



# PERL EDUCATION

PRIMARY EDUCATION & RIGHTEOUSNESS LEARNING

ALUMNI OF IITs / NITs

## JEE - 2021 RESULT



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IIT



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## Ch - 2: Structure of Chromosome

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**Structure of chromosome**

1. The chromatin material is formed of
  - (a) DNA only
  - (c) Histones only
  - (b) DNA and Histones
  - (d) Nucleotides
2. The term "chromosomes" literally means
  - (a) Inherited bodies
  - (c) Coloured bodies
  - (b) Twisted threads
  - (d) Shining threads
3. The number of chromosomes in a certain type of cell division is halved. This kind of cell division occurs in
  - (a) only testis
  - (c) both ovary and testis
  - (b) only ovary
  - (d) all body cells
4. In which one of the following options the two stages of mitosis have been given in correct sequence?
  - (a) Prophase, metaphase, telophase, anaphase
  - (c) Anaphase, telophase, prophase, metaphase
  - (b) Prophase, metaphase, anaphase, telophase
  - (d) Telophase, anaphase, prophase, metaphase
5. Synthesis phase in the cell cycle is called so for the synthesis of more of
  - (a) RNA
  - (c) DNA
  - (b) RNA and proteins
  - (d) Glucose
6. Name the following:
  - (a) The repeating components of each DNA strand lengthwise.
  - (b) The complex structure consisting of DNA strand and a core of histones.
  - (c) The type of bond which joins the complementary nitrogenous bases.
  - (d) The three components of nucleotide.
7. Imagine one cell (A) has undergone one mitotic division and another cell (B) has completed its meiotic division. How many cells would the two produce?

Cell A: .....

Cell B:.....

8. Match the column

Column 'A'	Column 'B'
(a) Chromosomes become arranged in a horizontal plane at the equator.	Anaphase
(b) Daughter chromosomes move to the opposite poles of a spindle	Prophase
(c) Chromosomes become visible as fine long threads.	Telophase
(d) Chromosomes lose their distinctiveness and gradually become transformed into a chromatin network	Metaphase

9. Fill in the blanks.
  - (a) DNA replicates in the ..... of the cell cycle.
  - (b) Mitosis occurs in our ..... cells.
  - (c) Meiosis occurs only in ..... cells.
  - (d) Modern humans have 46 chromosomes. Their sperms and eggs will have ..... chromosomes each.
  - (e) During the pairing of chromosomes in meiosis, the ..... chromosomes come to lie side by side.
  - (f) The two non-sister chromatids of a paired chromosome are attached to each other at ..... during the process of crossing over.
10. What is the difference between chromatin fibre and chromosome?

11. What are the rungs of the "DNA ladder" made of?

12. Correct the following statements if there is any mistake.

(a) The four nitrogenous bases in the DNA are Guanine, Thiamine, Adrenaline and Cytosine.

(b) Genes are specific sequences of bases on a chromosome.

(c) A nucleotide is composed of a sulphate, a sugar (pentose) and a nitrogenous base.

(d) Nucleosomes are groups of cysteine molecules surrounded by DNA strands.

(e) If there are 46 chromosomes in a cell there will be 23 chromatin fibres inside the nucleus during interphase.

13. Mention whether the following statements are true (T) or false (F). Give reason in support of your answer.

(a) As you grow from childhood to adult hood, your skin cells divide only to replace such cells that are lost from the surface.

(b) Nuclear membrane in a mitotically dividing cell remains intact up to the metaphase and disappears only in the telophase.

(c) Mitotic cell division can be a mode of reproduction.

(d) Crossing-over between chromatids can occur only between homologous chromosomes.

14. Define the following terms:

(a) Chromosome

(d) Chromatid

(b) Gene

(e) Aster

(c) Cell division

15. Give reason:

(a) Gametes must be produced by meiosis for sexual reproduction.

(b) Why is meiosis referred to as 'reductional division'?

(c) The children of the same parents, howsoever similar, are different from each other in certain aspects.

16. Distinguish between the following pairs:

(a) Cytokinesis and Karyokinesis

(d) Centrosome and Centromere

(b) DNA and RNA

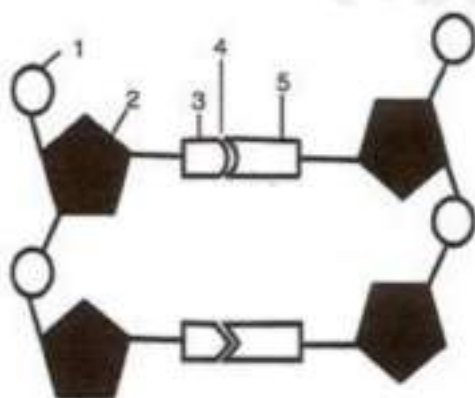
(e) Haploid and Diploid

(c) Nucleosome and Nucleotide

17. Enumerate the various changes that occur in the nucleus of the cell during (a) prophase (b) anaphase of mitotic division.

18. Name and explain the various stages of the cell cycle.

19. Given below is a schematic diagram of a portion of DNA.



(a) How many strands are shown in the diagram?

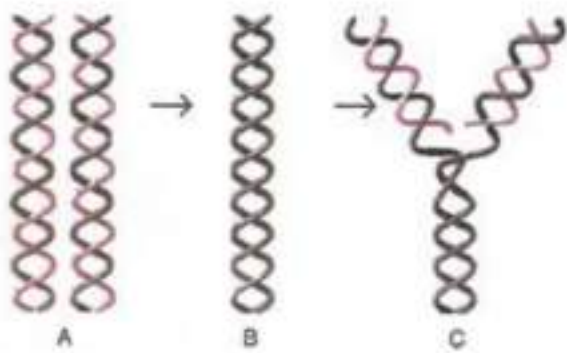
(b) How many nucleotides have been shown in each strand?

(c) Name the parts numbered 1,2,3,4 and 5 respectively.

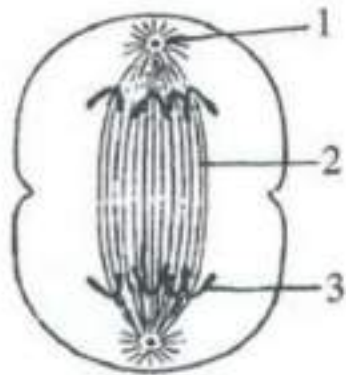
(d) Name the DNA unit constituted by the parts 1, 2 and 3 collectively.

20. The three sketches given below (A, B and C) are intended to represent the replication of DNA. What should be their correct sequence starting with the first and ending with the last? .....

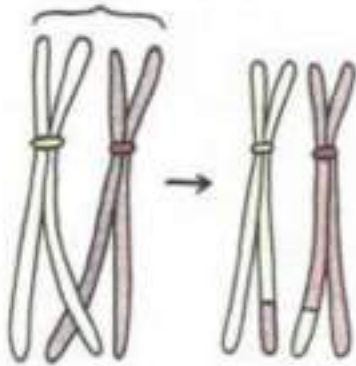




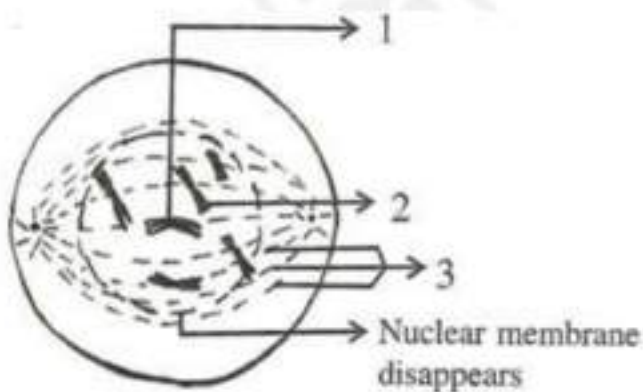
21. The diagram below represents a stage during cell division. Study the same and then answer the questions that follow:



- Name the parts labelled 1, 2 and 3.
  - Identify the above stage and give a reason to support your answer.
  - Mention where in the body this type of cell division occurs.
  - Name the stage prior to this stage and draw a diagram to represent the same.
22. Draw a labelled diagram to show the metaphase stage of mitosis in an animal cell having '6' chromosomes.
23. The diagram given below represents a certain phenomenon which occurs during meiosis.

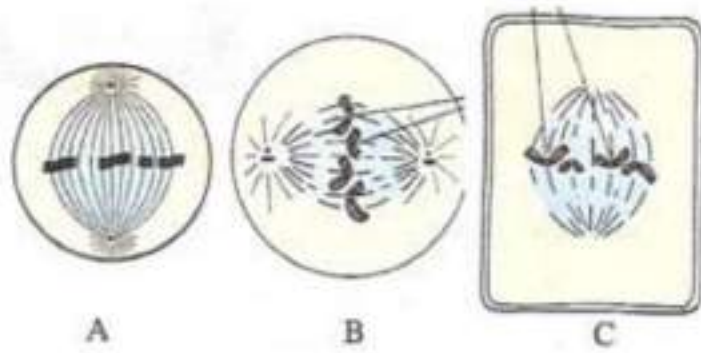


24. Name and explain the phenomenon by using the terms - homologous chromosomes, chromatids, and crossing-over.
25. Given below is a diagram representing a stage during mitotic cell division in an animal cell. Examine it carefully and answer the questions which follow.



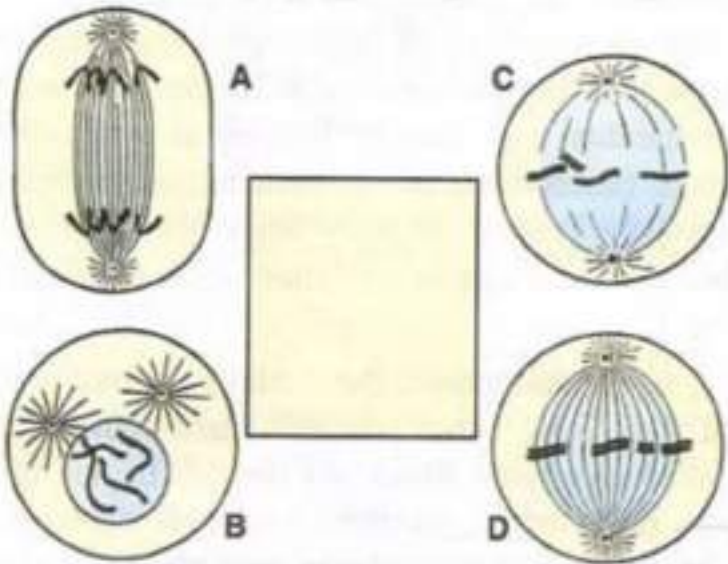
- Identify the stage. Give one reason in support of your answer.
- Name the cell organelle that forms the 'aster'.
- Name the parts labelled 1, 2 and 3.
- Name the stage that follows the one shown here. How is that stage identified?
- Mention two points of difference between mitosis and meiosis with regard to:
  - The number of daughter cells produced.
  - The chromosome number in the daughter cells.

26. Given ahead are three diagrammatic sketches (A, B and C) of one and the same particular phase during mitotic type of cell division.



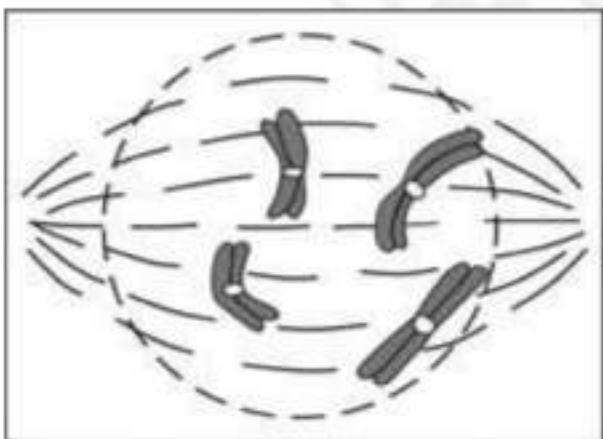
- (a) Identify the phase .....
- (b) What is the diploid number of chromosomes shown in them? .....
- (c) Identify whether these are animal cells or plant cell? Give reasons.  
 A .....
- B .....
- C .....

27. Shown below are four stages (A, B, C, D) (not in sequence) of a certain kind of cell division.



- (a) Is it a plant cell or an animal cell? Give two reasons .....
- (b) Is it undergoing mitosis or meiosis? .....
- (c) What should be the correct sequence of these four stages among themselves? .....
- (d) Name the stage that should precede the earliest of these stages.....
- (e) Draw the stage named above inside the blank space provided.

28. Given below is a diagram representing a stage during mitotic cell division. Study it carefully and answer the questions that follow.



- (a) Is it a plant cell or an animal cell? Give a reason to support your answer.
- (b) Identify the stage shown.
- (c) Name the stage that follows the one shown here. How is that stage identified?
- (d) How will you differentiate between mitosis and meiosis on the basis of the chromosome number in the daughter cells?
- (e) Draw a duplicated chromosome and label its parts.