DPP
DAILY PRACTICE PROBLEMS

Class : XIth
Date :

Solutions

Subject : BIOLOGY
DPP No. : 9

Topic :- Cell Cycle and Cell Division

1 **(b)**

Prophase-I It is more complicated and prolonged as compared to the similar stage of mitosis. In this phase, chromosomes are not distinguishable because they are often seen as heterochromatic (heteropycnotic) bodies

Anaphase-I The homologous chromosomes break their connections and separate out. It is called disjunction

Interphase It is the phase of cell cycle in which the cell spends the majority of its time in preparing itself for cell division. It is the time between two mitotic or meiotic cell cycles

Metaphase-I A chromatic fibrous bipolar spindles are formed in the areas of dividing nuclei. The spindles are arranged in isobilateral or tetrahedral fashion. The chromosomes arrange themselves at equator

2 **(a)**

G_1 is the longest period, which involves preparation for RNA and protein synthesis.

3 **(a)**

Bivalent A pair of homologous chromosomes lying together is called a bivalent.

(i) **Tetrad** In pachytene stage, the chromatids of each synapsed chromosome slightly separate and become visible. The two visible chromatids of a chromosome are referred to as dyad

(ii) A group of four homologous chromatids (two dyads) is called a tetrad

(iii) **Pachytene Stage** Crossing over occurs during pachytene stage

(iv) **Non-sister Chromatids** The two chromatids of two homologous chromosomes (bivalent) are termed non-sister chromatids

(v) **Sister Chromatids** The two chromatids of the same chromosome are called sister chromatids

4 **(c)**

$A - G_1; B - G_2$

6 **(a)**

The M-phase represents the phase when the actual cell division or mitosis occurs and the interphase represents the phase between two successive M-phases. It is significant to note that in the 24 hour average duration of cell cycle of a human cell, cell division proper lasts

for only about an hour. The interphase lasts more than 95% of the duration of cell cycle

7 **(b)**

It the initial amount of DNA is denoted as 2C, then it increases to 4C.
In the G_1-phase of interphase, the cell is metabolically active and continuously grows but do not replicate its DNA S or synthesis phase marks the period during which DNA synthesis or replication takes place. During this time, the amount of DNA per cell gets double

8 **(a)**

In meiosis, the daughter cells are not similar to that of parent genetically because of **crossing over**. Crossing over is the mutual exchange of homologous chromosomal regions between non-sister chromatids during the first prophase of meiosis.

9 **(c)**

Late anaphase is characterised by

(i) Centromeres split and chromatids separate

(ii) Chromatids move to opposite poles.

Prophase is characterised by centriole separation.

10 **(c)**

G_2-phase or second gap phase is the gap between DNA synthesis and division. This particular phase is spent in synthesizing molecules other than DNA, which are required for cell division.

11 **(d)**

The reciprocal exchange of chromosomal material between homologous chromosome is termed as **crossing over**.

12 **(b)**

In meiosis-I, division is reductional while II equational.

13 **(c)**

G_0-phase is the arrest phase or suspended phase of the cycle. The cells remain inactive or in a non-dividing resting state during this phase and may remain such for days to years before resuming cell division, *e.g.*, nerve cells remain in G_0-phase.

14 **(c)**

Cell cycle completes in two steps- Interphase and M-phase. Interphase is completed in three successive phases G_1-phase (post-mitotic phase), S-phase (synthetic phase) and G_2-phase (pre-mitotic or post-synthetic phase). In the given figure, D is representing the S-phase (synthesis phase) of cell cycle.

15 **(c)**

I. The shortening and thickening of chromosome fibres occurs due to the two reason Coming together of axial proteins and coiling or spiralisation of chromatin fibres. This is assisted by the proteins, called condensins

II. Sometimes, overlapping is shown by the elongated chromosome. Their ends are not visible. Therefore, the chromosomes appears like a ball of wool and this stage is called sprime stage

III. Animal cells generally have two centrosome or centriole pairs lying close together. These two centrides begins to move towards the opposite sides of the microtubules, surrounding each pair of centrioles (diplosome). It look like a star-shaped body called aster

IV. Shortening of chromosome during prophase is must for their equal distribution during anaphase. Each chromosome appears to have two longitudinal threads called chromatids or sister chromatids, attached to each other by means of a narrow point called centromere

16 **(a)**

At **metaphase**, the chromosome are clearly visible as composed to two closely associated halves (chromatids) and the chromosomes have undergone maximum contraction, so these can be counted conveniently

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17 **(a)**

Metaphase in both mitosis and meiosis is characterised by the orientation of chromosomes themselves on the spindle fibres at the equatorial plate.

18 **(b)**

Sporophyte is a diploid generation while gametophyte is haploid. Meiosis cause the reduction of chromosome number to half, *i.e*., from diploid to haploid.

19 **(d)**

The first meiotic division leads to reduction of chromosome number of half and the second meiotic division to segregate the replicated chromosomes.

20 **(b)**

There are two main ways of cell division *i.e.,* mitosis and meiosis. In each case, division of the nucleus, called karyokinesis, occurs before the division of the cytoplasm, termed as cytokinesis

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