

Test Code: B



# BIOPEGIA BIOLOGY

NEET-UG, CUET-PG-LIFE SCIENCES & BIOLOGY ALLIED EXAMS

## NEET-UG Biology Test Series — Test 2

### *Cell Cycle and Division*

Date: 2026-07-18

Duration: 60 Min.

Max. Marks: 360

Name: \_\_\_\_\_

Roll No: \_\_\_\_\_

Batch: \_\_\_\_\_

### GENERAL INSTRUCTIONS

1. This booklet contains 90 multiple-choice questions in Biology. All questions are compulsory.
2. Each question has four options, out of which only ONE is correct. Choose the most appropriate answer.
3. Marking scheme: +4 for each correct answer, -1 for each incorrect answer. Unattempted questions carry zero marks.
4. Do not write or mark anywhere on this booklet except in the space provided for rough work.
5. Use of calculators, mobile phones, log tables, or any other electronic device is strictly prohibited.
6. Ensure that the booklet is complete and has no missing or repeated pages before starting.
7. Rough work must be done only in the space provided at the end of the booklet.
8. Hand over the booklet to the invigilator at the end of the test. It may not be retained by the candidate.

### ANSWER KEY & RESULTS

1. BioPedia Website: <https://biopediafoundation.com>
2. WhatsApp Groups & Student Contacts available on request



*Solved Test-2*

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1.

The sequence of events by which a cell duplicates its genome, synthesises other cellular constituents and eventually divides into two daughter cells is termed:

- (A) Cytokinesis
- ☒ (B) Cell cycle
- (C) Karyokinesis
- (D) Cell differentiation

2.

Which of the following processes must occur in a coordinated manner during the cell cycle to ensure correct division and formation of progeny cells with intact genomes?

- (a) DNA replication
- (b) Cell growth
- (c) Cell division
- (d) Fertilisation
- (A) (a) and (b) only
- ☒ (B) (a), (b) and (c) only
- (C) (b), (c) and (d) only
- (D) (a), (b), (c) and (d)

3.

All organisms, including the largest ones, begin their life from:

- ☒ (A) A single cell
- (B) A pair of gametes
- (C) A cluster of stem cells
- (D) A diploid tissue mass

4.

Growth and reproduction, as described for the process of cell division, are characteristic features of:

- (A) Only meristematic tissues
- (B) Only diploid somatic cells
- (C) Only germ line cells
- ☒ (D) Cells, and hence of all living organisms

6.

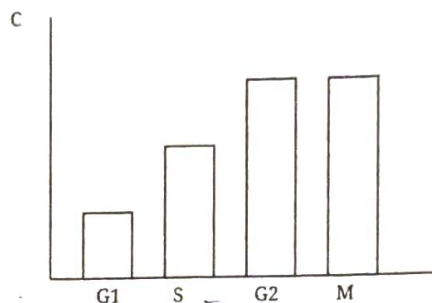
**Assertion (A):** Interphase is often referred to as the resting phase of the cell cycle.

**Reason (R):** During interphase the cell remains dormant and shows no metabolic activity.

- (A) Both Assertion (A) and Reason (R) are true, and R is the correct explanation of A
- (B) Both Assertion (A) and Reason (R) are true, but R is NOT the correct explanation of A
- ☒ (C) Assertion (A) is true, but Reason (R) is false
- (D) Assertion (A) is false, but Reason (R) is true

\* 5.

The diagram represents changes in DNA content (C) per cell during successive phases of the cell cycle, 1C DNA is present in gamet cell of the species, Which phase corresponds to the bar showing DNA content of a 2C



- ☒ (A) G1 phase
- (B) G2 phase
- (C) S phase
- (D) M phase

7.

Match List-I with List-II:

- |             |                                                               |
|-------------|---------------------------------------------------------------|
| a. G1 phase | 1. Cell grows, no DNA replication occurs                      |
| b. S phase  | 2. Protein synthesis in preparation for mitosis               |
| c. G2 phase | 3. DNA content doubles from 2C to 4C                          |
| d. G0 phase | 4. Metabolically active but non-proliferative quiescent stage |

- (A) a-2, b-1, c-4, d-3
- (B) a-1, b-2, c-3, d-4
- ☒ (C) a-1, b-3, c-2, d-4
- (D) a-4, b-2, c-1, d-3

8.

Which of the following statements regarding the cell cycle are correct?

- (a) DNA synthesis occurs only during S phase.
- (b) Centriole duplication occurs during S phase in animal cells.
- (c) M phase occupies more than half the total duration of the human cell cycle.
- (d) G2 phase involves synthesis of proteins required for mitosis.
- (A) (a), (b), (c) and (d)
- ☒ (B) (a), (b) and (d) only
- (C) (b), (c) and (d) only
- (D) (a) and (c) only

9.

**Statement I:** Yeast cells can complete one full cell cycle in about 90 minutes.

**Statement II:** In human cells with a 24 hour cell cycle, mitosis proper lasts for about 5 hours.

- (A) Both Statement I and Statement II are true  
 (B) Statement I is true but Statement II is false  
 (C) Statement I is false but Statement II is true  
 (D) Both Statement I and Statement II are false

10.

In a human cell with an average cell cycle duration of 24 hours, actual cell division (M Phase) lasts for approximately:

- (A) 1 hour  
 (B) 5 hours  
 (C) 12 hours  
 (D) 23 hours

11.

The M Phase of the cell cycle usually begins with separation of daughter chromosomes and ends with division of the cytoplasm. These two events are respectively called:

- (A) Cytokinesis and karyokinesis  
 (B) Synapsis and cytokinesis  
 (C) Karyokinesis and synapsis  
 (D) Karyokinesis and cytokinesis

12.

Which of the following statements regarding the two basic phases of the cell cycle are correct?

- (a) The cell cycle is divided into interphase and M Phase.  
 (b) Interphase represents the phase between two successive M phases.  
 (c) M Phase includes both karyokinesis and cytokinesis.  
 (d) The duration of the cell cycle is identical in all organisms and cell types.

- (A) (a) and (d) only  
 (B) (b), (c) and (d) only  
 (C) (a), (b) and (c) only  
 (D) (a), (b), (c) and (d)

13.

During which phase of the cell cycle does the amount of DNA per cell increase from 2C to 4C without any change in chromosome number?

- (A) G<sub>1</sub> phase  
 (B) S phase  
 (C) G<sub>2</sub> phase  
 (D) M phase

14.

Which of the following events occur during the G<sub>1</sub> phase of the cell cycle?

- (a) Continuous cell growth  
 (b) DNA replication  
 (c) Cell remains metabolically active  
 (d) Synthesis of proteins required for mitosis

- (A) (a) and (b) only  
 (B) (a) and (c) only  
 (C) (b) and (d) only  
 (D) (a), (c) and (d) only

15.

The diagram shows



- (A) Cell organelles begin to disappear  
 (B) Aster formation  
 (C) Centrioles migration to opposite poles  
 (D) b & c

16.

**Assertion (A):** G<sub>2</sub> phase of the cell cycle is characterised by synthesis of proteins required for mitosis.

**Reason (R):** During G<sub>2</sub> phase, cell growth continues along with the synthesis of proteins needed to prepare the cell for mitosis.

- (A) Both Assertion (A) and Reason (R) are true, and R is the correct explanation of A  
 (B) Both Assertion (A) and Reason (R) are true, but R is NOT the correct explanation of A  
 (C) Assertion (A) is true, but Reason (R) is false  
 (D) Assertion (A) is false, but Reason (R) is true

17.

In animals, mitotic cell division is normally restricted to which type of cells?

- (A) Haploid gametic cells  
 (B) Both haploid and diploid cells  
 (C) Only germ line cells  
 (D) Diploid somatic cells

18.

Which of the following statements about the quiescent stage (G<sub>0</sub>) of the cell cycle are correct?

- (a) Cells remain metabolically active.
- (b) Cells no longer proliferate.
- (c) Heart cells are an example of cells that largely remain in this stage.
- (d) Cells in this stage have already completed DNA replication.

- (A) (a), (b), (c) and (d)
- (B) (b) and (d) only
- ☒ (C) (a), (b) and (c) only
- (D) (a) and (d) only

19.

Constant replacement of cells in the upper layer of the epidermis, the lining of the gut, and blood cells is a significant contribution of:

- (A) Meiosis
- ☒ (B) Mitosis
- (C) Cytokinesis alone
- (D) DNA replication alone

20.

Match List-I with List-II:

- |                     |                                                |
|---------------------|------------------------------------------------|
| a. Apical meristem  | 1. Continuous growth in length                 |
| b. Lateral cambium  | 2. Continuous growth in girth                  |
| c. Heart cells      | 3. Remain in quiescent (G <sub>0</sub> ) stage |
| d. Gut lining cells | 4. Constantly replaced by mitosis              |

- (A) a-2, b-1, c-4, d-3
- ☒ (B) a-1, b-2, c-3, d-4
- (C) a-3, b-4, c-1, d-2
- (D) a-1, b-3, c-2, d-4

21.

Mitosis is referred to as equational division because:

- ☒ (A) The chromosome number of the daughter cells is the same as that of the parent cell
- (B) The daughter cells are haploid while the parent cell is diploid
- (C) Crossing over equally divides genetic material between chromatids
- (D) The cell divides into four equal daughter cells

22.

Which of the following mark the completion of prophase in mitosis?

- (a) Condensation of chromosomal material into compact mitotic chromosomes
- (b) Each chromosome visible as two chromatids joined at the centromere
- (c) Initiation of assembly of the mitotic spindle
- (d) Complete disintegration of the nuclear envelope

- (A) (a), (b), (c) and (d)
- (B) (b), (c) and (d) only
- (C) (a) and (d) only
- ☒ (D) (a), (b) and (c) only

23.

A cell examined under the microscope at the end of prophase would NOT show which of the following?

- (A) Condensed chromosomes
- (B) Duplicated centrioles at opposite poles
- ☒ (C) Golgi complex
- (D) Assembling spindle fibres

24.

**Statement I:** Centrioles, which duplicated during the S phase, begin moving towards opposite poles of the cell during prophase.

**Statement II:** The nucleolus and nuclear envelope reappear during prophase itself.

- (A) Both Statement I and Statement II are true
- ☒ (B) Statement I is true but Statement II is false
- (C) Statement I is false but Statement II is true
- (D) Both Statement I and Statement II are false

25.

An onion root tip cell has 16 chromosomes at the G<sub>1</sub> phase. What will be the chromosome number and DNA content of the cell at the end of S phase, respectively?

- (A) 32 chromosomes, 4C
- ☒ (B) 16 chromosomes, 4C
- (C) 16 chromosomes, 2C
- (D) 32 chromosomes, 2C

26.

**Assertion (A):** The two DNA molecules formed after replication during S and G<sub>2</sub> phases become untangled during prophase of mitosis.

**Reason (R):** Condensation of chromatin material during prophase resolves the intertwined DNA molecules into compact mitotic chromosomes.

- (A) Both Assertion (A) and Reason (R) are true, and R is the correct explanation of A  
 (B) Both Assertion (A) and Reason (R) are true, but R is NOT the correct explanation of A  
 (C) Assertion (A) is true, but Reason (R) is false  
 (D) Assertion (A) is false, but Reason (R) is true

27.

At the completion of prophase, the two sister chromatids of a chromosome are held together at which structure?

- (A) Kinetochore  
 (B) Centromere  
 (C) Chiasma  
 (D) Synaptonemal complex

28.

If the DNA content of an onion root tip cell at G<sub>2</sub> phase is 4C, what will be the DNA content of each daughter cell after completion of M phase?

- (A) 2C  
 (B) 1C  
 (C) 4C  
 (D) 8C

29.

Complete disintegration of the nuclear envelope, causing chromosomes to spread through the cytoplasm, marks the onset of which stage of mitosis?

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

30.

The small disc-shaped structures present at the surface of centromeres that serve as sites of attachment for spindle fibres are called:

- (A) Chiasmata  
 (B) Synaptonemal complexes  
 (C) Kinetochores  
 (D) Recombination nodules

\* 31.

The number of mitotic divisions to produce 128 cells from a single cell:

- (A) 7  
 (B) 127  
 (C) 129  
 (D) 64

32.

Morphology of chromosomes can be studied most easily during which stage of mitosis, since condensation is complete and chromosomes are clearly visible?

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

\* 33.

Match List-I with List-II:

- |                |                                                            |
|----------------|------------------------------------------------------------|
| a. Metaphase   | 1. Chromosomes align along the equatorial plate            |
| b. Anaphase    | 2. Nuclear envelope reassembles around chromosome clusters |
| c. Telophase   | 3. Centromere splits and chromatids move to opposite poles |
| d. Cytokinesis | 4. Cytoplasm divides into two daughter cells               |

- (A) a-1, b-2, c-3, d-4  
 (B) a-2, b-1, c-4, d-3  
 (C) a-3, b-4, c-1, d-2  
 (D) a-1, b-3, c-2, d-4

34.

During anaphase of mitosis, which part of the chromosome is oriented towards the pole?

- (A) Telomere  
 (B) Nucleolus  
 (C) Chromatid arm  
 (D) Centromere

35.

Which of the following statements regarding anaphase of mitosis are correct?

- (a) Centromeres split simultaneously.  
 (b) Sister chromatids move towards opposite poles.  
 (c) Chromosomes align at the equatorial plate.  
 (d) Nuclear envelope reappears around chromosomes.

- (A) (b) and (c) only  
 (B) (c) and (d) only  
 (C) (a) and (b) only  
 (D) (a), (b) and (d) only

36.

**Assertion (A):** During anaphase, each chromosome moves towards the pole with its centromere leading and the chromatid arms trailing behind.

**Reason (R):** Spindle fibres attached to the kinetochore pull the centromere region first towards the pole.

- ☒ (A) Both Assertion (A) and Reason (R) are true, and R is the correct explanation of A
- (B) Both Assertion (A) and Reason (R) are true, but R is NOT the correct explanation of A
- (C) Assertion (A) is true, but Reason (R) is false
- (D) Assertion (A) is false, but Reason (R) is true

37.

Which of the following events occur during telophase of mitosis?

- (a) Chromosomes decondense and lose their individuality
- (b) Nuclear envelope reassembles around chromosome clusters
- (c) Nucleolus, Golgi complex and ER reform
- (d) Centromeres split and chromatids separate
- (A) (a), (b), (c) and (d)
- ☒ (B) (a), (b) and (c) only
- (C) (b) and (d) only
- (D) (a) and (d) only

38.

In animal cells, cytokinesis is achieved by the appearance of a structure in the plasma membrane that deepens and eventually joins at the centre, dividing the cytoplasm into two. This structure is called the:

- (A) Cell plate
- ☒ (B) Furrow
- (C) Septum
- (D) Metaphase plate

39.

**Statement I:** In plant cells, the cell plate representing the middle lamella forms first at the centre of the cell and grows outward to meet the existing lateral walls.

**Statement II:** The cell plate originates at the periphery of the plant cell and grows inward towards the centre to complete cytokinesis.

- (A) Both Statement I and Statement II are true
- ☒ (B) Statement I is true but Statement II is false
- (C) Statement I is false but Statement II is true
- (D) Both Statement I and Statement II are false

40.

When karyokinesis is not followed by cytokinesis, a multinucleate condition called syncytium is formed. Which of the following is a classic example of this phenomenon?

- ☒ (A) Liquid endosperm of coconut
- (B) Onion root tip cells
- (C) Human red blood cells
- (D) Yeast bud cells

41.

Plant cells undergo cytokinesis by a mechanism different from that in animal cells mainly because plant cells possess:

- (A) A larger nucleus
- (B) Absence of centrioles
- (C) A higher number of mitochondria
- ☒ (D) A relatively inextensible cell wall

42.

Which of the following statements regarding cytokinesis are correct?

- (a) Mitochondria and plastids get distributed between the two daughter cells.
- (b) In plant cells, the furrow deepens from the periphery towards the centre.
- (c) In animal cells, the furrow in the plasma membrane gradually deepens and joins at the centre.
- (d) The cell plate represents the middle lamella between the walls of two adjacent cells.
- (A) (a) and (b) only
- (B) (b), (c) and (d) only
- ☒ (C) (a), (c) and (d) only
- (D) (a), (b) and (c) only

43.

A cell divides every 2 minutes. At this rate of division it can fill a 100ml beaker in one hour. How much time does it take to fill a 50ml beaker

- (A) 30 minutes
- ☒ (B) 58 minutes
- (C) 59 minutes
- (D) 32

44.

In an animal cell undergoing cytokinesis, the invagination of the plasma membrane that deepens and eventually divides the cytoplasm into two is called the:

- (A) Cell plate
- ☒ (B) Cleavage furrow
- (C) Metaphase plate
- (D) Synaptonemal complex

45.

Mitotic division in haploid cells is exhibited by which of the following organisms?

- ☒ (A) Male honey bees (drones) among social insects
- (B) Human liver cells
- (C) Diploid sporophyte of ferns
- (D) Zygote of flowering plants

46.

**Assertion (A):** Cell growth eventually necessitates mitotic division of the cell.

**Reason (R):** Continued cell growth disturbs the nucleo-cytoplasmic ratio, which is restored by cell division.

- ☒ (A) Both Assertion (A) and Reason (R) are true, and R is the correct explanation of A
- (B) Both Assertion (A) and Reason (R) are true, but R is NOT the correct explanation of A
- (C) Assertion (A) is true, but Reason (R) is false
- (D) Assertion (A) is false, but Reason (R) is true

47.

Match List-I with List-II:

- |                                            |                                                                  |
|--------------------------------------------|------------------------------------------------------------------|
| a. Growth of multicellular organisms       | 1. Mitotic activity in apical and lateral cambium                |
| b. Cell repair                             | 2. Replacement of epidermis, gut lining and blood cells          |
| c. Continuous lifelong growth in plants    | 3. Achieved through repeated mitotic divisions                   |
| d. Restoration of nucleo-cytoplasmic ratio | 4. Triggered when cell growth disturbs cytoplasm-nucleus balance |

- (A) a-1,b-3,c-2,d-4
- (B) a-4,b-1,c-3,d-2
- (C) a-2,b-4,c-1,d-3
- ☒ (D) a-3,b-2,c-1,d-4

52.

Meiosis in sexually reproducing organisms is typically encountered during:

- (A) Repair of injured epithelial tissue
- (B) Continuous growth at the apical meristem
- (C) Formation of blood cells in bone marrow
- (D) Gametogenesis in plants and animals

48.

Which of the following best describes a key outcome of mitosis?

- (A) Production of haploid gametes with recombined genes
- (B) Pairing of homologous chromosomes followed by crossing over
- ☒ (C) Production of diploid daughter cells with identical genetic complement
- (D) Reduction of chromosome number by half in daughter cells

49.

Meiosis is referred to as a reduction division because it results in the production of daughter cells with:

- (A) Twice the chromosome number of the parent cell
- ☒ (B) Half the chromosome number of the parent cell
- (C) The same chromosome number as the parent cell
- (D) Half the DNA content but same chromosome number as parent

50.

Which of the following are key features of meiosis?

- (a) Two sequential cycles of nuclear division but only one interphase
- (b) Pairing of homologous chromosomes accompanied by recombination
- (c) Formation of four haploid cells at the end of meiosis II
- (d) Chromosome number of daughter cells remains identical to that of the parent cell

- (A) (a), (b) and (d) only
- ☒ (B) (a), (b) and (c) only
- (C) (b), (c) and (d) only
- (D) (a), (c) and (d) only

51.

In a diploid organism with  $2n = 8$ , how many DNA molecules will each gamete contain after meiosis?

- ☒ (A) 4
- (B) 8
- (C) 16
- (D) 2

53.

How many cycles of DNA replication occur during the entire process of meiosis (Meiosis I and Meiosis II combined)?

- (A) Two
- (B) Three
- ☒ (C) One
- (D) Four

54.

**Statement I:** Meiosis involves two sequential cycles of nuclear and cell division but only a single cycle of DNA replication.

**Statement II:** Meiosis I is initiated before the parental chromosomes have replicated their DNA.

- (A) Both Statement I and Statement II are true
- ☒ (B) Statement I is true but Statement II is false
- (C) Statement I is false but Statement II is true
- (D) Both Statement I and Statement II are false

55.

Which of the following statements regarding Meiosis I and Meiosis II are correct?

- (a) Meiosis I involves pairing of homologous chromosomes.
  - (b) Meiosis II involves separation of sister chromatids.
  - (c) DNA replication occurs before both Meiosis I and Meiosis II.
  - (d) Recombination between homologous chromosomes occurs during Meiosis I.
- (A) (a), (b) and (c) only
  - ☒ (B) (a), (b) and (d) only
  - (C) (b), (c) and (d) only
  - (D) (a), (c) and (d) only

56.

**Assertion (A):** Meiosis results in the formation of four haploid daughter cells from a single diploid parent cell.

**Reason (R):** Meiosis involves two sequential cycles of nuclear and cell division but only a single cycle of DNA replication.

- ☒ (A) Both Assertion (A) and Reason (R) are true, and R is the correct explanation of A
- (B) Both Assertion (A) and Reason (R) are true, but R is NOT the correct explanation of A
- (C) Assertion (A) is true, but Reason (R) is false
- (D) Assertion (A) is false, but Reason (R) is true

57.

During which stage of prophase I do the chiasmata become clearer visible?

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

58.

Which of the following statements regarding the stages of prophase I of meiosis are correct?

- (a) Synapsis of homologous chromosomes occurs during zygotene.
  - (b) Recombination nodules appear during pachytene.
  - (c) Chiasmata become visible during diplotene following dissolution of the synaptonemal complex.
  - (d) Chromosome compaction continues throughout leptotene.
- ☒ (A) (a), (b), (c) and (d)
  - (B) (a) and (b) only
  - (C) (a), (b) and (c) only
  - (D) (b) and (d) only

59.

Match List-I with List-II:

- |              |                                                                           |
|--------------|---------------------------------------------------------------------------|
| a. Leptotene | 1. Chromosomes become gradually visible; compaction continues             |
| b. Zygotene  | 2. Appearance of recombination nodules and crossing over                  |
| c. Pachytene | 3. Synapsis of homologous chromosomes with synaptonemal complex formation |
| d. Diplotene | 4. Dissolution of synaptonemal complex; chiasmata become visible          |

(A) a-2, b-1, c-4, d-3

☒ (B) a-1, b-3, c-2, d-4

(C) a-4, b-2, c-1, d-3

(D) a-1, b-2, c-3, d-4

60.

The enzyme that mediates crossing over between non-sister chromatids of homologous chromosomes at the recombination nodules is called:

- (A) Helicase
- (B) DNA ligase
- ☒ (C) Recombinase
- (D) DNA polymerase

61.

Recombination nodules, the sites at which crossing over occurs between non-sister chromatids, appear prominently during which stage of prophase I?

- (A) Leptotene
- ☒ (B) Pachytene
- (C) Zygotene
- (D) Diakinesis

62.

Which of the following are characteristic events of diakinesis, the final stage of meiotic prophase I?

- (a) Terminalisation of chiasmata
- (b) Disappearance of the nucleolus
- (c) Breakdown of the nuclear envelope
- (d) Formation of the synaptonemal complex
- (A) (a) and (d) only
- ☒ (B) (a), (b) and (c) only
- (C) (b), (c) and (d) only
- (D) (a), (b), (c) and (d)

63.

The X-shaped structures formed at the sites of crossing over, where recombined homologous chromosomes remain associated during diplotene, are called:

- ☒ (A) Chiasmata
- (B) Bivalents
- (C) Recombination nodules
- (D) Synaptonemal complexes

64.

In oocytes of some vertebrates, which stage of meiotic prophase I can last for months or even years?

- (A) Leptotene
- (B) Zygotene
- (C) Diakinesis
- ☒ (D) Diplotene

65.

During Metaphase I of meiosis, microtubules from the opposite poles of the spindle attach to:

- (A) A single unpaired chromatid
- (B) Only the maternal chromosome of each pair
- ☒ (C) A pair of homologous chromosomes (bivalent)
- (D) The nucleolus

66.

**Assertion (A):** During anaphase I of meiosis, sister chromatids remain associated at their centromeres while homologous chromosomes separate and move towards opposite poles.

**Reason (R):** Centromeres split simultaneously during anaphase I, allowing sister chromatids to separate.

- (A) Both Assertion (A) and Reason (R) are true, and R is the correct explanation of A
- (B) Both Assertion (A) and Reason (R) are true, but R is NOT the correct explanation of A
- ☒ (C) Assertion (A) is true, but Reason (R) is false
- (D) Assertion (A) is false, but Reason (R) is true

67.

The pair of cells formed after cytokinesis at the end of Telophase I of meiosis is referred to as a:

- (A) Tetrad of cells
- ☒ (B) Dyad of cells
- (C) Synaptonemal complex
- (D) Bivalent

68.

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

- (A) Genetically similar
- ☒ (B) Genetically different
- (C) There occurs only one chromatids in each chromosome
- (D) None of the above

69.

**Statement I:** Meiosis II is initiated immediately after cytokinesis of meiosis I, usually before the chromosomes have fully elongated.

**Statement II:** The nuclear membrane persists throughout prophase II and does not disappear.

- (A) Both Statement I and Statement II are true
- ☒ (B) Statement I is true but Statement II is false
- (C) Statement I is false but Statement II is true
- (D) Both Statement I and Statement II are false

70.

Which of the following events characterises anaphase II of meiosis?

- ☒ (A) Centromere of each chromosome splits, allowing sister chromatids to move to opposite poles
- (B) Homologous chromosomes separate and move to opposite poles
- (C) Chromosomes align at the equatorial plate
- (D) Nuclear envelope reappears around chromosome clusters

71.

Which of the following statements regarding Metaphase II of meiosis are correct?

- (a) Chromosomes align at the equator.
  - (b) Microtubules from opposite poles attach to kinetochores of sister chromatids.
  - (c) Homologous chromosomes pair to form bivalents.
  - (d) Centromeres split simultaneously.
- (A) (b) and (c) only  
 (B) (a), (c) and (d) only  
 (C) (c) and (d) only  
☒ (D) (a) and (b) only

72.

Match List-I with List-II:

- |                 |                                                                   |
|-----------------|-------------------------------------------------------------------|
| a. Prophase II  | 1. Chromosomes recompact, nuclear membrane disappears             |
| b. Metaphase II | 2. Chromosomes align at equator, kinetochores attached to spindle |
| c. Anaphase II  | 3. Centromeres split, chromatids move to opposite poles           |
| d. Telophase II | 4. Nuclear envelope reforms, four haploid cells formed            |

- (A) a-2, b-1, c-4, d-3  
 (B) a-1, b-3, c-2, d-4  
☒ (C) a-1, b-2, c-3, d-4  
 (D) a-4, b-2, c-3, d-1

73.

The process of meiosis, despite reducing the chromosome number by half, helps in:

- (A) Random mutation of genes
- ☒ (B) Conservation of specific chromosome number of a species across generations
- (C) Permanent loss of genetic material
- (D) Formation of diploid gametes

\* 74.

Aleurone layer cell of a Maize plant has 42 Chromosomes, how many chromosomal arms will be present in shoot tip cell at G2 phase

- (A) 56  
☒ (B) 112  
 (C) 48  
 (D) 24

75.

Which of the following statements correctly describe the significance of meiosis?

- (a) It conserves the specific chromosome number of a species across generations.
- (b) It increases genetic variability in a population from one generation to the next.
- (c) It results in permanent doubling of chromosome number.
- (d) It occurs only in somatic cells of animals.

- ☒ (A) (a) and (b) only  
 (B) (b) and (c) only  
 (C) (a), (c) and (d) only  
 (D) (c) and (d) only

76.

**Assertion (A):** Meiosis helps in maintaining a constant chromosome number of a species across successive generations of sexually reproducing organisms.

**Reason (R):** Meiosis reduces the chromosome number by half during gamete formation, and fertilisation subsequently restores the diploid number.

- ☒ (A) Both Assertion (A) and Reason (R) are true, and R is the correct explanation of A  
 (B) Both Assertion (A) and Reason (R) are true, but R is NOT the correct explanation of A  
 (C) Assertion (A) is true, but Reason (R) is false  
 (D) Assertion (A) is false, but Reason (R) is true

77.

Arrange the following events of mitosis in their correct sequential order: (i) Chromatids move to opposite poles (ii) Chromosomes align along the equatorial plate (iii) Chromosomal material condenses into compact chromosomes (iv) Nuclear envelope reassembles around chromosome clusters

- (A) (ii), (iii), (iv), (i)
- (B) (iii), (i), (ii), (iv)
- (C) (iv), (iii), (ii), (i)
- ☒ (D) (iii), (ii), (i), (iv)

78.

Duplication of most cell organelles takes place mainly during which phase of the cell cycle?

- (A) S phase
- (B) G<sub>2</sub> phase
- ☒ (C) G<sub>1</sub> phase
- (D) M phase

79.

In a human cell cycle of 24 hours, if the M Phase lasts about 1 hour, approximately what percentage of the cell cycle is occupied by interphase?

- (A) 50%
- ☒ (B) 96%
- (C) 75%
- (D) 90%

80.

The phase of the cell cycle that lies between two successive M phases is called:

- (A) Prophase
- ☒ (B) Interphase
- (C) G<sub>0</sub> phase
- (D) Cytokinesis

81.

A diploid cell ( $2n = 6$ ) has a DNA content of  $4C$  at the end of S phase, just before entering meiosis. What will be the chromosome number and DNA content of each cell at the end of Meiosis I (telophase I)?

- ☒ (A)  $n = 3$  chromosomes,  $2C$  DNA
- (B)  $2n = 6$  chromosomes,  $4C$  DNA
- (C)  $n = 3$  chromosomes,  $4C$  DNA
- (D)  $2n = 6$  chromosomes,  $2C$  DNA

82.

Which of the following statements regarding the diplotene stage of prophase I are correct?

- (a) Dissolution of the synaptonemal complex marks its onset
- (b) Recombined homologous chromosomes tend to separate except at chiasmata
- (c) Crossing over between non-sister chromatids occurs during this stage
- (d) Chromosomes achieve maximum condensation in preparation for spindle assembly

- (A) (b) and (c) only
- (B) (a), (c) and (d) only
- (C) (a), (b) and (d) only
- ☒ (D) (a) and (b) only

83.

If the amount of DNA in the cell during given mitosis stage is  $20pg$ , then the number of chromosome and amount of DNA in its mother cell at G<sub>1</sub> phase was

- (A)  $8; 20pg$
- (B)  $4; 10pg$
- (C)  $8; 10pg$
- (D)  $4; 20pg$

84.

**Statement I:** Meiosis I is initiated after the parental chromosomes have replicated to produce identical sister chromatids during S phase.

**Statement II:** A fresh round of DNA replication occurs during interkinesis, between meiosis I and meiosis II.

- (A) Both Statement I and Statement II are true
- ☒ (B) Statement I is true but Statement II is false
- (C) Statement I is false but Statement II is true
- (D) Both Statement I and Statement II are false

85.

Match List-I with List-II:

- |               |                                                                       |
|---------------|-----------------------------------------------------------------------|
| a. Leptotene  | 1. Chromosomes begin to appear thread-like as compaction starts       |
| b. Zygotene   | 2. Synapsis of homologous chromosomes occurs                          |
| c. Pachytene  | 3. Recombination nodules and crossing over are observed               |
| d. Diakinesis | 4. Terminalisation of chiasmata and disappearance of nuclear envelope |

- (A) a-2, b-1, c-4, d-3
- ☒ (B) a-1, b-2, c-3, d-4
- (C) a-3, b-4, c-1, d-2
- (D) a-4, b-3, c-2, d-1

86.

**Assertion (A):** Prophase II of meiosis is much simpler than prophase I.

**Reason (R):** Prophase II lacks pairing of homologous chromosomes and crossing over, which are characteristic events of prophase I.

- ☒ (A) Both Assertion (A) and Reason (R) are true, and R is the correct explanation of A
- (B) Both Assertion (A) and Reason (R) are true, but R is NOT the correct explanation of A
- (C) Assertion (A) is true, but Reason (R) is false
- (D) Assertion (A) is false, but Reason (R) is true

87.

The complex formed by a pair of synapsed homologous chromosomes during prophase I of meiosis is called a bivalent or a:

- (A) Dyad
- ☒ (B) Tetrad
- (C) Chiasma
- (D) Synaptonemal complex

88.

Which event restores the diploid chromosome number in the life cycle of sexually reproducing organisms following meiosis?

- ☒ (A) Fertilisation
- (B) Mitosis
- (C) Cytokinesis
- (D) Crossing over

89.

The process by which homologous chromosomes come together and associate closely during zygotene of meiotic prophase I is called:

- (A) Crossing over
- (B) Terminalisation
- (C) Recombination
- ☒ (D) Synapsis

90.

In which of the following processes are the four haploid daughter cells produced by meiosis unequal in size?

- (A) Spermatogenesis in humans
- (B) Microsporogenesis in plants
- ☒ (C) Oogenesis in humans
- (D) Meiosis in yeast