

CHAPTER 2

Cell Cycle and Cell Division

Cell Cycle

- The fruit fly has 8 chromosomes ($2n$) in each cell. During interphase of Mitosis if the number of chromosomes at G_1 phase is 8, what would be the number of chromosomes after S phase? (2021)
 - 16
 - 4
 - 32
 - 8
- The centriole undergoes duplication during: (2021)
 - Prophase
 - Metaphase
 - G_2 phase
 - S-phase
- Match List-I with List-II (2021)

List-I		List-II	
A.	S phase	(i)	Proteins are synthesized
B.	G_2 phase	(ii)	Inactive phase
C.	Quiescent stage	(iii)	Interval between mitosis and initiation of DNA replication
D.	G_1 phase	(iv)	DNA replication

Choose the correct answer from the options given below.

- A-iv B-ii C-iii D-i
 - A-iv B-i C-ii D-iii
 - A-ii B-iv C-iii D-i
 - A-iii B-ii C-i D-iv
- Identify the correct statement with regard to G_1 phase (Gap 1) of interphase. (2020)
 - Reorganisation of all cell components takes place.
 - Cell is metabolically active, grows but does not replicate its DNA.
 - Nuclear division takes place.
 - DNA synthesis or replication takes place.
 - Some dividing cells exit the cell cycle and enter vegetative inactive stage. This is called quiescent stage (G_0). This process occurs at the end of: (2020)
 - G_1 phase
 - S phase
 - G_2 phase
 - M phase

- Match the following events that occur in their respective phases of cell cycle and select the correct option: (2020-Covid)

1.	G_1 phase	(i)	Cell grows and organelle duplication
2.	S phase	(ii)	DNA replication and chromosome duplication
3.	G_2 phase	(iii)	Cytoplasmic growth
4.	Metaphase in M-phase	(iv)	Alignment of chromosomes

- (1) (2) (3) (4)
 - (iii) (iv) (i) (ii)
 - (iv) (i) (ii) (iii)
 - (i) (ii) (iii) (iv)
 - (ii) (iii) (iv) (i)
- The correct sequence of phases of cell cycle is (2019)
 - $M \rightarrow G_1 \rightarrow G_2 \rightarrow S$
 - $G_1 \rightarrow G_2 \rightarrow S \rightarrow M$
 - $S \rightarrow G_1 \rightarrow G_2 \rightarrow M$
 - $G_1 \rightarrow S \rightarrow G_2 \rightarrow M$
 - Cell in G_0 phase (2019)
 - Exit the cell cycle
 - Enter the cell cycle
 - Suspend the cell cycle
 - Terminate the cell cycle
 - DNA replication in bacteria occurs: (2017-Delhi)
 - During S-phase
 - Within nucleolus
 - Prior to fission
 - Just before transcription
 - When cell has stalled DNA replication fork, which checkpoint should be predominantly activated? [OS] (2016 - II)
 - M
 - Both G_2/M and M
 - G_1/S
 - G_2/M
 - During cell growth, DNA synthesis takes place in: (2016 - II)
 - G_2 phase
 - M phase
 - S phase
 - G_1 phase
 - A somatic cell that has just completed the S phase of its cell cycle, as compared to gamete of the same species, has: (2015 Re)
 - Twice the number of chromosomes and four times the amount of DNA
 - Four times the number of chromosomes and twice the amount of DNA
 - Twice the number of chromosomes and twice the amount of DNA
 - Same number of chromosomes but twice the amount of DNA

13. During which phase(s) of cell cycle, amount of DNA in a cell remains at $4C$ level if the initial amount is denoted as $2C$? (2014)

- a. G_2 and M b. G_0 and G_1
c. G_1 and S d. Only G_2

14. In 'S' phase of the cell cycle: (2014)

- 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

Mitosis

15. Which one of the following **never** occurs during mitotic cell division? (2022)

- a. Coiling and condensation of the chromatids
b. Spindle fibres attach to kinetochores of chromosomes
c. Movement of centrioles towards opposite poles
d. Pairing of homologous chromosomes

16. Select the **incorrect** statement with reference to mitosis: (2022)

- a. Splitting of centromere occurs at anaphase.
b. All the chromosomes lie at the equator at metaphase.
c. Spindle fibres attach to centromere of chromosomes
d. Chromosomes decondense at telophase.

17. In a mitotic cycle, the correct sequence of phases is (2020-Covid)

- a. G_1 , S, G_2 , M b. M, G_1 , G_2 , S
c. G_1 , G_2 , S, M d. S, G_1 , G_2 , M

18. Attachment of spindle fibers to kinetochores of chromosomes becomes evident in: (2020-Covid)

- a. Telophase b. Prophase
c. Metaphase d. Anaphase

19. Which of the following options gives the correct sequence of events during mitosis? (2017-Delhi)

- 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

20. 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? [OS] (2017-Delhi)

- a. Chromosomes will not condense
b. Chromosomes will be fragmented
c. Chromosomes will not segregate
d. Recombination of chromosome arms will occur

21. Which of the following is not a characteristic feature during mitosis in somatic cells? (2016 - I)

- a. Spindle fibres
b. Disappearance of nucleolus
c. Chromosome movement
d. Synapsis

22. Spindle fibres attach on to: (2016 - I)

- a. Telomere of the chromosome
b. Kinetochore of the chromosome
c. Centromere of the chromosome
d. Kinetosome of the chromosome

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: (2016 - I)

- a. Aneuploidy b. Polyploidy
c. Somaclonal variation d. Polyteny

24. A stage in cell division is shown in the figure. Select the answer which gives correct identification of the stage with its characteristics: (2013)



a.	Telophase	Endoplasmic reticulum and nucleolus not reformed yet.
b.	Telophase	Nuclear envelope 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.

Meiosis

25. The appearance of recombination nodules on homologous chromosomes during meiosis characterizes? (2022)

- a. Terminalization
b. Synaptonemal complex
c. Bivalent
d. Sites at which crossing over occurs

26. Regarding Meiosis, which of the statements is **incorrect**? (2022)

- a. Four haploid cells are formed at the end of Meiosis-II
b. There are two stages in Meiosis, Meiosis-I and II
c. DNA replication occurs in S phase of Meiosis-II
d. Pairing of homologous chromosomes and recombination occurs in Meiosis-I

- a. Axoneme b. Equatorial plate
c. Kinetochore d. Bivalent

[illegible]