



BIOLOGY

BOOKS - TRUEMAN BIOLOGY

CELL CYCLE AND CELL DIVISION

Multiple Choice Questions

1. E. coli /Bacteria does not show alternation of generations because of absence of

A. nucleus

B. chromosomes

C. reduction division

D. syngamy

Answer: C



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2. The decision for cell division is taken

A. G_1

B. S

C. G_2

D. Not known

Answer: A



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3. The active phase, also called metabolic or energetic phase with most cytogenetic activity is

A. Interphase

B. M-Phase

C. Meiosis

D. Pachytene

Answer: A



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4. Which of the phase of cell cycle is of longer duration?

A. Leptotene

B. Zygotene

C. Pachytene

D. Diplotene

Answer: D



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5. Which of the following will undergo meiosis and mitosis both ?

A. Oocytes

B. Spermatids

C. Interstitial cells

D. Gonads

Answer: D



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6. Cell would normally proceed to mitosis without interruption

A. G_1 Phase

B. S-Phase

C. G_2 Phase

D. M-Phase

Answer: B



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7. Phase of shortest duration is

A. G_1

B. G_2

C. S

D. All are of almost equal duration

Answer: B



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8. "Bouquet-stage" occur in which sub stages of prophase -I ?

A. zygotene

B. leptotene

C. pachytene

D. diplotene

Answer: B



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9. Quiescent cells in the root tip cells are in which phase of cell cycle of mitosis ?

A. G_1

B. G_0

C. G_2

D. M

Answer: B



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10. In plant cell, spindle is formed from

A. Cytoplasm

B. ER

C. Nuclear membrane

D. Centrosome

Answer: D



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11. The best stage to view structure, size and to count the number of chromosomes is

A. Metaphase

B. Late prophase

C. Telophase

D. I-phase

Answer: A



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12. G_0 phase is

A. arrest of cell cycle and onset of
differentiation

B. phase after G_2

C. phase after M phase in which daughter cells enter new cell cycle

D. all of the above

Answer: A



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13. In which stage of cell division the nucleus looks like a ball of wool (spireme stage) ?

A. Prophase

B. Prophase I

C. Anaphase

D. Cytokinesis

Answer: A



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14. Chromosomes at anaphase are of various shapes depending upon position of centromere. It is J shaped when centromere is

A. metacentric

B. telocentric

C. acrocentric

D. submetacentric

Answer: D



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15. Suppose an organism has 5 pg of DNA in nucleus of its egg. How much DNA would a diploid cell has in its nucleus at G_1 ?

A. 5 pg

B. 10 pg

C. 20 pg

D. 2.5 pg

Answer: B



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16. Which is called direct cell division ?

A. Mitosis

B. Amitosis

C. Meiosis

D. All cell divisions

Answer: A



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17. Chromosomes can be identified easily during metaphase. How ?

A. Metaphase

B. Anaphase

C. Telophase

D. Late prophase

Answer: B



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18. In Metaphase I, from each centromere of a chromosome, how many chromosomal fibres (Tractile fibres) arise towards poles ?

A. 2

B. 1

C. 4 – 20

D. 4

Answer: B



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19. Meiotic division occurring just at the time of gametogenesis is

A. terminal

B. initial

C. intermediate

D. none of these

Answer: A



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

A. 128

B. 255

C. 10

D. All wrong

Answer: B



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21. Starting with a bacterium that divides once in half hour how many bacteria are formed after 24 hours of growth ?

A. 2^{12}

B. 2^{24}

C. 2^{48}

D. 2^{47}

Answer: C



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22. Cell division occurs throughout the body in animals. It occurs in localized ___ regions in higher plants.

A. meristematic

B. young

C. mature

D. differentiated

Answer: A



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23. In Anaphase-I

A. chromosomes move to respective poles

B. chromatids move to respective poles

C. centriole moves

D. spindle fibres move

Answer: A



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24. Mechanism of genetic continuity in mitosis

is due to

A. segregation of maternal and paternal
chromosomes

B. duplication of DNA

C. crossing over

D. halving of chromosomes

Answer: B



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25. Synaptonemal complexes is a nucleoprotein structure. It is visible or found from-

- A. leptotene through diplotene
- B. pachytene through diplotene
- C. zygotene through pachytene
- D. diplotene through metaphase

Answer: C



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26. During synapsis, the number of chromonemata /DNA in bivalent chromosome are

A. 2

B. 4

C. 8

D. 16

Answer: B



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27. In meiosis, chromatids separate at

A. Anaphase I

B. Anaphase II

C. Diakinesis

D. Diplotene

Answer: B



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28. L- shaped chromosomes are termed :

- A. metacentric
- B. acrocentric
- C. telocentric
- D. submetacentric

Answer: D



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29. Centriole replicates during

A. Metaphase

B. Late prophase

C. G_1 of I phase

D. S-phase of I phase

Answer: D



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30. The term "mitosis" was proposed by

A. Walter Flemming

B. Strasburger

C. Hertwig

D. Moore

Answer: A



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31. During G_2 -phase a diploid cell contains the amount of DNA equal to a :-

A. $4n$

B. $8n$

C. $2n$

D. $1n$

Answer: A



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32. Number of mitotic divisions required to produce 128 cells from a single cell is

A. 64

B. 126

C. 128

D. 7

Answer: D



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33. Bacterial cell divides in every minute it takes one hour to fill up a cup. How much time be taken to fill half the cup

A. 30 minutes

B. 29 minutes

C. 59 minutes

D. 15 minutes

Answer: C



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34. What is the cause of cell division ?

A. Increase in surface area/volume ratio
due to growth of cell.

B. Nucleo-cytoplasmic ratio decreases due
to increase in size of cell.

C. Disturbance in lipid and protein ratio

D. All of the above

Answer: B



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35. Which stage connecting link between Meiosis 1 and Meiosis II

A. Interphase

B. Interkinesis

C. Generation Time

D. I-phase

Answer: B



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36. In disjunction (separation) of sister chromatids at anaphase

A. centromere moves first and arms trail behind

B. arms move first and centromere trails behind

C. any of the above cases

D. centromere does not move in anaphase

Answer: A



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37. Reorganisation occurs in which stage of cell division ?

A. I phase

B. G_1 phase

C. Telophase

D. S phase

Answer: C



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38. In animal cells, cytokinesis occurs by cleavage method. Here the cell membrane grows ____ to divide a cell into two.

- A. centripetally
- B. centrifugally
- C. asymmetrically
- D. gravitationally

Answer: A



39. New cell membrane during animal cytokinesis arises from

A. endoplasmic reticulum

B. Golgi bodies

C. nucleus

D. microfilaments

Answer: A



40. Generation Time is

A. period between telophase and cytokinesis

B. time gap between meiosis ii and cytokinesis

C. period of time taken by a cell to double

D. all are correct

Answer: C





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41. A double equatorial plate is formed in

- A. Metaphase I
- B. Metaphase II
- C. Mitotic Metaphase
- D. Cytokinesis

Answer: A



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42. Mitotic apparatus is a temporary structure which

- A. disappears in prophase
- B. reappears in telophase
- C. persists in cytokinesis of plant cells
- D. all are correct

Answer: C



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43. In pachytene stage of meiosis the chromosomes appear

- A. single stranded
- B. three stranded
- C. double stranded
- D. four stranded

Answer: D



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44. Stages in proper sequence of prophase I are

A. Leptotene - Zygotene - Pachytene -

Diplotene - Diakinesis

B. Leptotene - Zygotene - Pachytene -

Diakinesis - Diplotene

C. Leptotene - Zygotene - Pachytene -

Diakinesis

D. Leptotene - Pachytene - Diplotene -

Zygotene - Diakinesis

Answer: A



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45. In Zygotene, homologous chromosomes undergo pairing to form bivalent having 2 homologous chromosomes. These 2 chromosomes are attached laterally due to

A. U protein

B. centromere

C. Ribonucleoprotein

D. Endonuclease

Answer: C



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46. Actual haploidy in terms of DNA comes in

A. metaphase I

B. anaphase

C. anaphase II

D. cell plate

Answer: C



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47. In meiosis which is antithesis of fertilization, the division is like

A. 1st division is reductional and 2nd is equational.

B. 1st division is equational and 2nd is reductional

C. 1st division is equational and 2nd is also equational

D. Both divisions are reductional

Answer: A



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48. Cell plate grows from

- A. wall to centre
- B. one wall to another
- C. centre to wall
- D. any of the above

Answer: C



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49. Homologous chromosomes are

- A. morphologically & genetically different
- B. morphologically different but genetically similar
- C. genetically similar
- D. chromosomes which pair during synapsis

Answer: D



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50. Movement of chromosomes during anaphase

A. is independent of spindle fibres

B. depends on spindle fibres and kinetochore

C. is due to cytoplasmic streaming

D. is interaction of chromosomes over spindle

Answer: B



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51. Meiosis and mitosis differ from each other because in meiosis

A. chromosomes. first pair and then reduced to half

B. homologous chromosomes pair and exchange parts

C. 4 nuclei are formed which are not identical

D. all of the above three are correct

Answer: D



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52. What happens in meiosis ?

A. One division of nucleus and one division of chromosomes

B. Two divisions of nucleus and one division of chromosomes

C. Two divisions of nucleus and three divisions of chromosomes

D. One division of nucleus and two divisions of chromosomes

Answer: B



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53. Which is a wrong statement about mitosis

?

A. Prophase is of longest duration

B. During anaphase, centromere moves first

C. In interphase no metabolic activity occurs

D. Chromosomes are spirally coiled

Answer: C



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54. Nucleolus disappears in

A. late prophase

B. metaphase

C. early prophase

D. interphase

Answer: A



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55. Poleward movement of dyads occurs during

- A. metaphase I
- B. metaphase II
- C. anaphase I
- D. anaphase II

Answer: C



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56. In prophase, chromosomes shorten and thicken due to

A. microtubules

B. coiling of chromosomes

C. disappearance of microfilament

D. formation of proteins

Answer: B



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57. Meiosis II leads to

A. separation of homologous chromosomes

B. separation of chromatids and centromeres

C. fresh DNA synthesis

D. separation of sex chromosomes

Answer: B



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58. Cell becomes refractive and viscous first during

A. prophase

B. telophase

C. anaphase

D. cytokinesis

Answer: A



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59. Interzonal fibres appear in

A. anaphase

B. prophase

C. late metaphase

D. early metaphase

Answer: D



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60. Diploid chromosome number being 8, what shall be the number of chromatids in each daughter after meiosis I

A. 8

B. 4

C. 2

D. 16

Answer: A



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61. Aster is

A. centriole

B. astral rays and Microtubular spindle

C. centriole and astral rays

D. centriole spindle

Answer: C



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62. At diakinesis, a meiocyte has ten pairs of chromosomes. The chromosomes number expected in each nucleus is, therefore,

A. ten at the end of I division and 5 at the end of II division

B. ten at the end of I division and ten at the end of second division

C. five at the end of I division and 5 at the end of second division

D. 20 at the end of I division and ten at the end of second division

Answer: B



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63. During regeneration, following takes place

(a) cell division (b) cell movement

(c) dedifferentiation and

(d) tissue differentiation

The correct sequence is

A. a, b, c, d

B. c, a, b, d

C. b, a, c, d

D. a, c, b, d

Answer: B



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64. The stage at which cytokinesis begins in plant cells is

A. Anaphase

B. I-phase

C. Late Metaphase

D. Telophase

Answer: A



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65. Which of the following is part of mitosis in cells of seed plants ?

A. Centrioles

B. Asters

C. Spindles

D. Cleavage furrows

Answer: C



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66. 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. Metaphase II

B. Metaphase I

C. Anaphase II

D. None of these

Answer: A



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67. Metaphase II of meiosis is just like metaphase of mitosis except that

- A. there are half as many chromosomes
- B. nucleolus is absent
- C. genes have become doubled
- D. synaptonemal complex is present

Answer: A



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68. A diploid cell has $2n = 4$. If this cell divides by mitosis, how many types of genotypes are formed amongst the daughter cells ?

A. 1

B. 2

C. 3

D. 4

Answer: A



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69. Middle lamella starts forming during

A. I-phase

B. Late Metaphase

C. Late Prophase

D. Late Anaphase

Answer: D



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70. Phragmoplast is precursor of

A. leucoplast

B. chloroplast

C. spindle apparatus

D. cell plate

Answer: D



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71. Each chromosome at anaphase stage of bone marrow cell in our body has

- A. two chromatids
- B. one chromatid
- C. many chromatids
- D. no chromatid

Answer: B



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72. N/C ratio after cell division

A. increases

B. decreases

C. remains same

D. first decreases and then increases

Answer: B



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73. The number of bivalents in Prophase I of meiosis are 10. How many chromosomes will be in Anaphase II of meiosis at each pole?

- A. 5
- B. 10
- C. 20
- D. 40

Answer: B



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74. Chromosomes are ring like in

A. pachytene

B. diplotene

C. zygotene

D. leptotene

Answer: B



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75. A cell with $2n=16$ undergoes meiosis. Each of the four daughter nuclei formed at the end of the division will have

A. 4 chromosomes- double stranded

B. 8 chromosomes- single stranded

C. 8 chromosomes-double stranded

D. 4 chromosomes- single stranded

Answer: B



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76. Which stage is responsible for genetic variations and evolution of species ?

A. Diplotene

B. Diakinesis

C. Pachytene

D. Anaphase II

Answer: C



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77. Congression is

- A. pairing of homologous chromosomes
- B. separation of paired chromosomes
- C. bringing the chromosomes on equator
of spindle apparatus
- D. movement of sister chromatids towards
the poles

Answer: C



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78. Bivalents are formed in

A. diplotene

B. pachytene

C. zygotene

D. interkinesis

Answer: B



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79. The nuclear membrane disappears in

A. metaphase

B. anaphase

C. early prophase

D. late prophase

Answer: D



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80. During cell division in apical meristem nuclear membrane reappears in

- A. metaphase
- B. late telophase
- C. cytokinesis
- D. late anaphase

Answer: B



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81. Number of chromosome groups at each equatorial plate of metaphase I of a plant having $2n = 60$ chromosomes, will be

A. 60

B. 120

C. 180

D. 30

Answer: D



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82. How many cells and meiosis are required to produce 200 cells ?

A. 50, 25

B. 25, 25

C. 50, 50

D. 50, 125

Answer: C



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83. The four daughter cells produced at the end of meiosis as tetrad are genetically

A. dissimilar

B. similar

C. enucleated

D. clones

Answer: A



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84. In which stage the chromosomes appear thin and long thread-like

A. leptotene

B. zygotene

C. prophase

D. pachytene

Answer: A



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85. Which of these is usually constant for a variety of cells?

A. Time for S, G_2 and M phases

B. Time for G_1

C. Time for G_2

D. Time for G_1 , S and G_2

Answer: A



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86. The cell cycle of somatic cell usually consists of

- A. long interphase followed by short mitotic phase
- B. short interphase and long mitotic phase
- C. long interphase and long mitotic phase
- D. short interphase

Answer: A



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87. During Amitosis

- A. Spindle apparatus is formed
- B. Nucleus elongates and divides into two nuclei without equitable chromosome distribution
- C. Nucleus elongates followed by spindle apparatus formation
- D. No division of cell occurs

Answer: B



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88. In a cell cycle G_1 phase is marked by the

A. Transcription of r-RNA

B. Transcription of r-RNA, t-RNA

C. Transcription of r-RNA, m-RNA

D. Transcription of -RNA, m-RNA, t-RNA and

synthesis of different proteins

Answer: D



89. has been described as a tripartite ribbon like structure situated between pairing homologous chromosomes

- A. Synaptonemal complex
- B. Lateral elements
- C. Axial filaments
- D. Central elements

Answer: A



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90. Synaptonemal complex permits

A. disjunction

B. the proper alignment of the
homologous chromosomes

C. congression

D. all of the above

Answer: B





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91. Cytokinesis in animals takes place by

- A. invagination
- B. cell plate formation
- C. both (1) and (2)
- D. centrifugal method

Answer: A



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92. The second spindle formed in Merosis-II is formed

- A. at right angle to first spindle
- B. parallel to first spindle
- C. oblique to the axis
- D. at any site in the cell

Answer: A



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93. Number of spindle apparatus formed during meiosis is

A. 3

B. 2

C. 1

D. 4

Answer: A



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94. In which of the following ways are mitosis and meiosis similar?

A. Both are preceded by DNA replication

B. Both occur in all kinds of cells

C. Both include the crossing over of chromosomes

D. (1) and (3)

Answer: A



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95. During the first metaphase of meiosis the centromeres

- A. undergo division
- B. do not divide
- C. divide but do not separate
- D. are not identical

Answer: B



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96. Aster disappears in

- A. Telophase
- B. Metaphase
- C. Anaphase
- D. G_1 phase

Answer: A



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97. A bacterium divides every 35 minutes. If a culture containing 10^5 cells/ml is grown for 175 minutes. What will be the cell concentration / ml after 175 minutes

- A. 32×10^5 cells
- B. 5×10^5 cells
- C. 35×10^5 cells
- D. 175×10^5 cells

Answer: A



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98. In a culture of E.coli the cell population increased from 1.5×10^6 cells/ml to 12×10^6 cells/ml in 36 minutes. The generation time is

- A. 6 min.
- B. 9 min.
- C. 12 min.
- D. 18 min.

Answer: C





99. Longitudinal duality of each chromosome of a homologous pair becomes clearly evident showing formation of 4 chromatids from each bivalent at

A. pachytene

B. diakinesis

C. diplotene

D. zygotene

Answer: C



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100. The term "meiosis" was given by

A. Farmer & Moore

B. Johannsen

C. W. Flemming

D. Strasburger

Answer: A



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101. In meiosis centromeres divide and chromatids separate during

- A. Anaphase I
- B. Anaphase II
- C. Metaphase I
- D. Prophase I

Answer: B



102. Name the stage of mitosis in which chromosomes are arranged on the equator of spindle

- A. Anaphase
- B. Metaphase
- C. Late prophase
- D. S phase

Answer: B



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103. In a dividing somatic cell, which one of the following stage is diploid ?

A. G_1

B. G_2

C. S

D. M

Answer: A



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104. Anastral mitosis is found in

- A. lower plants
- B. higher plants
- C. lower plants and animals
- D. higher animals

Answer: B



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105. Leptotene chromosomes have

- A. two chromatids
- B. one chromatid
- C. four chromatids
- D. no chromatid

Answer: A



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106. Bead-like thickened portions of leptotene chromosomes are

A. puffs

B. chromomeres

C. centromeres

D. centrosome

Answer: B



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107. If a somatic cell undergoes two successive nuclear divisions without cytokinesis, the resultant structure will have

- A. 2 diploid nuclei
- B. 4 diploid nuclei
- C. 4 haploid nuclei
- D. 2 haploid nuclei

Answer: B



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108. 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

A. Anaphase, Metaphase, Zygotene,

Pachytene

B. Metaphase, Pachytene, Zygotene,
Diplotene

C. Metaphase, Anaphase, Zygotene,
Pachytene

D. Anaphase, Metaphase, Pachytene,
Zygotene.

Answer: C



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

A. 36 hrs

B. 24 hrs

C. 48 hrs

D. 12 hrs

Answer: B



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110. When energy is stored and cell undergoes differentiation, the stage is called

A. G_1

B. S

C. G_0

D. Anaphase

Answer: C



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111. Which one of the following precedes reformation of the nuclear envelope during M phase of the cell cycle.

A. Transcription from chromosomes and ressembly of the nuclear lamina.

B. Decondensation from chromosomes, and reassembly of the nuclear lamina.

C. Formation of the contractile ring, and transcription from chromosomes

D. Formation of the contractile ring, and
formation of the phragmoplast

Answer: D



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112. Postmitotic gap phase and synthetic
phase refer to

A. G_2 and S

B. G_1 and S

C. G_1 and G_2

D. S and G_2

Answer: B



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113. The two chromatids of a metaphase chromosome represent

A. Homologous chromosome of a diploid set

B. Replicated chromosomes to be

separated at anaphase

C. Nonhomologous chromosomes joined at

the centromere

D. Maternal and paternal chromosomes

joined at the centromere

Answer: B



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114. Which one of the following pair is correctly matched?

A. Shortest phase of cell cycle - M-phase

B. Synthesis of histone protein - S phase

C. DNA replication - G_1 -phase

D. Synthesis of RNA and protein - M-phase

Answer: A



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115. A cell has 46 chromosomes at each pole in mitotic telophase. In tis division the number of chromatids at the metaphase was :-

A. 23

B. 46

C. 69

D. 92

Answer: D



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116. If the DNA content of a cell is $2C$ after M phase, what will be the DNA content of the cells at G_1 , after S and at G_2

A. $4C, 4C, 8C$

B. $2C, 2C, 4C$

C. $2C, 4C, 8C$

D. $2C, 4C, 4C$

Answer: D



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117. Reductional division involves

- A. Splitting of centromere
- B. Separation of sister chromatids
- C. Formation of single metaphasic plate
- D. None of the above

Answer: D



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118. Match List-I (Distinguishing features based on chromosomal appearance) with List-II (Stage of meiosis) and select the correct answer using the codes given below the list

List-I	List-II
A. Terminalized chiasmata	1. Pachytene
B. Exchange of segments of chromatids	2. Zygotene
C. Synapsis of homologous chromosomes	3. Diakinesis
D. Appearance of chiasmata	4. Leptotene
	5. Diplotene

A. $A \quad B \quad C \quad D$
 4 2 3 1

B. $A \quad B \quad C \quad D$
 3 1 2 5

C. $A \quad B \quad C \quad D$
 2 5 1 3

D. $\begin{matrix} A & B & C & D \\ 2 & 4 & 3 & 1 \end{matrix}$

Answer: B



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119. Match list-I with list-II and select the correct answer using the codes given below

the lists.

List-I	List-II
A. Pairing of homologous chromosomes.	1. Chiasmata
B. Actual inter change of complex segments between two homologous chromosomes.	2. Synaptonemal complex
C. Protein body formed between paired homologous chromosomes.	3. Synapsis
D. The cross shaped configuration visible at diplotene between homologous chromosomes	4. Crossing over

A. *A B C D*
4 3 1 2

B. *A B C D*
3 4 1 2

C. *A B C D*
3 4 2 1

D. *A B C D*
4 3 2 1

Answer: C



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120. Which one of the following combinations of chromosome number (n) and DNA content (c) is true of the diplotene stage of mammalian oocyte?

A. $1n$ and $2c$

B. $2n$ and $4c$

C. $2n$ and $2c$

D. $1n$ and $4c$

Answer: B



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121. A characteristic feature of meiosis is

A. Two DNA replications and one division of cytoplasm

B. A single DNA replication and three divisions of cytoplasm

C. Two DNA replication cycles and two divisions of cytoplasm

D. A single DNA replication and two divisions of cytoplasm

Answer: D



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122. The undifferentiated cell of an animal has 64 chromatids in metaphase. How many

chromosomes will be present in the gametes
of that animal

A. 64

B. 8

C. 32

D. 16

Answer: D



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123. If the number of dyads at each pole during Anaphase-I is 25 the gametes will contain how many chromosomes?

A. 25

B. 50

C. 100

D. None of above

Answer: A



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124. The genome of onion has 8 chromosomes ($n=8$). In a root tip cell undergoing anaphase the number of chromosomes will be

A. 8

B. 16

C. 32

D. Indeterminate

Answer: C



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125. During a cell cycle, the transition from G1 to S phase and from G2 to M phase requires the activation of which of the following?

- A. Inducer enzyme
- B. ATP molecules
- C. Cyclins
- D. Cyclin- CDK complex

Answer: D



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126. Cell division is tightly regulated. Which of the following is TRUE regarding mitosis OR meiosis?

I. Mitosis shows no homologue pairing

II. There is no S phase between meiosis I and II

III. Meiosis centromeres do not divide at anaphase I.

A. I and III only

B. I and II only

C. II only

D. I, II and III

Answer: D



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127. Whereas the number of chromosomes is reduced to half in first reduction division of meiosis, then what is the need for second mitotic division

- A. The division is required for the formation of four gametes
- B. Division ensures equal distribution of haploid chromosomes
- C. Division ensures equal distribution of genes on chromosomes
- D. Division is required for segregation of replicated, chromosomes

Answer: D



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128. In which phase of cell division is oocyte arrested ?

A. anaphase II

B. prophase I

C. interphase

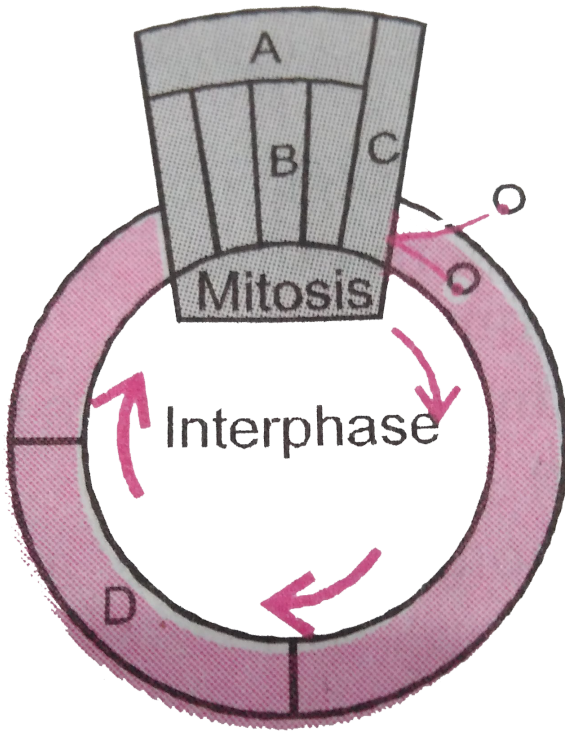
D. both prophase I and II

Answer: B



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129. Given below is schematic break-up of phases of cell cycle. Which one is correct matching ?



A. D-Synthetic phase

B. A-Cytokinesis

C. B-Metaphase

D. C-Karyokinesis

Answer: A



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130. Synapsis occurs between

A. Spindle fibres and centromere

B. Two homologous chromosomes

C. A male and a female gamete

D. mRNA and ribosomes

Answer: B



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131. Recombination is completed by the end of

A. Zygotene

B. Leptotene

C. Pachytene

D. Diplotene

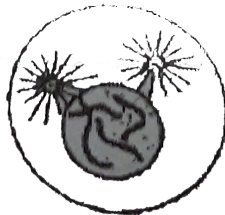
Answer: C

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132. Which stages of cell division do the following figures A and B represent respectively



A



B

A. Prophase - Anaphase

B. Metaphase - Telophase

C. Telophase - Metaphase

D. Late Anaphase - Prophase

Answer: D



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133. Most of the histone production during cell cycle occurs in

A. G_0 phase

B. G_1 phase

C. S phase

D. G_2 phase

Answer: C



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134. Which stage is marked by terminalization of chiasmata?

A. Zygotene

B. Pachytene

C. Diplotene

D. Diakinesis

Answer: D



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135. At metaphase, chromosomes are attached to the spindle fibres by their

A. Satellites

B. Secondary constrictions

C. Kinetochores

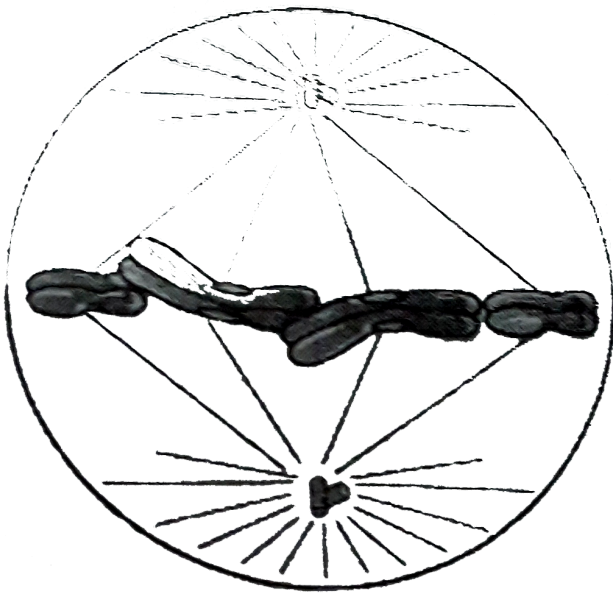
D. Centromere

Answer: C



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136. 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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137. Spindles are arrested by colchicine at

A. anaphase

B. metaphase

C. telophase

D. prophase

Answer: B



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

A. Anaphase I

B. Anaphase II

C. Metaphase I

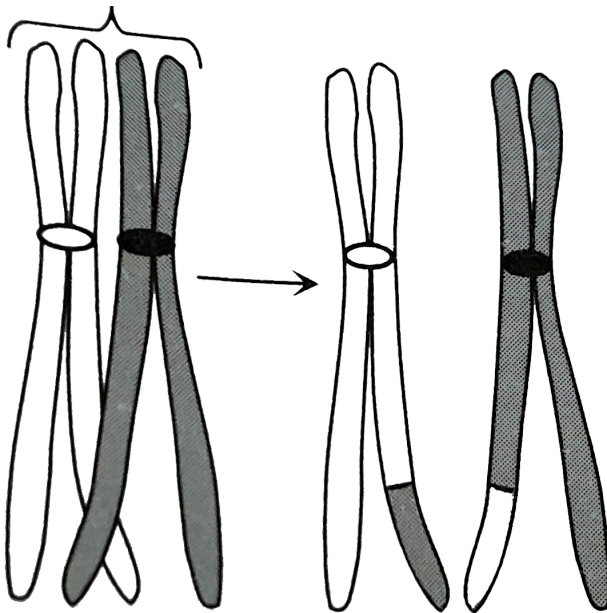
D. Metaphase II

Answer: A



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139. Given below is the representation of a certain event at a particular stage of a type of cell division. Which is this stage



A. Prophase II during meiosis

B. Prophase of Mitosis

C. Both prophase and metaphase of mitosis

D. Prophase I during meiosis

Answer: D



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140. During gamete formation, the enzyme recombinase participates during

- A. Anaphase-II
- B. Prophase-I
- C. Prophase-II
- D. Metaphase-I

Answer: B



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141. Chiasmata can be distinctively seen in

A. Zygotene

B. Pachytene

C. Diplotene

D. Diakinesis

Answer: C



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

- A. Bivalent
- B. Axoneme
- C. Equatorial plate
- D. Kinetochore

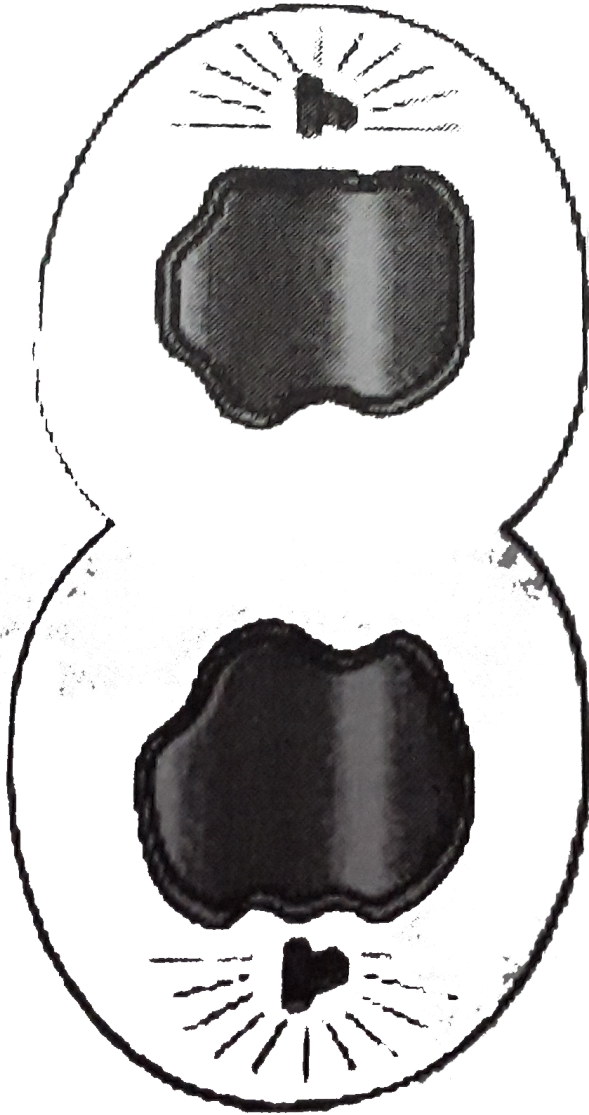
Answer: A



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

characteristics



A. prophase

B. metaphase

C. anaphase

D. telophase

Answer: 4



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144. In 'S' phase of the cell cycle

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

B. Amount of DNA doubles in each cell

C. Amount of DNA remains same in each cell

D. Chromosome number is increased

Answer: B



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

A. G_2 and M

B. G_0 and G_1

C. G_1 and S

D. Only G_2

Answer: D



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

A. Diakinesis

B. Pachytene

C. Zygotene

D. Diplotene

Answer: B



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147. Select the correct option

	I		II
A	Synapsis aligns homologous chromosomes	(i)	Anaphase-II
B	Synthesis of RNA and protein	(ii)	Zygotene
C	Action of enzyme recombinase	(iii)	G ₂ -phase
D	Centromeres do not separate but chromatids move towards opposite poles	(iv)	Anaphase-I
		(v)	Pachytene

- A. *A* *B* *C* *D*
(ii) (iii) (v) (iv)
- B. *A* *B* *C* *D*
(i) (ii) (v) (iv)
- C. *A* *B* *C* *D*
(ii) (iii) (iv) (v)
- D. *A* *B* *C* *D*
(ii) (i) (iii) (iv)

Answer: A



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148. A chromosome, in which the centromere is situated is situated close to its end so that one arm is very short and other vey long is

- A. acrocentric
- B. telocentric
- C. sub-metacentric
- D. metacentric

Answer: A



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149. A somatic cell that has just completed has just completed the S-phase of its cell cycle, as compared to gamete of the same species, has

A. same number of chromosomes but twice the amount of DNA

B. twice the number of chromosomes and four times the amount of DNA

C. four times the number of chromosomes
and twice the amount of DNA

D. twice the number of chromosomes and
twice the amount of DNA

Answer: B



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150. Arrange the following events of meiosis in
correct sequence

(a) Crossing over

(b) Synapsis

(c) Terminalisation of chiasmata

(d) Disappearance of nucleolus.

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

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

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

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

Answer: B



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151. 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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152. Spindle fibers attach on to

- A. Kinetochore of the chromosome
- B. Centromere of the chromosome
- C. Kinetosome of the chromosome
- D. Telomere of the chromosome

Answer: A



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153. In meiosis crossing over is initiated at

A. Leptotene

B. Zygotene

C. Diplotene

D. Pachytene

Answer: D



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154. At what stages of cell cycle does DNA synthesis take place.

A. S phase

B. G_1 phase

C. G_2 phase

D. M phase

Answer: A



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155. 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: A



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

Column - I	Column - II
1. Pachytene	(i) Pairing of homologous chromosomes
2. Metaphase I	(ii) Terminalization of chiasmata
3. Diakinesis	(iii) Crossing over takes place
4. Zygotene	(iv) Chromosomes align at equatorial plate

A. 1 2 3 4
 (iii) (iv) (ii) (i)

B. 1 2 3 4
 (i) (iv) (ii) (iii)

- C. 1 2 3 4
 (ii) (iv) (iii) (i)
- D. 1 2 3 4
 (iv) (iii) (ii) (i)

Answer: A



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157. 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 not condense
- B. Chromosomes will be fragmented
- C. Chromosomes will not segregate
- D. Recombination of chromosome arms will occur

Answer: C



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

A. Condensation → nuclear membrane disassembly → crossing over → segregation → telophase

B. Condensation → nuclear membrane disassembly → arrangement at equator → centromere division → segregation → telophase

C. Condensation → crossing over →

nuclear membrane disassembly →

segregation → telophase

D. Condensation → arrangement at

equator → centromere division →

segregation → telophase

Answer: B



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