

Topic :- Cell Cycle and Cell Division

- 1 (a)
In meiotic cell division, homologous chromosomes pair up during zygotene stage of prophase-I, this phenomena is called synapsis. During anaphase-I, homologous chromosomes of each bivalent start migrating towards opposite pole of the spindle, ultimately each pole receives a haploid group of segregated chromosomes.
- 2 (c)
During pachytene substage of prophase-I of meiosis, the non-sister chromatids of homologues exchange segments between themselves. This exchange of chromatid segments is called **crossing over**, which involves proper breakage and then fusion of broken ends oppositely and hence, results in the recombination.
- 3 (c)
The zygote is formed by the fusion of male and female gametes. The male and female gametes are formed by meiosis in diploid organism. A diploid living organism develops from zygote by repeated **mitotic divisions**.
- 4 (d)
Synapsis of homologous chromosomes takes place during zygotene stage of meiosis-I. Division of centromere takes place during anaphase-II of meiosis.
- 5 (d)
Egg is haploid and has 5 pg (pico gram) DNA. Its animal, which is diploid will be having 10 pg DNA. In S-phase, DNA doubles and therefore, in G₂ amount of DNA will be 20 pg.
- 6 (d)
Meiosis occurs in a diploid cell. It is a double division which gives rise to four haploid cells, each having half the number of chromosomes as compared to the parent cell. The term 'meiosis' was coined by **Farmer** and **Moore** in 1905
- 7 (a)
Chromosomes that results from the separation of sister chromatids during cell division are called daughter chromosomes. During anaphase of mitosis, paired chromosomes (sister chromatids) separates to form daughter chromosomes.

Each daughter chromosome migrates to centromere, toward the opposite ends of the cell. At the end of cell division, two distinct daughter cells are formed from a single cell

8 (b)

In G_2 -phase of interphase stage of cell cycle, the proteins required for spindle formation are synthesized. In G_1 -phase, enzymes required for protein and DNA replication are synthesized. In S-phase, DNA replication process takes place. In anaphase, chromosomes split longitudinally at the centromere.

9 (d)

Meiosis is a double division, which occurs in a diploid cell (nucleus) and gives rise to four haploid cells (nuclei), each having half the number of chromosomes as compared to the parent cell. In meiosis-I, bivalent is an association of four chromatids and two centromeres.

10 (d)

Drug colchicines is obtained from *Colchicum autumnale*. It arrests the polymerization of microtubules from tubulin protein, i.e., arrests spindle formation at **metaphase**.

11 (b)

Replication of DNA takes place at S-phase of cell cycle. The number of chromosomes reduced only in meiosis. So, the number remain 14, 14, and 14 in G_1 after S and after M-phase.

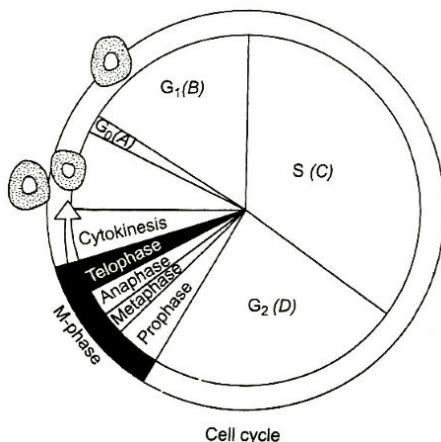
12 (a)

During diplotene substage of meiotic division, the force of attraction between homologous chromosomes reduced and later on they move apart.

13 (d)

The beginning of diplotene stage is marked by chiasma formation. The chiasma formation is the indication of crossing over and the beginning of separation of chromosomes. The chiasma formation is associated with the process of terminalisation

14 (a)



A typical eukaryotic cell in a culture divides once in approximately 24 hrs. The duration of cell cycle can vary from organism to organism and also from cell to cell type

16 **(c)**

Interphase of cell cycle is divided into three phases- G_1 , S and G_2 -phase. The, S-phase comes in between G_1 and G_2 phase.

17 **(a)**

Synapsis is the pairing of homologous chromosomes during meiosis. While autosomes undergoes synapsis during meiosis, sex chromosomes often remain unpaired. A consequence of recombinant synapsis is to increase genetic variability within both the offsprings and population

18 **(c)**

In prokaryotes and unicellular eukaryotic organisms, cell division is a method of multiplication but in multicellular eukaryotic organism, it is a method of growth.

20 **(b)**

M-phase (mitosis) is the most important period of cell cycle. It involves a major recognition of virtually all components of the cell. Since, the number of chromosomes in the parent and progeny cells is the same, it is also called as equal division

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ANSWER-KEY										
Q.	1	2	3	4	5	6	7	8	9	10
A.	a	c	c	d	d	d	a	b	d	d
Q.	11	12	13	14	15	16	17	18	19	20
A.	b	a	d	a	b	c	a	c	b	b

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