

10. Two key events take place during S-phase in animal cells, i.e., DNA replication and duplication of centriole. In which parts of the cell do these events occur? [NCERT Exemplar]

Ans. DNA replication occurs in the nucleus whereas centriole duplication takes place in the cytoplasm.

11. Distinguish cytokinesis from karyokinesis? [NCERT]

Ans. Cytokinesis is the division of cytoplasm, whereas karyokinesis is the division of nucleus of the cell.

12. During which phase of mitotic cell division, chromosomes get separated? [HOTS]

Ans. During anaphase.

13. It is said that one cell cycle of cell division in human cells (eukaryotic cells) takes 24 h. Which phase of the cycle, do you think occupies the maximum part of the cell cycle. [HOTS]

Ans. Interphase.

14. If a tissue has 1024 cells at a given time, how many cycles of mitosis had the original parental single cell undergone? [HOTS; NCERT Exemplar]

Ans. 10 (2^n , where $n = 10$ generations).

15. Can there be mitosis without DNA replication in S-phase? [HOTS]

Ans. Mitosis cannot occur without DNA replication in S-phase because the trigger for mitosis takes place due to the disturbance in nucleocytoplasmic ratio caused by DNA replication in S-phase.

SHORT ANSWER Type I Questions

[2 Marks]

16. There occurs a process in which two divisions of nucleus take place. Identify the process and also write about its different phases.

Ans. Karyokinesis is a series of uninterrupted changes before forming two daughter nuclei. Though karyokinesis is a continuous process, it has been divided into four phases. They are prophase, metaphase, anaphase and telophase. [2]

17. What is quiescent stage of cell cycle? [NCERT]

Ans. G_0 is the quiescent stage of the cell cycle. Also known as inactive stage of the cell cycle. Cells in this stage remain metabolically active, but no longer proliferate unless they do not get instruction to do so, depending on the requirement of the organisms. [2]

18. Why do the chromosomes become short and thick in prophase?

Ans. It happens so because it is physically easier for short and compact chromosomes to move through the cytoplasm than the very long and twisted interphase chromosomes. [2]

19. What is metaphasic plate?

Ans. It is the equatorial plane at the centre of cell on which chromosomes arrange during metaphase. (2)

20. The following events occur during the various phases of the cell cycle. Name the phase against each of the events;

(i) Disintegration of nuclear membrane

(ii) Appearance of nucleolus

(iii) Division of centromere

(iv) Replication of DNA [NCERT Exemplar]

Ans. (i) prophase (ii) telophase
(iii) anaphase (iv) S-phase [1/2 × 4]

21. A cell having 32 chromosomes, undergoes mitotic divisions. What will be the chromosome number (n) during metaphase? What would be the DNA content (C) during anaphase? [NCERT Exemplar]

Ans. The number of chromosome during metaphase will be 32. Also the DNA content during anaphase will be same as in the parent cell. [1+1]

22. Supply a specific scientific term for each of the following

(i) The period between two successive mitotic divisions.

(ii) Point at which two sister chromatids are held together.

(iii) Phase in the cell cycle when protein and RNA are synthesised.

(iv) Nuclear division.

Ans. (i) Interphase (ii) Kinetochore
(iii) G_1 -phase (iv) Mitotic or M-phase [1/2 × 4]

23. Discuss the significance of mitosis. Give any four points.

Ans. Refer to text on page no. 280-281. [2]

24. Why is mitosis called equational division? [NCERT]

Ans. Mitosis is called an equational division because it divides the mother cell into two daughter cells, which are identical to the original mother cell in every respect. In mitosis, the chromosomes of the mother cell are duplicated and distributed equally to the two daughter cells and daughter cells have same number of chromosome as mother cell has. [2]