of mitosis?

(a)The nuclear membrane reappears

(b)Chromosomes are thickest and shortest

(c)Chromosomes begin to uncoil

(d)Chromatids move apart

(e)Nucleus is active but chromosomes are not

distinct

(f)Followed by cytokinesis

(g)Each chromosome consists of two chromatids.

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26. Comment on the statement - meiosis enables the conservation of specific chromosome number of each species even through the process results in reduction of chromosome number ?

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

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Long Answer Questions

1. What is mitosis?give a brief acciunt of mi tosis in an animal cell.

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2. Describe the meiotic cell division.

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3. Discuss the modifications of mitosis and meiosis.

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4. With the help of illustrations,explain the various stages of meiosis-1.What is the logical significance of first meiotic division?

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5. Explain the mitotic cell division with the help of a series of labelled diagrams.

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6. Draw a labelled sketch showing various stages of meiosis.

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7. Draw a figure of cell cycle.

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8. List the main differences between mitosis and meiosis.

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9. Plant X has 2_n=8 chromosomes.sketch the various stages of meiosis in This plant.

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10. What are homologous chromosomes? What Happens to homologous during meiosis?

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11. Anaphase-I of meiosis differs from anaphase of mitosis in one essential way.Describe the diffrence and explain how it effects the daughter cells.

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12. Why does a Multicellular organism require two type of cell division?Which of the two produces the greater number of cells?

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13. A well-known biologist stated that the life history of an organism can be summed up as "gametic fusion,equational division and reductional division."comment.

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14. Discuss the forces that move the chromatids apart of mitotic anaphase.

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15. Tabulate diffrences between plant and animal cells regarding cytokinesis.

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16. Why is meiosis called the reductional division,Whereas mitosis is called equational division?

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17. How cytokinesis is different in an animal and plant cell?

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18. What are chiasmata? State their significance.

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19. Why is meiosis essential in sexually reproducing oraganisms?

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20. Draw diagrams to show the sequence of changes occuring in a cell during meiosis-II

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21. Fill in the blanks with suitable word:

(i)_____Gave the aphorism "omnis cellula e cellula."

(ii)G_1 phase is followed by _____phase.

(iii)Cell division that occurs without the formation of spindle is called_____

(iv)Anastral mitosis occurs in_____

(v)Metaphase plate is formed by_____

(vi)A chromosome with equal arms is called_____

(vii)___is the failure of the two sister chromatids to separate in mitosis.

(viii)pairing of homologous chromosomes is called____

(ix)The cell that undergo meiosis are called___

(x)_____ occurs in all kinds of cells.

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22. Comment on the statement-telophase is reverse of prophase.

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23. What are the various stages of meiosis prophase-I?Enumerate the chromosomal events during each stage.

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24. List the main differences between mitosis and meiosis.

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Analytical Questions With Answers

1. What are mitogens? Cite atleast two examples.

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2. what is interkinesis?

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3. What is meant by the term congression in cell division?

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4. Name atleast two flowers where polyploid varieties are common.

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5. How does meiosis help in evolution?

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6. How would you define cance? What is the technical term used for substances that cause cancer?

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7. Give difference in the attachment of chromosomes to the spindle fibres in mitosis and meiosis-I

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8. What are tractile fibres?

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9. Why is it not possible to shorten the cell cycle?

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10. Why do the chromosomes become short and thick in prophase?

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11. (a)What is meant by cell cycle?(b)In context of cell cycle,what is meant by generation time? also, give external factors which influence it.

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12. What happens during interphase?What is its duration.It iks divisible into how periods? Name them.

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13. (a)Why is mitosis also known as the equational division?

(b)you are viewing a dividing cell under a microscope.How can you determine whether it is an animal cell or a plant cell.

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14. (a)In which is animal cytokinesis different from plant cytokinesis?

(b)The plant cell cannot undergo cytokinesis by an invaginating cleavage furrow.Why?

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15. (a)Differentiate between intranuclear and extranuclear mitosis.In which organisms such

type occur?

(b)Give example where one would find free nuclear division without the division of cytoplasm,resulting in multinucleate organisms.

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16. (a)How many divisions take place in meiosis?How many times ,the chromosomes replicate during meiotic division?

(b)How many daughter cells are produced

during mitotic division and a meiotic divisin?

(c)What is the status of chromosomes and DNA contnet in each daughter cell?

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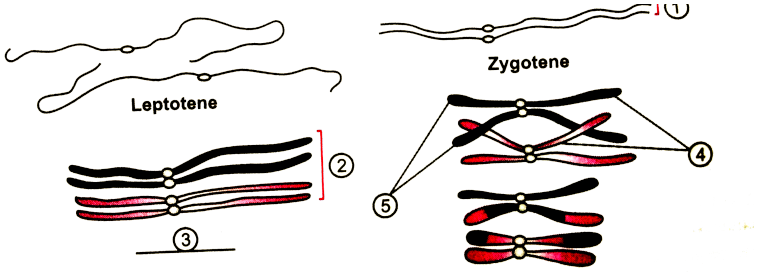
17. Study the following diagrams(depicting behaviour of chromosomes in meiosis)carefully and label the point 1,2,3,4 and 5.



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18. fill in the blanks from the followin g word:Bivalent,synapsis,tetrad,dyad,non-sister chromatids, sister chromatids,disjuction,chiasmata,anneaking.

(a)The pairing of homologous chromosoms during zygotene stage of prophase of meiosis-I is termed___

(b)The two visible chromatids of a chromosome during pachytene of meiosis-I is termed___

(c)A group of four homologous chromatids (two dyads)is termed as____

(d)The two chromatids of two homologous chromosomes(bivalent)are termed as____

(e)The separation of homologous chromosomes during diplotene stage is called____

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19. (a)What is the significance of meiosis-I?

(b)Why meiosis-II is necessary?Explain.

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20. Name the chemical which is used by plant breeders to induce polypoidy.

(a)What is its other significance?(b)What is the source of the above mentioned chemical?

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Practice Questions Multiple Choice Quetions

1. In a somatic cell cycle

A. DNA replication takes place in S-phase.

B. A short interphase is followed by a long mitotic phase

C. G_2 Phase following mitotic phae

D. In G_1 phase DNA content is double the amount of DNA present in the original cell

Answer: A

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2. Crossing over that result in genetic recombination in higher organisms occurs between

A. non-sister chromatids of a bivalent

B. Two daughter nuclei

C. Two daughter bivalents

D. Sister chromatids of a bivalent

Answer: A

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3. Which one of the following precedes reformation of the nuclear envelope during m-phase of the cell cycle?

A. Transcription from chromosomes and reassembly of the nuclear lamina

B. Formation of the contractile ring and formation of the phragmoplast

C. Formation of the contractile ring and transcription from chromosomes

D. Decondensation of chromosomes, and reassembly of the nuclear lamina

Answer: D

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4. In Ulothrix, meiosis takes place in

A. Cell of the filament

B. holdfast

C. zygote

D. Zoopores

Answer: C

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5. At what stage of the cell cycle are histone proteins synthesized a eukaryotic cell?

A. During G-2 stage of prophase

B. During 5-Phase

C. During entire prophase

D. During telophase

Answer: A

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6. Exchange of chromosome segments between maternal and paternal chromatids during meiosis is called.

Or

In meiosis the daughter cellsa re not similar to that of parent because of

A. Crossing over

B. synapsis

C. Both (a) and (b)

D. None of those

Answer: A

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7. Synapsis occurs in which of the following stage of meiosis

A. Leptotene

B. Zygotene

C. Pachytene

D. Diakinesis

Answer: B

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8. If a cell has twice as much DNA as in a normal functional cell,It means that the cell

A. Is preparing to divide

B. Has completed division

C. Has reached the end of its life span

D. Has ceased to function

Answer: A

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9. During G_1 phase of cell division

A. RNA and proteins are synthesized

B. DNA and proteins are synthesized

C. Cell prepares fir M-phase

D. Cell undergoes duplication

Answer: A

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10. During the meiotic division the

A. Homologous chromosomes are separated

B. The linkage is disturbed

C. The homologous chromosomes do not segregate

D. all the above

Answer: A

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11. When synapsis is complete all along the chromosomes, the cell is said to have entered a stage called

A. Zygotene

B. Pachytene

C. Diplotene

D. Diakinesis

Answer: B

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12. Major event that occur during anaphase of mitosis which brings about equal distribution of chromosomes is

A. Replication of the genetic material

B. splitting of the chromatids

C. Splitting of the centromeres

D. Condensation of the chromatin

Answer: C

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13. In which of the following stages, chromosomes are arranged at equatorial plate?

A. Metaphase

B. Anaphase

C. telophase

D. Prophase

Answer: A

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14. Spindle fibre is made up of

A. tubulin

B. actin

C. intermediate filament

D. Flagellin

Answer: A

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15. The number of mitotic cell division required to produce 256 cells from single cell would be

A. 10

B. 12

C. 6

D. 8

Answer: D

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16. In meiosis chromosome number becomes

A. half of its parent chromosome

B. same as that of parent chromosome

C. One fourth of its parent chromosome

D. None of above

Answer: A

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17. Cell division or mitosis is normal process in a living cell, but sudden and abnormal mitosis in an will frequently result in:

A. Zygote

B. Cancer

C. new organ

D. gastrula

Answer: B

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18. Pick out the correct statements.

(a)Mitosis takes place in the somatic cells and the meiosis takes place in the germ cells.

(b)During mitosis, the DNA replicates once for

one cell division and in meiosis, the DNA replicates twice for two cell division.

(c)mitosis and meiosis occur both in sexually and asexually reproducing organisms

A. A only

B. B only

C. telophase

D. interphase

Answer: A

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19. Which of the following sequence is a correct one for a meiotic cycle?

A. $G_1 \rightarrow \mathrm{S} \rightarrow G_2 \rightarrow \mathrm{M} \rightarrow G_1$

B. $G_1 \rightarrow G_2\,\mathrm{S} \rightarrow \mathrm{M} \rightarrow G-2$

C. $G_2 \rightarrow G_1 \rightarrow \mathrm{S} \rightarrow \mathrm{M}\,G_2$

D. $\mathrm{S} \rightarrow \mathrm{S} \rightarrow G_2 \rightarrow \mathrm{M} \rightarrow \mathrm{S}$

Answer: A

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20. Chromosomes replicate in which stage of meiosis?

A. Prophase I

B. Prophase II

C. Telophase I

D. Interphase

Answer: D

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21. In which stage of cell division chromosomes are most condensed

A. (prophase)

B. metaphase

C. anaphase

D. telophase

Answer: B

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22. Cell in G_0 phase of cell cycle

A. Exist cell cycle

B. enter cell cycle

C. Suspend cell cycle

D. terminate cell cycle

Answer: C

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23. The microtubules from opposite poles of the spindle get attached to the kinetochores of sister chromatids in

Or

At what phase of meiosis are there two cells, each with sister chromatids aligned at the spindle equator

A. prophase II

B. metaphase II

C. anaphase II

D. none of these

Answer: B

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24. The non-sister chromatids twist around and exchange segments with each other during

A. Diplotene

B. Diakinesis

C. Leptotene

D. pachytene

Answer: D

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25. Which of the following is unique to mitosis and not a part of meiosis

A. homologous chromosomes behave independently

B. Chromatids are separated during anaphase

C. homologous chromosome pair and form bivalents

D. homologous chromosomes crossover

Answer: A

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26. Diploid cells have :

A. two chromosomes

B. One side of chromosomes

C. two pairs of homologous chromosomes

D. two sets of chromosomes

Answer: D

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27. DNA replication occurs during

Or

The replication of centrioles occurs during

Or

G_1, G_2 and S phaes are seen in which phase of the cell cycle

A. metaphase

B. Prophase II

C. anaphase

D. interphase

Answer: D

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28. During the G_1 phase of cell division

A. RNA and proteins are synthesized

B. pre-mitotic DNA are synthesized

C. Post-mitotic DNA are synthesized

D. Cell undergoes duplication

Answer: A

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29. Synapsis occurs between :

A. Two homologous chromosomes

B. a male and a female gamete

C. mRNA and ribosomes

D. Spindle fibres and centromere

Answer: A

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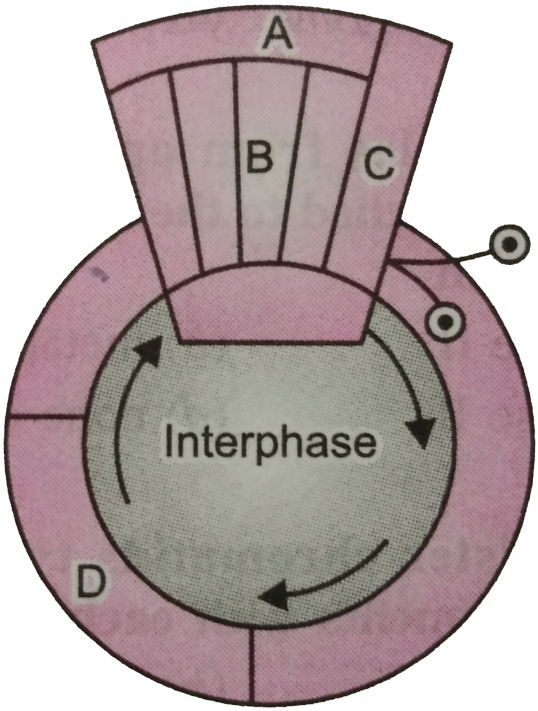
30. Gives is a schematic break-up of the phases/stage of cell cycle :



Which one of the following is the correct indication of the stage/phase in the cycle?

A. A-cytokinesis

B. B-metaphase

C. C-karyokinesis

D. D-synthetic phase

Answer: D

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31. Meoisis result in

A. production of gametes

B. reduction in the number of chromosomes

C. Introduction of variation

D. all of the above

Answer: D

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32. At which stage of meiosis does the genetic constitution of gametes is finally decided?

A. Metaphase I

B. Anaphase II

C. Metaphase II

D. Anaphase I

Answer: D

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33. Meiosis occurs in organisms during

A. Sexual reproduction

B. vegetative reproduction

C. Both sexual and vegetative reproduction

D. none of the above

Answer: A

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34. During anaphase I of meiosis

A. Homologous chromosomes separate

B. non-homologous autosomes separate

C. Sister chromatids separate

D. non-sister chromatids separate

Answer: A

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35. Mitosis is characterised by

A. Reduction division

B. Equal division

C. Both reduction and equal division

D. None of the above

Answer: A

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36. A bivalent of meiosis i consists of

A. Two chromatids and one centromere

B. Two chromatids and two centromeres

C. Four chromatids and two centromeres

D. Four Chromatids and four centromeres

Answer: C

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37. Cells which are not dividing are likely to be at

A. G_1

B. G_2

C. G_0

D. S phase

Answer: C

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38. Which of the events listed below is not observed ruing mitosis?

A. Chromatin condensation

B. Movement of cenrioles to opposite pole

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

D. crossing over

Answer: D

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39. Identify the wrong statement about meiosis

A. pairing of homologous chromosomes

B. four haploid cell are formed

C. at the end of meiosis the number of chromosomes are reduced to half

D. two cycles of DNA replication occur

Answer: D

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40. Select the correct statement about G_1 phase.

A. Cell is metabolicaly 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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41. During mitosis ER and nucleolus begin to disappear at

A. early prophase

B. late prophase

C. early metaphase

D. late metaphase

Answer: B

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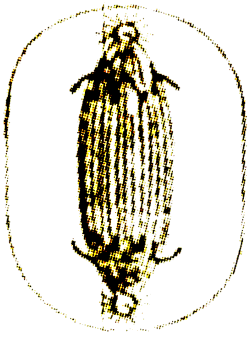
42. Which stage of cell division do the following figures A and B represent respectively?



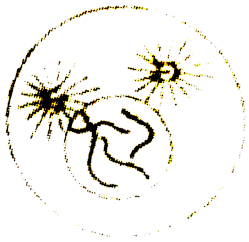


Fig. (A)

(*a*) Prophase

(*b*) Metaphase

(*c*) Telophase

(*d*) Late anaphase

Fig. (B)

— Anaphase

— Telophase

— Metaphase

— Prophase

A. Prophase-anaphase

B. Metaphase-telophse

C. Telophase-Metaphase

D. Late anaphase-Prophase

Answer: D

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43. Assertion: Synthesis of DNA takes place in the S. phase of interphase.

Reason: Every chromosme, during metaphase, has two chromatids.

A. Both the statements A and B correct and A is the reason for B

B. Both the statements A and B are correct and A is not the reason for B

C. Statement A is wrong and B is Corret.

D. Statement A is correct and B is wrong

Answer: A

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44. In a DNA molecule distance between two bases is

A. 2 nm/20 Å

B. 0.2 nm/2 Å

C. 3.4 nm/34 Å

D. 0.34 nm/3.4 Å

Answer: D

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45. Which of the following conditions is called monosomic?

A. 2n+1

B. 2n +2

C. n + 1

D. 2n - 1

Answer: D

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46. Cell divison can not be stopped in which phase of the cell cycle.

A. G_1-phase

B. G_2-phase

C. S-phase

D. prophase

Answer: C

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47. DNA replication occurs in

A. G_1-phase

B. S-phase

C. G_2-phase`

D. Dividing phase

Answer: B

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48. The exchange of segments of non-sister chromatids between chromosomes of a homologous pair is termed

A. Transformation

B. translocation

C. Crossing over

D. Chromosomal aberration

Answer: C

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49. the long and short arms of chromosome are designated respectively as :

A. p and q arms

B. q and p arms

C. m and p arms

D. I and s arms

Answer: B

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50. Select the correct option with respect to mitosis

A. Chromatids separate but remain in the centre of the cell in anaphase

B. Chromatids start moving towards opposite poles in telophase

C. Golgi complex and endoplasmic reticulum are still visible at the end of prophase

D. Chromosomes move to the spindle equator and get aligned along equatorial plate in metaphase

Answer: D

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51. At metaphase, chromosmes are attached to the spindle fibres by their

A. Satellites

B. (Secondary constrictions)

C. Kinetochores

D. Centromeres

Answer: C

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52. Yeast cell can progress through the cell cycle in about

A. 30 minutes

B. 60 minutes

C. 90 minutes

D. 120 minutes

Answer: C

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53. During gamete formation, the enzyme recombinate participates during

A. Metaphase-I

B. Anaphase-II

C. Prophase-I

D. Prophase-II

Answer: C

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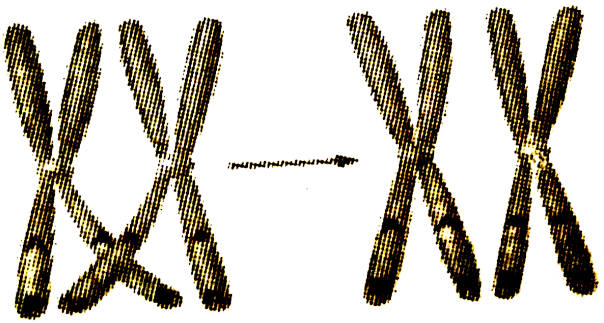
54. Given below is the representaton of a certain event at a particular stage of a type of

cell division.Which is this stage ?



A. Prophase I during meiosis

B. Prophase of mitosis

C. Prophase-I

D. Both prophase and metaphase of mitosis

Answer: A

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55. Identify the meiotic sage in which the homologous chromosomes separate while the sister chromatids remain associated at their centrometres. Or In which stage of meiosis homologous chromosomes are segregated

A. Metaphase I

B. Metaphase II

C. anaphase I

D. Anaphase II

Answer: C

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56. The complex formed by a pair of synapsed homologous chromosomes is called

A. kinetochore

B. Bivalent

C. axoneme

D. equatorial plate

Answer: B

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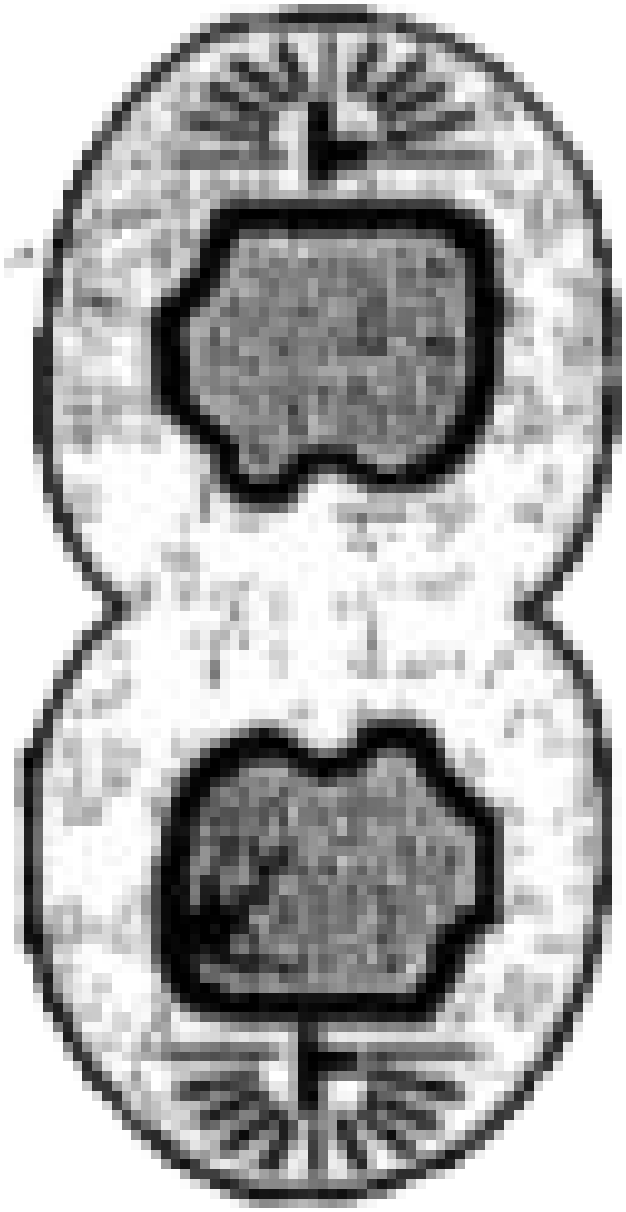
57. A stage in cell division is shown in the figure. Select the answer which gives correct identification of the stage with its

characteristics.



A. Late anaphase chromosomes move away from equatorial plate, golgi complex not present.

B. Cytokinesis Cell plate formed,mitochondria distributed between teo daughter cells.

C. Telophase Endoplasmic reticulum and nucleaolus not reformed yet.

D. Telophase Nuclear envelop reforms,Golgi complex reforms.

Answer: D

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58. Meiosis takes place in

A. Conidia

B. gemmule

C. megascpore

D. meiocyte

Answer: D

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59. During which phase(s) of cell cycle amount of DNA in a cell remains at 4C level if the initial amount is denoted an 2C

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60. In 'S' phase of the cell cycle

A. Amount of DNA doubles in each cell.

B. Amount of DNA remains same in each cell.

C. Chromosome number is increased.

D. Amount of DNA is reduced to half in each cell.

Answer: A

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61. The enzyme recombinase is required in which stage of meiosis ?

A. Pachytene

B. Zygotene

C. Diplotene

D. Diakinesis

Answer: A

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62. Arrange the following events of meiosis in correct sequence :

(a) Crossing over

(b) Synapsis

(c) Terminalisation of chaismata

(d) Disappearance of nucleolus

A. Crossing over

B. Synapsis

C. Terminalisation of chaismata

D. Disappearance of nucleolus

(a)(B),(C),,(A) (b)(B),(A),,(C)

(c)(B),(A),(C), (A),(B),(C),

Answer: C

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63. Which of the following is not a characteristic feature during mitosis in somatic cells?

A. Disappearance of nucleolus

B. chromosome movement

C. Synapsis

D. Spindle fibres

Answer: C

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64. Spindle fibers attach on to

A. Kinetochore of the chromosomes

B. Centeromere of the chromosomes

C. Kinerosome of the chromosomes

D. telomere of the chromosomes

Answer: A

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65. In meiosis crossing over is initiated at

A. Leptotene

B. Zygotene

C. Diplotene

D. Pachetene

Answer: D

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66. During cell growth, DNA synthesis takes place in

A. S phase

B. G_1 Phase

C. G_2 phase

D. M phase

Answer: A

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67. When cell has stalled DNA replication fork , which checkpoint should be predominantly activated

A. G_1/S

B. G_2/M

C. M

D. Both G_2/M and M

Answer: B

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68. Match the stages of meiosis in Column-I to their characteristic feature in Column-II and select the correct option using the codes given below:

	Column-I		Column-II
(a)	Pachytene	(i)	Pairing of homologous chromosomes
(b)	Metaphase-I	(ii)	Terminalization of chiasmata
(c)	Diakinesis	(iii)	Crossing over takes place
(d)	Zygotene	(iv)	Chromosomes align at equatorial plate

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69. Which of the following option gives the correct sequence of events during mitosis

A. Condensation $\rightarrow$ Nuclear membrane disassembly $\rightarrow$ Arrangement at eqator $\rightarrow$ Centromere division $\rightarrow$ Segregation $\rightarrow$ Telophase

B. Condensation $\rightarrow$ Crossing over $\rightarrow$ Nuclear membrane disassembly $\rightarrow$ Segregation $\rightarrow$ Telophase

C. Condensation $\rightarrow$ Arrangement at equator $\rightarrow$ Centromere division $\rightarrow$ Segregation $\rightarrow$ Telophase

D. Condensation $\rightarrow$ Nuclear membrane disassembly $\rightarrow$ Crossing over $\rightarrow$ Telophase

Answer: A

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70. Zygotic meiosis is characteristic of :-

A. Fucus

B. Funaria

C. Chlamydomonas

D. Marchantia

Answer: C

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71. Anaphase promoting complex (APC) is a protein degradation machinery necessary for proper mitosis of animal cells. If APC is defective in a human cell, which of the following is expected to occur

A. Chromosomes will be fragmented

B. Chromosome will not segregate

C. Recombination of chromosomes arms will occur

D. Chromosomes will not condense

Answer: B

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72. The stage during which separation of the paired homologous chromosomes begin is

A. Pachytene

B. Diplotene

C. Diakinesis

D. Zygotene

Answer: B

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Assertion Reason Type Questions

1. Assertion.Meiotic division produces four dissimilar cells

Reason.Synapsis and crossing over in the zygotene and pachytene of meiosis-I prophase

A. If both A and R true and R is the correct explanation of A.

B. If both A and R are true but R is not the correct explanation of A.

C. If A is true but R is false

D. If both A and R are false

Answer: A

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2. Assertion.Bacteria have a very short generation time,hust 20 minutes.

Reason.Becteria occur everywhere in abundance.

A. If both A and R true and R is the correct explanation of A.

B. If both A and R are true but R is not the correct explanation of A.

C. If A is true but R is false

D. If both A and R are false

Answer: B

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3. Assertion.The cells which,afterG_1 phase, start undergoing differentition instead of prepairing for mitosis are said to be nG_0 Phase.

Reason.The cells which,after $G-1$ phase never divide again.

A. If both A and R true and R is the correct explanation of A.

B. If both A and R are true but R is not the correct explanation of A.

C. If A is true but R is false

D. If both A and R are false

Answer: C

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4. Assertion : Histone proteins are synthesized during the S-phase when DNA synthesis occurs.

Reason : Histone proteins form an association with DNA to form nucleosome.

A. If both A and R true and R is the correct explanation of A.

B. If both A and R are true but R is not the correct explanation of A.

C. If A is true but R is false

D. If both A and R are false

Answer: A

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5. Assertion.Mitosis is a means of multiplication in the unicellular organisms.

Reason.Mitosis in the multicellular organisms brings about growth and repair.

A. If both A and R true and R is the correct explanation of A.

B. If both A and R are true but R is not the correct explanation of A.

C. If A is true but R is false

D. If both A and R are false

Answer: B

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6. Assertion.The spindle microtubles join the chromatids at the kinetochore in metaphase of mitosis

Reason.poleward movement of the chromadits during anaphase begins at the kinetochores.

A. If both A and R true and R is the correct explanation of A.

B. If both A and R are true but R is not the correct explanation of A.

C. If A is true but R is false

D. If both A and R are false

Answer: A

7. Assertion.Chromosomal congression in metaphase is caused by equal pull of the chromosomal fibres of the two poles.

Reason.Metaphase is not an appropiate time for chromosome study.

A. If both A and R true and R is the correct explanation of A.

B. If both A and R are true but R is not the correct explanation of A.

C. If A is true but R is false

D. If both A and R are false

Answer: C

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8. Assertion.Shortening of chromosomes in prophase proves advantageous in anaphase.

Reason.It is easier for short chromosomes to move to the opposite poles through the cytoplasm than it is for long.twisted interphase chromosomes.

A. If both A and R true and R is the correct explanation of A.

B. If both A and R are true but R is not the correct explanation of A.

C. If A is true but R is false

D. If both A and R are false

Answer: A

9. Assertion.Mitosis is amphiastral in all organisms.

Reason.Centrioles that organize the asters and spindle occur in all cells.

A. If both A and R true and R is the correct explanation of A.

B. If both A and R are true but R is not the correct explanation of A.

C. If A is true but R is false

D. If both A and R are false

Answer: D

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10. Assertion.Meiosis produces four genetically dissimilar cells.

Reason.Synapsis,crossing over and disjunction of homologous chromosomes occur in the prophase,of meiosis-I

A. If both A and R true and R is the correct explanation of A.

B. If both A and R are true but R is not the correct explanation of A.

C. If A is true but R is false

D. If both A and R are false

Answer: A

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11. Assertion.Meiosis-I is called heterotypic(reduction)division.

Reason.It halves the chromosome number in the daughter cells.

A. If both A and R true and R is the correct explanation of A.

B. If both A and R are true but R is not the correct explanation of A.

C. If A is true but R is false

D. If both A and R are false

Answer: A

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12. Assertion.Meiosis -II is not mitotic.

Reason.Mitosis and meiosis have nothing in common.

A. If both A and R true and R is the correct explanation of A.

B. If both A and R are true but R is not the correct explanation of A.

C. If A is true but R is false

D. If both A and R are false

Answer: D

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13. Assertion.Meiosis-II is not mitotic.

Reason.Meiosis-II occurs with haploid chromosomes and is not preceded by interphase.

A. If both A and R true and R is the correct explanation of A.

B. If both A and R are true but R is not the correct explanation of A.

C. If A is true but R is false

D. If both A and R are false

Answer: A

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14. Assertion.Crossing over occurs during the pachytene stage of meiosis-I

Reason.Crossing over introduces genetic variation in the cells.

A. If both A and R true and R is the correct explanation of A.

B. If both A and R are true but R is not the correct explanation of A.

C. If A is true but R is false

D. If both A and R are false

Answer: B

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15. Assertion.Separation of daughter prochromosomes to opposite sides is aided by cell membrane in bacteria.

Reason.Bacterial cell membrane has a special molecular structure.

A. If both A and R true and R is the correct explanation of A.

B. If both A and R are true but R is not the correct explanation of A.

C. If A is true but R is false

D. If both A and R are false

Answer: C

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16. Assertion Old age is not an illness. It is a continuation of life with decrease capacity for adaptation.

Reason Cessation of mitosis is normal genetically programmed event.

A. If both A and R true and R is the correct explanation of A.

B. If both A and R are true but R is not the correct explanation of A.

C. If A is true but R is false

D. If both A and R are false

Answer: A

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17. Assertion.Among the primates,Chimpanzee is the closest relative of the present day humans.

Reason.The banding pattern in the autosome numbers 3 and 6 of man and chimpanzee is remarkbly similar

A. If both A and R true and R is the correct explanation of A.

B. If both A and R are true but R is not the correct explanation of A.

C. If A is true but R is false

D. If both A and R are false

Answer: A

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18. Assertion: G_1 -phase is also called anaphase , as during this phase the cell stores ATP for cell division.

Reason: Cell produce structural and functional

proteins. Cell's metabolic rate is high and is controlled by the enzymes,

A. If both A and R true and R is the correct explanation of A.

B. If both A and R are true but R is not the correct explanation of A.

C. If A is true but R is false

D. If both A and R are false

Answer: D

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