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Topic: Cell Cycle & Cell Division
Class: 11th Ignite
Sub: Biology

EXERCISE – I

1. Which of the following not occurs in Anaphase-I but occurs in Anaphase-II :-
(A) Condensation of chromosomes (B) Poleward movement of chromosome
(C) Contraction of spindle fibers (D) Splitting of centromere

2. Crossing over takes place in :-
(A) Zygotene (B) Pachytene (C) Diplotene (D) Diakinesis

3. Which of the two events restore the normal number of chromosomes in life cycle ?
(A) Mitosis and Meiosis (B) Meiosis and fertilization
(C) Fertlisation and mitosis (D) Only meiosis

4. Match the column-I with column-II and select the correct answer :

Column-I	Column-II
(a) Pachytene	(i) Bouquet stage
(b) Zygotene	(ii) Chiasma visible
(c) Diplotene	(iii) Terminalisation
(d) Leptotene	(iv) Gene exchange
(e) Diakinesis	(v) Synapsis

(A) a-i, b-ii, c-iii, d-iv, e-v (B) a-iv, b-v, c-ii, d-i, e-iii
(C) a-iii, b-iv, c-v, d-ii, e-i (D) a-ii, b-iii, c-iv, d-i, e-v

5. Which part of plant is suitable for the study of meiosis :-
(A) Root apex (B) Ovary (C) Anther (D) Shoot apex

6. Slipping of chiasmata towards the ends of bivalent is called :-
(A) Terminalisation (B) Diakinesis (C) Interkinesis (D) Heteropycnosis

7. In meiosis, how many cycle of chromosome division occurs ?
(A) One (B) Four (C) Two (D) Three

8. "Bouquet-stage" occur in which sub stages of prophase-I ?
(A) Leptotene (B) Zygotene (C) Pachytene (D) Diplotene

9. At anaphase-II of meiosis each chromosome contains :-
(A) 4-DNA (B) 3-DNA (C) 2-DNA (D) 1-DNA

10. In Anaphase-I each chromosome composed of :-
(A) One chromatid (B) Two chromatid (C) Four chromatid (D) Many chromatid

11. In meiosis, division of centromere occurs during :-
(A) Interphase (B) Anaphase-I (C) Anaphase-II (D) Metaphase-I

12. In meiosis, nuclear membrane and nucleolus disappear during :-

(A) Zygotene (B) Pachytene (C) Diakinesis (D) Metaphase-I

13. Separation of homologous chromosomes during Anaphase-I is called :-

(A) Synapsis (B) Disjunction (C) Nondisjunction (D) Crossing over

14. Diakinesis represent :-

(A) transition to prophase (B) transition to metaphase

(C) transition to anaphase (D) transition to telophase

15. Synaptonemal complex is characteristic of :-

(A) Mitotic chromosomes (B) Leptotene chromosomes

(C)Paired meiotic chromosomes (D) Metaphase

16. Each chromosome composed of one chromatid in :-

(A) Anaphase-I (B) Anaphase-II (C) Metaphase-I (D) Metaphase-II

17. If the number of bivalents are 8 in metaphase-I what shall be the number of chromosomes in daughter cells after meiosis-I and meiosis-II respectively :-

(A) 8 and 4 (B) 4 and 4 (C) 8 and 8 (D) 16 and 8

18. Which of the following not occurs in Anaphase-I

(A) Segregation of homologous chromosomes

(B) Shortening in spindle

(C) Poleward movement of chromosomes

(D) Division of centromere

19. In meiosis :-

(A)Division of nucleus twice but replication of DNA only once

(B) Division of nucleus twice and replication of DNA twice

(C) Division of nucleus once and replication of DNA is also once

(D) Division of nucleus once and DNA-replication is twice

20. After meiosis-I, the two chromatids of a chromosome are :-

(A) Genetically similar

(B) Genetically different

(C) There occurs only one chromatid in each chromosome

(D) None of the above

21. Chiasmata appears during :-

(A) Diakinesis (B) Synaptotene (C) Diplotene (D) Leptotene

22. Pairing of homologous chromosomes is called :-

(A) Disjunction (B) Synapsis (C) Segregation (D) Polyteny

23. Synaptionemal complex first appear :-

(A) Leptotene (B) Pachytene (C) Zygotene (D) Diplotene

24. The correct sequence of prophase-I of meiosis is :-

(A) Leptotene, pachytene, zygotene, diplotene, diakinesis

(B) Leptotene, diplotene, pachytene, zygotene, diakinesis

(C) Leptotene, zygotene, pachytene, diplotene, diakinesis

(D) Leptotene, zygotene, diakinesis, diplotene

25. Which of the following is called heterotypic division :-

(A) Meiosis-I (B) Meiosis-II (C) Mitosis (D) Amitosis

26. Thick-thread stage occurred in :-
(A) Leptotene (B) Zygotene (C) Pachytene (D) Diplotene

27. The significance of meiosis is that it :-
(A) Produce four cells having chromosomal number equal to mother cell
(B) Occurs in all types of cells
(C)Maintains the constant chromosomes number to a particular species
(D) Growth of animal body organs

28. The number of DNA in chromosome at G_2 state of cell cycle :-
(A) One (B) Two (C) Four (D) Eight

29. 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 different bivalents (D) Sister chromatids of a bivalents

30. In the 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 follows mitotic phase
(D) In G_1 phase DNA content is double the amount of DNA present in the original cell

31. 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

32. Many cells function properly and divide mitotically even through they do not have :-
(A) Plasma membrane (B) Cytoskeleton (C) Mitochondria (D) Plastids

33. Centromere is required for :-
(A) Movement of chromosomes towards poles
(B) Cytoplasmic cleavage
(C) Crossing over
(D) Transcription

34. At which stage of the cell cycle are histone proteins synthesized in a eukaryotic cell ?
(A) During telophase
(B) During S-phase
(C) During G_2-stage of prophase
(D) During entire prophase

35. If the n = 16 in plant cell then what is possible in metaphase –I of meiosis ?
(A) 32 bivalents (B) 16 telravalents (C) 16 bivalents (D) 32 bivalents

MITOSIS

36. During G_2-phase a diploid cell contains the amount of DNA equal to a :-
(A) Diploid cell (B) Tetraploid cell (C) Haploid cell (D) Nothing can be said

37. A contractile mid body forms during cytokinesis in :-
(A) Animals (B) Higher plants (C) Fungi (D) Algae

38. In which order, cytokinesis occurs in plants :-
(A) Centripetel (B) Centrifugal (C) Oblique (D) Equatorial

39. Chromosomal movement in Anaphase occurs with the help of :-

(A) Astral rays (B) Centrioles (C) NOR (D) Spindle fibres

40. Nuclear envelope reappears at :-

(A) Metaphase (B) Prophase (C) Anaphase (D) Telophase

41. Which does not occurs in prophase ?

(A) Decondensation of chromatin

(B) Condensation of chromatin

(C) Appearance of chromosome

(D) Disappearance of nuclear membrane and nucleolus

42. In which stage of cell division, number of chromosomes best counted :-

(A) Prophase (B) Metaphase (C) Telophase (D) Interphase

43. How many chromosome shall be present in a diploid cell at mitotic anaphase if its egg cell has ten chromosome :-

(A) 10(Ten) (B) 20(Twenty) (C) 30(Thirty) (D) 40(Forty)

44. Chromosome exhibit high level of coiling at which phase of karyokinesis :-

(A) Prophase (B) Metaphase (C) Telophase (D) Interphase

45. In which stage of mitosis, the chromosomes are composed of two chromatids ?

(A) Prophase & metaphase (B) Anaphase and telophase

(C) Prophase and telophase (D) Metaphase and anaphase

46. Gap between division phase and start of DNA-replication is called :-

(A) G_1-phase (B) G_2-phase (C) M-phase (D) Interkinesis

47. In cell cycle, which stage is misnomerly called resting phase :-

(A) S-phase (B) Telophase (C) Cytokinesis (D) Interphase

48. During cell division, spindle fibres attach to which part of chromosome :-

(A) Primary constriction (B) Secondary constriction

(C) Chromomere (D) Chromatid

49. During which stage a diploid cell becomes tetraploid in mitosis :-

(A) G_2 (B) Prophase (C) Metaphase (D) Anaphase

50. Division of centromere occurs in :-

(A) Prophase (B) Metaphase (C) Anaphase (D) Telophase

51. Which one of the following statement is correct ?

(A) Cell divided by cytokinesis only in mitosis

(B) DNA is replicated before the start of meiosis only

(C) Spindles consisting of microtubules are formed only in mitosis

(D) Exchange of genetic materials occurs only in meiosis

52. What happens in synthesis phase during cell cycle :-

(A) DNA synthesis (B) Chromosome number becomes double

(C) Formation of two nuclei (D) Synthesis of tubulin proteins

53. Reappearance of nuclear memebrane & nucleolus along with thining & elongation in chromosomes are diagnostic characters for the phase :-

(A) Anaphase (B) Metaphase (C) Interphase (D) Telophase

54. Condensation of chromosomes and appearance of astral rays occurs during :-

(A) Prophase (B) Metaphase (C) Anaphase (D) Telophase

55. During telophase :-
(A) Nuclear membrane is formed (B) Nucleolus appears
(C) Astral rays disappear (D) All the above

56. Chromosomal morphology (Structure) is best observed at :-
(A) Prophase (B) Metaphase (C) Interphase (D) Anaphase

57. Preparation phase of mitosis is :-
(A) G_1 – phase (B) S – phase (C) Prophase (D) Interphase

58. M-phase of cell cycle consist of :-
(A) G_1, S and G_2 phase
(B) Prophase, metaphase, anaphase, telophase
(C) Interphase, prophase, metaphase, anaphase, telophase
(D) Only prophase

59. If the cell is diploid in G_1 than after the S phase cell remain/become :-
(A) n (B) 4n (C) 8n (D) 2n

60. Nuclear membrane disappears in :-
(A) Late prophase (B) Early prophase (C) Metaphase (D) Telophase

61. Pre-DNA synthesis phase is :-
(A) G_1 – phase (B) G_2 - phase (C) S – phase (D) Prophase

62. DNA replication is found in :-
(A) Mitosis and meiosis-I (B) Mitosis and meiosis-I and meiosis-II
(C) Meiosis only (D) Mitosis only

63. How many times division will occur in an isolated tip cell to form 128 cells ?
(A) 128 (B) 127 (C) 32 (D) 7

64. In which stage the DNA is doubled :-
(A) Metaphase (B) Anaphase (C) Interphase (D) Prophase

65. Cell cycle of an ordinary animal cell :-
(A) $2n \xrightarrow{\text{Mitosis}} n \xrightarrow{\text{Fertilization}} 2n \xrightarrow{\text{Meiosis}} 2n$
(B) $n \xrightarrow{\text{Meiosis}} 2n \xrightarrow{\text{Fertilization}} 2n \xrightarrow{\text{Mitosis}} n$
(C) $2n \xrightarrow{\text{Meiosis}} n \xrightarrow{\text{Fertilization}} 2n \xrightarrow{\text{Mitosis}} 2n$
(D) $2n \xrightarrow{\text{Fertilization}} n \xrightarrow{\text{Mitosis}} 2n \xrightarrow{\text{Meiosis}} n$

EXERCISE-II

1. Which one is correct about S-shape of cell cycle
(A) It occurs between G_1 and G_2
(B) It marks the period during which DNA replicates
(C) At the end of this phase DNA is doubled but the number of chromosomes remains unchanged
(D) All of these

2. Identify the stage when homologous chromosomes separate but sister chromatids remain associated
(A) Metaphase-I (B) Anaphase-I (C) Metaphase-II (D) Anaphase-II

3. Which one is not found in zygotene of meiosis.
(A) Synapsis (B) Synaptonemal complex
(C) Bivalent chromosome (D) Crossing over

4. Which of following is related with mesosome
(A) DNA replication (B) DNA transfer (C) Cell division (D) all of above

5. Gametic meiosis and zygotic meiosis are result in respectively
(A) Diplontic life cycle, haplontic life cycle (B) Haplontic life cycle, diplontic life cycle
(C) Haplontic life cycle, haplontic life cycle (D) Diplontic life cycle, diplontic life cycle

6. The ER and GB are disappeared in
(A) Beginning of anaphase (B) End of anaphase
(C) Beginning of prophase (D) End of prophase

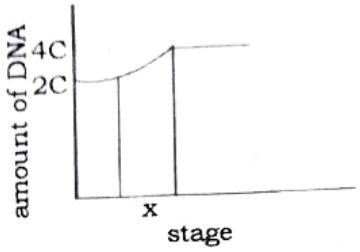
7. Which type of spindle fibre is present in Anaphase but absent in metaphase
(A) Chromosomal spindle fibre (B) Non chromosomal spindle fibre
(C) Interzonal spindle fibre (D) None of these

8. If an haploid cell of an animal cell contain 'C' concentration of DNA than what is the amount of DNA in G_2 phase of diploid cell
(A) 4C (B) 2C (C) C (D) 8C

9. A diploid cell which consist 46 chromosomes, than how many bivalent or tetrad found in Zygotene
(A) 46 (B) 23 (C) 92 (D) None

10. If a meiocyte cell contain 26 chromosome in G_1- phase than how many chromatids is/are present in each chromosome of anaphase-I
(A) 26 (B) 52 (C) 1 (D) 2

11. In given graph



x represents :
(A) Interphase (B) Metaphase (C) Anaphase (D) Prophase

12. Recombinase enzyme is functional in _____.

(A) Leptoene (B) Zygotene (C) Pachytene (D) Deplotene

13. How many types of core proteins are present in nucleosome.

(A) 4 (B) 8 (C) 9 (D) 5

14. Initiation of assembly of mitotic spindle, appearance of two chromatids, initiation of condensation process are marked feature of :

(A) Prophase (B) Metaphase (C) Anaphase (D) Telophase

15. If a cell cotain 14 chromosomes in its nucleus than what is the ratio between chromosome and chromatids in anaphase-I.

(A) 1 : 2 (B) 2 : 1 (C) 1 : 4 (D) 1 : 1

16. Which is the chracteristics of Diplotene

(A) It can last for months or years in some invertibrates

(B) Chiasmata are absent in it.

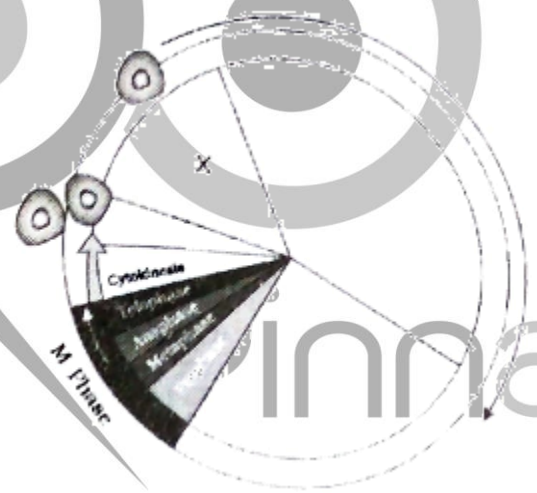
(C) It is recognized by dissolution of the synaptonemal complex

(D) None of these

17. Arm ratio in submetacentric chromosome is :-

(A) 1 : 0 (B) 2 : 1 (C) 4 : 1 (D) 1 : 1

18. Consider the given diagram :



In above diagram 'X' is -

(A) Pre synthesis phase (B) Post mitotic phase

(C) G_1 – phase (D) All of these

19. Which is correct about quiescent stage of cell :

(A) G_0 – phase, cell metabolically passive (B) G_1 – phase, cell metabolically active

(C) G_0 – phase, cell metabolically active (D) G_1 – phase, cell metabolically passive

20. 'X' shaped structure on chromosomes is the characteristics of

(A) Mitosis (B) Meiosis - I (C) Meiosis - II (D) Both B and C

21. Consider the following statements –

(i) Nuclear membrane, nucleolus, ER and GB are reappeared

(ii) Chromosomes are decondensed and converted in chromatin fibre

(iii) One chromatin consists two chromatids

Above characteristics represents -

(A) Telophase (B) Telophase-I (C) Telophase-II (D) All of these

22. I^{st} check point is found between

(A) G_1 & S phase (B) G_2 & M phase

(C) S & G_2 phase (D) Prophase & metaphase

23. In which of following stage metabolic activity is maximum.

(A) Interphase (B) Prophase (C) Metaphase (D) Anaphase

24. If a cell of aleurone layer contain 48 chromosomes than, how many chromosomes are found in a meiocyte.

(A) 48 (B) 16 (C) 32 (D) 64

25. In which of following stage maternal and paternal characteristics are mixed between homologous chromosomes.

(A) Metaphase (B) Anaphase-I (C) Pachytene (D) S-phase

26. Segregation of sister chromatids is found in :

(A) Prophase (B) Anaphase (C) Anaphase-I (D) Both (B) and (C)

27. Which of following is an example of meiocyte -

(A) Epidermal cell of root (B) Mesophyll cell of leaf

(C) Epidermal cell of anther (D) Microspore mother cell

28. The G_2 phase of the cell cycle is characterized by the presence of :

(A) Normal diploid (2n) chromosomes

(B) Single chromatids

(C) DNA synthesis

(D) Double amount of DNA (in chromosomes) than in S-phase

29. A tetrad consists of :

(A) Four non homologous chromatids

(B) Four non-homologous chromosomes

(C) Two sets of homologous chromosomes, each with two sister chromatid

(D) Two sets of homologous chromosomes, each with non-sister chromosomes

30. G_0 stage of cells in eukaryotic cell cycle denotes :

(A) Check point before entering the next phase

(B) Pausing in the middle of cycle to cope with a temporary delay

(C) Death of cell

(D) Exit of cell from cell cycle

31. Which of the following does not occur in the interphase of eukaryotic cell division ?

(A) Increase of ATP synthesis (B) Increase of DNA synthesis

(C) Increase of RNA synthesis (D) Reduction in cell size

32. During meiosis I, the bivalent chromosomes clearly appear as tetrads during :

(A) diakinesis (B) diplotene

(C) zygotene (D) telocentric and acrocentric

33. One type of chromosome has middle centromere whereas other has a terminal centromere. They are

(A) metacentric and acrocentric (B) metacentric and telocentric

(C) sub-metacentric and telocentric (D) telocentric and acrocentric

34. How many are correct :

a. Nuclear membrane forms a barrier between nuclear material and cytoplasm

b. Larger and more numerous nucleoli are present in cell actively carrying out protein synthesis

c. A chromatin contain DNA, histone protein, non-histone protein and also RNA

d. Primary constriction of chromosome is called as kinetochores

(A) 3 (B) 4 (C) 1 (D) 2

35. Select the correct statements in following :

a. Outer nuclear membrane usually remains continuous with ER and also bear ribosomes

b. Through nuclear pore movement of DNA, RNA and protein take place

c. Nuclear pores are formed by the fission of two membranes of nucleus

d. Nuclear pores are passages between the nucleus and the cytoplasm

(A) b, c, d (B) a, d (C) a. b. c (D) all

36. The statement related to nuclear membrane :

(a) Both membrane run parallel to each other

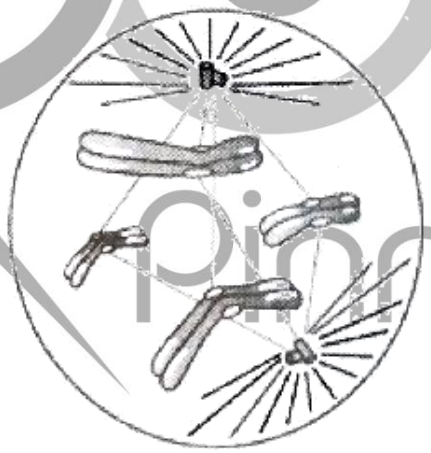
(b) Perinuclear space (10 to 50 nm)

(c) Outer membrane remains continuous with ER

(A) only (a) and (b) statement are true (B) only (a) and (b) statement are true

(C) no one statement is incorrect (D) (a), (b) and (c) are incorrect

37. In relation to the given diagram of cell division for mitosis, which of the following statements is incorrect :



(A) This representing the transition of prophase to metaphase

(B) Chromosomes are moving towards equatorial plate

(C) Spindle fibres are formed and centrioles are reached at the poles

(D) Nuclear membrane is present while nucleaolus, ER and golgi complex are disappeared

38. In some organisms karyokinesis is not followed by cytokinesis. Which leads to -

(A) formation of uninucleate condition (B) multinucleate condition

(C) amitosis (D) all the above

39. Match the followings :

I. Metacentric a. Centromere at the centre of chromosome

II. Sub-metacentric b. Centromere absent in chromosome

III. Acentric c. Centromere at some distance from centre
IV. Telocentric d. Centromere at the tip of choromosome

(A) I-a, II-b, III-c, IV-d (B) I-a, II-b, III-d, IV-c
(C) I-a, II-c, III-b, IV-d (D) I-a, II-d, III-c, IV-b

40. Bivalents in meiosis are :
(A) single chromosomes (B) pairs of non-homologous chromosomes
(C) pairs of several chromatids (D) pairs of homologous chromosomes

41. In meiosis the daughter cells are not similar to that of parent because of:
(A) crossing over (B) synapsis (C) both (1) and (2) (D) none of these

42. What shape is taken by an acrocentric and telocentric chromosome at the anaphase of meiosis respectively
(A) I and V shape (B) V and J shape (C) J and I shape (D) I and J shape

43. Meiocyte is the name given to a cell in which **-**
(A) reduction division takes place (B) amitosis takes place
(C) mitosis takes place (D) budding occurs

44. Which of the following is not true for homologous chromosome pairs ?
(A) they come from only one of individual's parents
(B) they usally contain slightly different versions of the same genetic information
(C) they segregate from each other during meiosis – I
(D) they synapse during meiosis – I

45. In which cell cytoplasm is divided centripetal type
(A) mesophyll (B) onion cell
(C) endodermis cell of root (D) animal cell

46. In diploid zygote, chromosome number is 80 chromosome number in a gamete will be -
(A) 40 (B) 20 (C) 10 (D) 30

47. Select the correct option :
(a) M- phase represents the phase when actual actual cell division occurs and division phase represents the phage between two successive m-phases
(b) cells with twice the normal DNA content in the G – phase
(c) during anaphase, centromere of each chromosomes splits and chromatids separate
(d) metaphase II begins with splitting of centromere of each chromosome into two
(e) mitosis helps the cell to restore the nucleo cytoplasmic ratio
(A) a, b, d, e (B) b, c, d, e (C) a, b, d (D) b, c, e

48. " Some cell undergo G_0 phase due to inactivation of cell cycle " the right explanation of this statement is :
(A) G_0 phase occurs due to non availability of mitogen and energy rich compound
(B) cell in this stage remain metabolically active but no longer proliferate
(C) both of these
(D) cells in this stage remain metabolically inactive

49. Which of the following events are not characteristic features of telophase?
(A) Chromosome material condenses to form compact mitotic chromosomes
(B) Nucleolus, golgi complex and ER reform

(C) Nucleolus envelope assembles around the chromosome clusters
(D) Centromeres split and chromatids separate
(E) Chromosomes cluster at opposite, spindle poles and their identity as discrete elements is lost
(1) A,B and C only (2*) A and D only (3) B and C only (4) C, D and E only

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 prophase
(D) Chromosomes move to the spindle equator and get aligened along equatorial plate in metaphase

51. Which statement is correct for meiotic cell cycle ?
(A) In G_1 each chromosome consists of two chromatids
(B) In S – phase the chromatids begin pair
(C) In G_2 phase the sister chromatids are held together by the centromere
(D) In M – I chromosome number remain the same

52. The number of chiasmta are :
(A) Inversly proportional to the length of the chromosome
(B) Directly proportional to the length of the chromosome
(C) Independent of the length of the chromosome
(D) All of these

53. 56 cells are produced in meiosis in which :
(A) First division is reductional
(B) First division is equational
(C) Second division is reductional
(D) None of these

54. Arrange the following events of meiosis in correct sequence :
I. crossing over II. Synapsis III. Terminalisation of chiasmata
IV. Disappearance of nucleolus
(A) I, II, III, IV (B) II, III, IV, I (C) II, I, IV, III (D) II, I, III, IV

55. Mitotic anaphase differs from metaphase in possessing
(A) spliting of centromere (B) pairing of chromosomes
(C) crossing over (D) all of these

56. In the somatic cell cycle :
(A)In G_1 phase DNA content is double the amount of DNA present in the original cell
(B) RNA replication takes place in S-phase
(C) A short interphase is followed by a long mitotic phase
(D) G_2 phase follows mitotic phase

57. Colchicine act at which stage of mitosis ?
(A) Anaphase (B) Metaphase (C) Telophase (D) Interphase

58. At the end of prophase, nucleolus disappers because of :
(A) Its enzymatic dissolution into its macro molecules
(B) Its dispersion into cytoplasm
(C)Its dispersion into nucleoplasm

(D) Its poor stainability

59. Crossing over occurs in

(A) pachytene (B) zygotene (C) leptotene (D) diplotene

60. The two chromatids of a metaphase chromosome represent :

(A) Replicated chromosomes to be separated at anaphase

(B) Homologous chromosome of a diploid set

(C) None-homologous chromosomes joined at the centromere

(D) Maternal and paternal chromosomes joined at the centromere

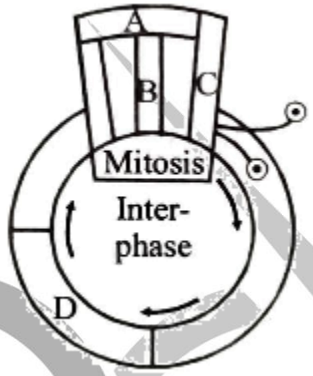
EXERCISE-III

1. Synapsis occurs between :-

(A) Two homologous chromosomes (B) A male and a female gamete

(C) mRNA and ribosomes (D) Spindle fibers and centromere

2. Given below is schematic break-up of the phases/stages of cell cycle :-



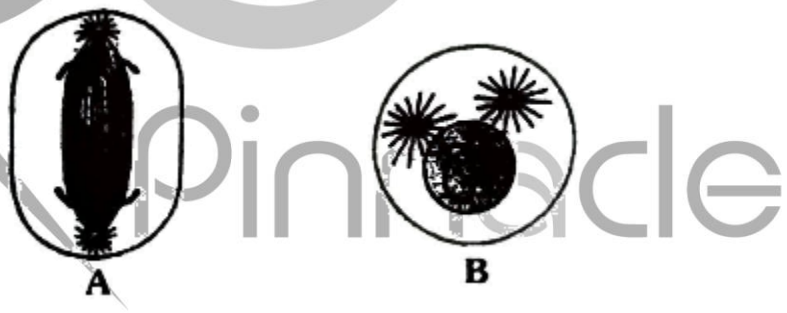
Which one of the following is the correct indication of the stage/phase in the cell cycle ?

(A) A-Cytokinesis (B) B-Metaphase (C) C-Karyokinesis (D) D-Synthetic phase

3. During mitosis ER and nucleolus begin to disappear at :-

(A) Early prophase (B) Late prophase (C) Early metaphase (D) Late metaphase

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



(A) Prophase - Anaphase (B) Metaphase – Telophase

(C) Telophase - Metaphase (D) Late Anaphase – Prophase

5. Select the correct option with respect to mitosis

(A) Chromatids separate but remain in the center 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

6. At metaphase, chromosomes are attached to the spindle fibers by their :-

(A) Centromere (B) Satellites

(C) Secondary constrictions (D) Kinetochores

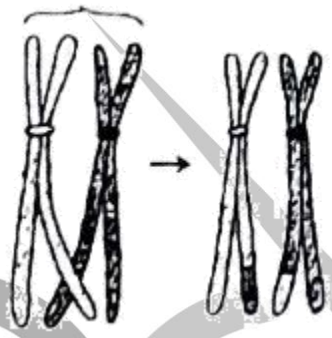
7. Meiosis is not having the one of the character out of the four given below :-

(A) It involves two stages of DNA replication, one before meiosis-I and another before meiosis-II

(B) It involves recombination and crossing over
(C) Sister chromatids separate during anaphase-II
(D) Nuclear membrane disappears during prophase

8. During gamete formation, the enzyme recombinase participates during :-
(A) Prophase-I (B) Prophase-II (C) Metaphase-I (D) Anaphase-II

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

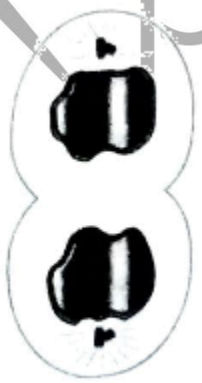


(A) Prophase of Mitosis (B) Both prophase and metaphase of mitosis
(C) Prophase I during meiosis (D) Prophase II during meiosis

10. Identify the meiotic stage in which the homologous chromosomes separate while the sister chromatids remain associated at their centromeres :-
(A) Anaphase-I (B) Anaphase-II (C) Metaphase-I (D) Metaphase-II

11. Which of the following is wrong about G_1 phase?
(A) G_1 stage followed by Mitosis (B) Cell is metabolically active
(C) Cell grows continuously (D) Cell does not replicate its DNA

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



(A) Telophase Endoplasmic reticulum and nucleolus not reformed yet.
(B) Telophase Nuclear envelop reforms, Golgi complex reforms.
(C) Late anaphase Chromosomes move away from equatorial plate, Golgi complex not present.
(D) Cytokinesis Cell plate formed, mitochondria distributed between two daughter cells.

13. The complex formed by a pair of synapsed homologous chromosomes is called :-
(A) Axoneme (B) Equatorial plate (C) Kinetochore (D) Bivalent

14. In which phase of cell cycle the amount of DNA in a diploid cell become four times as compared to a haploid cell?

(A) G_1 (B) S (C) G_2, S & M (D) G_0

15. 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_0 and G_1 (B) G_1 and S (C) Only G_2 (D) G_2 and M

16. 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.

17. The enzyme recombinase is required at which stage of meiosis :-

(A) Pachytene (B) Zygotene (C) Diplotene (D) Diakinesis

18. Which of the following is longest phase of the cell cycle ?

(A) Prophase (B) Interphase (C) Telophase (D) M-phase

19. A somatic cell that 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

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

(a) Crossing over (b) Synapsis

(c) Terminalisation of chaismata (d) Disappearance of nucleolus

(A) (b), (c), (d), (a) (B) (b), (a), (d), (c) (C) (b), (a), (c), (d) (D) (a), (b), (c), (d)

21. During cell cycle in which phase normal components of cell are synthesized, and assembled?

(A) S (B) G_2 (C) G_1 (D) M

22. In meiosis crossing over is initiated at :-

(A) Pachytene (B) Leptotene (C) Zygotene (D) Diplotene

23. A cell at telophase stage is observed by a student in a plant brought from the field. He tells his teacher that this cell is not like other cells at telophase stage. There is no formation of cell plate and thus the cell is containing more number of chromosomes as compared to other dividing cells. This would result in :-

(A) Aneuploidy (B) Polyploidy

(C) Somaclonal variation (D) Polyteny

24. During cell growth, DNA synthesis takes place in :-

(A) G_2 phase (B) M phase (C) S phase (D) G_1 phase

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

(A) M (B) Both G_2/M and M (C) G_1/S (D) G_2/M

26. 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**

(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

Codes:

	a	b	c	d
(A)	ii	iv	iii	i
(B)	iv	iii	ii	i
(C)	iii	iv	ii	i
(D)	I	iv	ii	iii

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

(A) Chromosomes will be fragmented

(B) Chromosomes will not segregate

(C) Recombination of chromosome arms will occur

(D) Chromosomes will not condense

28. Which of the following options gives the correct sequence of events during mitosis ?

(A) Condensation → nuclear membrane disassembly → arrangement at equator → centromere division → segregation → telophase

(B) Condensation → crossing over → nuclear membrane disassembly → segregation → telophase

(C) Condensation → arrangement at equator → centromere division → segregation → telophase

(D) Condensation → nuclear membrane disassembly → crossing over → segregation → telophase

29. The stage during which separation of the paired homologous chromosomes begins is :-

(A) Diakinesis (B) Zygotene (C) Diplotene (D) Pachytene

30. Select the incorrect match :-

(A) Submetacentric chromosomes – L-shaped chromosomes

(B) Polytene chromosomes – Oocytes of amphibians

(C) Allosomes – Sex chromosomes

(D) Lampbrush chromosomes – Diplotene bivalents

31. The correct sequence of phases of cell cycle is :-

(A) $M \rightarrow G_1 \rightarrow G_2 \rightarrow S$ (B) $G_1 \rightarrow G_2 \rightarrow S \rightarrow M$

(C) $S \rightarrow G_1 \rightarrow G_2 \rightarrow M$ (D) $G_1 \rightarrow S \rightarrow G_2 \rightarrow M$

32. Cell in G_0 phase :-

(A) exit the cell cycle (B) enter the cell cycle

(C) suspend the cell cycle (D) terminate the cell cycle

ANSWER KEY

EXERCISE -I

1.	(D)	**2.**	(B)	**3.**	(B)	**4.**	(B)	**5.**	(C)	**6.**	(A)	**7.**	(A)
8.	(A)	**9.**	(D)	**10.**	(C)	**11.**	(C)	**12.**	(B)	**13.**	(B)	**14.**	(B)
15.	(C)	**16.**	(B)	**17.**	(C)	**18.**	(D)	**19.**	(A)	**20.**	(B)	**21.**	(B)
22.	(B)	**23.**	(C)	**24.**	(C)	**25.**	(A)	**26.**	(C)	**27.**	(C)	**28.**	(B)
29.	(A)	**30.**	(A)	**31.**	(B)	**32.**	(A)	**33.**	(B)	**34.**	(D)	**35.**	(D)
36.	(A)	**37.**	(B)	**38.**	(D)	**39.**	(B)	**40.**	(A)	**41.**	(A)	**42.**	(D)
43.	(A)	**44.**	(D)	**45.**	(C)	**46.**	(D)	**47.**	(A)	**48.**	(D)	**49.**	(A)
50.	(D)	**51.**	(B)	**52.**	(D)	**53.**	(B)	**54.**	(D)	**55.**	(A)	**56.**	(A)
57.	(A)	**58.**	(D)	**59.**	(C)	**60.**	(C)	**61.**	(A)	**62.**	(A)	**63.**	(D)
64.	(C)	**65.**	(C)										

EXERCISE -II

1.	(D)	**2.**	(B)	**3.**	(D)	**4.**	(D)	**5.**	(A)	**6.**	(D)	**7.**	(C)
8.	(A)	**9.**	(B)	**10.**	(D)	**11.**	(A)	**12.**	(C)	**13.**	(A)	**14.**	(A)
15.	(A)	**16.**	(C)	**17.**	(B)	**18.**	(D)	**19.**	(C)	**20.**	(B)	**21.**	(B)
22.	(A)	**23.**	(A)	**24.**	(C)	**25.**	(C)	**26.**	(B)	**27.**	(D)	**28.**	(A)
29.	(C)	**30.**	(D)	**31.**	(D)	**32.**	(D)	**33.**	(B)	**34.**	(A)	**35.**	(B)
36.	(C)	**37.**	(D)	**38.**	(B)	**39.**	(C)	**40.**	(D)	**41.**	(D)	**42.**	(C)
43.	(A)	**44.**	(A)	**45.**	(D)	**46.**	(A)	**47.**	(D)	**48.**	(C)	**49.**	(B)
50.	(D)	**51.**	(C)	**52.**	(B)	**53.**	(A)	**54.**	(D)	**55.**	(A)	**56.**	(D)
57.	(B)	**58.**	(B)	**59.**	(A)	**60.**	(A)						

EXERCISE -III

1.	(A)	**2.**	(D)	**3.**	(B)	**4.**	(D)	**5.**	(D)	**6.**	(D)	**7.**	(A)
8.	(A)	**9.**	(C)	**10.**	(A)	**11.**	(A)	**12.**	(B)	**13.**	(D)	**14.**	(B)
15.	(D)	**16.**	(A)	**17.**	(A)	**18.**	(B)	**19.**	(B)	**20.**	(C)	**21.**	(C)
22.	(A)	**23.**	(B)	**24.**	(C)	**25.**	(D)	**26.**	(C)	**27.**	(B)	**28.**	(A)
29.	(C)	**30.**	(B)	**31.**	(D)	**32.**	(C)						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