DON BOSCO SCHOOL, KOKAR, RANCHI

Session-2020 - 2021

Class 10

Subject- Biology

Chapter 2

Structure of Chromosomes, Cell Cycle and Cell Division

Question 1
The chromatin material is formed of
(a) DNA only
(b) DNA and Histones
(c) Histones only
(d) Nucleotides

Q.(2)The term “chromosomes” literally means
(a) Inherited bodies
(b) Twisted threads
(c) Coloured bodies
(d) Shining threads Solution 2
(c) Coloured bodies

Q.(3)The number of chromosomes in a certain type of cell division is halved. This kind of cell division occurs in
(a) only testis
(b) only ovary
(c) both ovary and testis
(d) all body cells
Solution 3
(c) both ovary and testis
Q.(5)Synthesis phase in the cell cycle is called so for the synthesis of more of
(a) RNA
(b) RNA and proteins
(c) DNA
(d) Glucose
Solution 5
(c) DNA

Q.(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.
Solution 6
(a) - Nucleotides.
(b) - Nucleosome.
(c) - Hydrogen Bond.
(d) - Phosphate, Sugar and Nitrogenous base.

Q. 7Imagine 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:.....
Solution 7
Cell A: 2
Cell B: 4

Q. 9.Fill in the blanks.
(a) DNA replicates in the ..... of the cell cycle.
(b) Mitosis occurs in our ..... cells.
(c) Mitosis produces two daughter cells, whereas meiosis produces ..... daughter cells.
(d) Meiosis occurs only in ..... cells.
(e) Modern humans have 46 chromosomes. Their sperms and eggs will have ..... chromosomes each.
(f) During the pairing of chromosomes in meiosis, the ..... chromosomes come to lie side by side.
Solution 9
(a) DNA replicates in the synthesis (S) phase of the cell cycle.
(b) Mitosis occurs in our somatic (body) cells.
(c) Mitosis produces two daughter cells, whereas meiosis produces four daughter cells.
(d) Meiosis occurs only in reproductive cells.
(e) Modern humans have 46 chromosomes. Their sperms and eggs will have 23 chromosomes each.
(f) During the pairing of chromosomes in meiosis, the homologous chromosomes come to lie side by side.

Q. 10. What is the difference between chromatin fibre and chromosome?
Solution 10

Chromatin fibre is unfolded, uncondensed, extended DNA. It is only visible when cell under goes division whereas chromosomes are condensed DNA and they are visible when the cell is divided.

Q.11What are the rungs of the "DNA ladder" made of?
Solution 11
Rungs of DNA ladder is made of nitrogenous bases which includes Adenine (A), Guanine (G), Cytosine (C) and Thymine (T).

Q. 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.
Solution 12
(a) The four nitrogenous bases in the DNA ladder are Guanine, Thymine, Adenine and Cytosine.
(b) Genes are specific sequences of nucleotides on a chromosome.
(c) A nucleotide is composed of a phosphate, sugar (pentose) and a nitrogenous base.
(d) Nucleosomes are groups of histone molecules surrounded by DNA strands.
(e) If there are 46 chromosomes in a cell there will be 46 chromatin fibres inside the nucleus during interphase.

Q.13.State the difference between:
(a) Chromosome and chromatid,
(b) Centrosome and centomere,
(c) Aster and spindle fibres
(d) Haploid and diploid
Solution 13
(a) A chromosome is an organized structure of DNA and protein found in cells. It is a single piece of coiled DNA containing many genes, regulatory elements and other nucleotide sequences whereas a chromatid is one of the two copies of DNA making up a duplicated chromosome, which are joined at their centromeres, for the process of cell division (mitosis or meiosis).
(b) The centrosome is an area in the cell where microtubules are produced. Within an animal cell centrosome, there is a pair of small organelles called the centrioles. During animal cell division, the centrosome divides and the centrioles replicate (make new

copies) whereas each chromosome in its condensed form consists of two chromatids joined at some point along the length. This point of attachment is called centromere.
(c) An aster is a cellular structure shaped like a star, formed around each centrosome during mitosis in an animal cell whereas spindle fibers are aggregates of microtubules that move chromosomes during cell division.
(d) A haploid cell is a cell that contains one complete set of chromosomes. Gametes are haploid cells that are produced by meiosis whereas a diploid cell is a cell that contains two sets of chromosomes. One set of chromosomes is donated from each parent.

Q. 12Correct 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.
Solution 12
(a) The four nitrogenous bases in the DNA ladder are Guanine, Thymine, Adenine and Cytosine.
(b) Genes are specific sequences of nucleotides on a chromosome.
(c) A nucleotide is composed of a phosphate, sugar (pentose) and a nitrogenous base.
(d) Nucleosomes are groups of histone molecules surrounded by DNA strands.
(e) If there are 46 chromosomes in a cell there will be 46 chromatin fibres inside the nucleus during interphase.