

## Topic :- Cell Cycle and Cell Division

- 1 **(c)**  
*The cell cycle is divided into two basic phases*  
(i) Interphase  
(ii) M-phase (mitosis phase)  
*The interphase is further divided into three phases*  
(i) G<sub>1</sub>-phase (gap 1)  
(ii) S-phase (synthesis)  
(iii) G<sub>2</sub>-phase (gap 2)  
The correct sequence of a cell cycle is  
G<sub>1</sub>→S→G<sub>2</sub>→M
- 2 **(b)**  
It is mitosis, in which both diploid and haploid cells undergoes this process.  
If a diploid cell undergoes mitosis, it results in two identical diploid cells.  $2n \rightarrow n$   
If a haploid cell undergoes mitosis, the result is two identical haploid cells ( $n \rightarrow n$ ).  
In meiosis however, a diploid cell participates that divides twice to produce four haploid cells
- 3 **(d)**  
Some cells in the adult animals do not appear to exhibit division (*e.g.*, heart cells, and many other cells divide only occasionally *e.g.*, when there is need to replace cells that have been lost due to injury or cell death. These cells that do not divide further and exit G<sub>1</sub>-phase to enter an inactive stage called quiescent stage (G<sub>0</sub>) of the cell cycle. Cells in this stage remains metabolically active but no longer proliferate
- 4 **(d)**  
A-diploid; B-haploid
- 5 **(c)**  
The spindle are formed of microtubules
- 6 **(d)**  
In mitosis, prophase is the longest phase of karyokinesis. In early prophase, nuclear membrane and nucleolus start disintegrating. Cell cytoskeleton, Golgi complex, ER, etc, also disappear.

- 7 **(b)**  
The plane of alignment of the chromosomes at metaphase is referred to as the **metaphase plat**. *The key features of metaphase are*  
(i) Spindle fibres attach to kinetochores of chromosomes  
(ii) Chromosomes are moved to spindle equator and get aligned along metaphase plate through spindle fibres to both poles
- 8 **(a)**  
In meiosis-I, displacement of chiasmata takes place in diakinesis and homologous chromosomes segregates during anaphase-I
- 9 **(c)**  
Colchicine is an alkaloid widely used in plant breeding for doubling the chromosome number. Colchicine is extracted from the corms of *Autumn crocus (Colchicum autumnale)*. The alkaloid does not allow the formation of spindle. Colchicine induced polyploidy has been used in raising several varieties of horticultural and agricultural plants, *e.g.*, potato
- 10 **(c)**  
**Crossing over** leads to separation of linked genes and recombination with the genes present on homologous chromosome to form new combinations.
- 11 **(a)**  
The correct sequence of cell cycle phases is  
 $G_1 \rightarrow S \rightarrow G_2 \rightarrow M$ .
- 12 **(c)**  
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
- 13 **(a)**  
Cell would normally proceed to mitosis without interruption once it had started the S-period.
- 14 **(a)**  
The two chromatids of a metaphase chromosome represent replicated chromosomes to be separated at anaphase.
- 15 **(b)**  
During interphase, the chromosome material (DNA of chromosome) replicates and becomes doubled. Chromosome material in the form of very loosely coiled threads is called chromatin

- 16 **(a)**  
**G<sub>1</sub>-phase** is the longest phase of the cell cycle and is also called as presynthetic or post mitotic phase. During it, the synthesis of biochemicals like RNAs, proteins, enzymes (DNA polymerase) for DNA synthesis, amino acids for histone formation, nucleotides and ATP, takes place.
- 17 **(d)**  
Telomeres are the ends of chromosomes. These are required for the individuality of chromosomes. Generally, these are present more than one and less than five in a chromosome.
- 18 **(a)**  
Meiosis is division necessary for the formation of gametes in animals and spores in plants. **Prophase-I** is longest phase of meiosis and composed of leptotene, zygotene, pachytene, diplotene and diakinesis.
- 20 **(c)**  
Crossing over is also an enzyme mediated process and the enzyme involved is called recombinase

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

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