

CBSE TEST PAPER-01
CLASS - XI BIOLOGY
(CELL CYCLE & CELL DIVISION)

General Instruction:

- All questions are compulsory.
 - Question No. 1 to 3 carries one marks each. Question No. 4 to 6 carry two marks each. Question No. 7 and 8 carry three marks each. Question No. 9 carry five marks.
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1. Name the stage of cell division in which paired homologous chromosomes get shortened & thickened.
2. Which structure of animal cell forms the asters of the spindle?
3. Name the cells in which meiosis occurs.
4. What is the importance of DNA replication during interphase?
5. Distinguish between metaphase of mitosis & metaphase I of meiosis.
6. What is the approximate cell cycle duration in fast-dividing mammalian cells? Is this the same for all cells?
7. What is the significance of meiosis?
8. Differentiate between the mitosis of animal cell & plant cell.
9. Explain the various phases of meiosis II division.

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[ANSWERS]

1. Pachytene.
2. Centrosome
3. Reproductive cells or germ cells.
4. It is important to make copies of the chromosomes by DNA replication because each daughter cell should receive chromosomes that are alike in composition and equal in number to that of the parent cell. The daughter cells are exact copies of the parent cell which ensures they will function correctly.
- 5.

| METAPHASE OF MITOSIS | METAPHASE OF MEIOSIS: I |
|--|---|
| i) Each chromosome consist of two chromatids which are held together by centromere | i) Homologous chromosomes form bivalent each bivalent consists of four chromatids & two centromeres |
| ii) The chromosomes line up in one plane to make up the equatorial plate. | ii) Bivalents become arranged in the plane of the equator forming an equatorial plate. |

6. 24 hours. Different organisms have different cell cycle durations. Even within an organism, different cell types can have different cell cycle durations. Therefore, the cell cycle duration is not the same for all cells.
7. Significance of Meiosis:-
 - a) It reduces the number of chromosomes to half in daughter cells.
 - b) It is an essential phenomenon in the life cycle of sexually reproducing animals as it restores the fixed number of chromosomes.
 - c) Gametes are formed as a result of meiosis. Each gamete possesses half the number of chromosomes present in somatic cells.
 - d) It avoids the multiplication of chromosomes & thus maintains the stability & a constant number of chromosomes of the species.
 - e) During the crossing over, exchange of nuclear material, genetic variations within the

species takes place with the result that new combinations of genetic material are formed.

8.

| ANIMAL CELL MITOSIS | PLANT CELL MITOSIS |
|--|--|
| i) Occurs in bone marrow & many epithelial tissues | i) Occurs in meristems |
| ii) Cell becomes spherical before cell division | ii) Cell shape does not change before division |
| iii) Several hormones induce cell division | iii) Induced by plant hormone cytokinin |
| iv) Centrosome present | iv) Centrosome absent |
| v) Mitotic apparatus contains asters | v) Mitotic apparatus has no asters |
| vi) Mid body is formed | vi) Mid body is not formed. |
| vii) Occurs through cleavage | vii) Occurs by cell-plate formation. |
| viii) Microfilaments are involved in it | viii) Microfilaments are not formed. |
| ix) Cleavage proceeds centripetally in it | ix) Cell grows centrifugally in it. |

9. STAGES OF MEIOSIS II:-

- i) **PROPHASE II:-** Meiosis II is initiated immediately after cytokinesis usually before chromosomes have fully elongated. The nuclear membrane disappears by the end of prophase-II. The chromosomes again become compact.
- ii) **METAPHASE-II:-** At this stage, the chromosomes align at the equator & the microtubules from opposite poles of the spindle get attached to the kinetochores of sister chromatids.
- iii) **ANAPHASE-II:-** It begins with the simultaneous splitting of the centromere of each chromosome allowing them to move towards opposite poles of the cell.
- iv) **TELOPHASE-II:-** Meiosis ends with telophase-II, in which two groups of chromosomes once again get enclosed by a nuclear envelope, cytokinesis follows resulting in the formation of the tetrad of cell i.e. four haploid daughter cells.

