

QB365

Important Questions - Cell Cycle and Cell division

11th Standard CBSE

**Biology**

Reg.No. :

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Time : 01:00:00 Hrs

Total Marks : 50

**Section-A**

- 1) Mention the duration of cell cycle in yeast. 1
- 2) Name a drug that has an inhibitory effect on cell cycle in mitotic stage. 1
- 3) During anaphase-I, i.e., a stage of meiosis, the homologous chromosomes separate, but sister chromatids remain associated, but sister chromatids remain associated. State whether true or false. 1
- 4) At what stage of meiosis, formation of tetrads occurs. Name it. 1
- 5) Which cells of our body do not divide? 1
- 6) What does a bivalent of meiosis-I consist of? 1
- 7) At the following stage of meiosis, the chromosomes appear to be beaded. Can you find out the stage? 1
- 8) At what stage of cell cycle the grown up cell divides? 1
- 9) The shortest phase of mitosis is anaphase. State whether this statement is true or false. 1
- 10) In which stage of prophase-I of meiosis, homologous chromosomes lie side by side in pairs. 1

**Section-B**

- 11) The diagram shows a bivalent at prophase-I of meiosis. Which of the four chromatids can cross over? 2



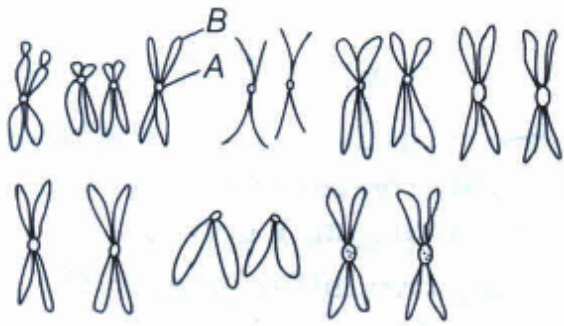
- 12) Substance W is a chemical that inhibits spindle formation during cell division. If a meristematic plant cell were exposed to substance W, which process will not be able to occur in that plant cell? 2
- 13) The second meiotic division is similar to mitosis as it results in the separation of the sister chromatids. However, it also differs from mitosis. Explain how? 2
- 14) Why do the chromosomes become short and thick in prophase? 2
- 15) What is metaphasic plate? 2
- 16) List the difference between metaphase of mitosis and metaphase-I of meiosis. 2
- 17) What is the term given to multinucleated condition? Explain briefly. 2
- 18) Mention the name of the phase of mitosis in order of their occurrence. Also explain any of them. 2

19) Answer the following questions based upon the given figure.

2

(i) What type of division is this? Whether meiotic or/and mitotic and which stage?

(ii) What is A and B?



20) Name three phases of interphase. Give one major event of each phase.

2

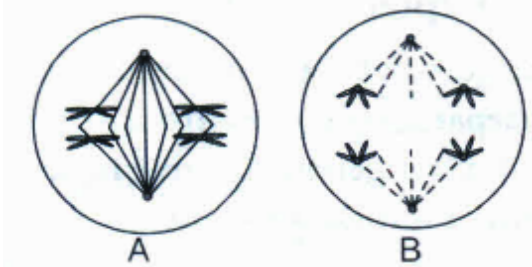
**Section-C**

21) State the role of centrioles in cell division.

5

22) (i) Name the stages and type of cell division represented in A and B, respectively.

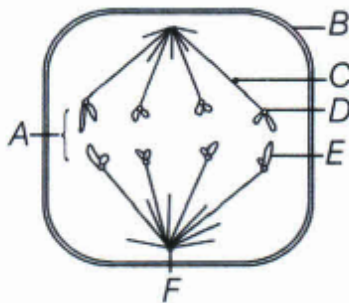
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(ii) Also explain any one of them.

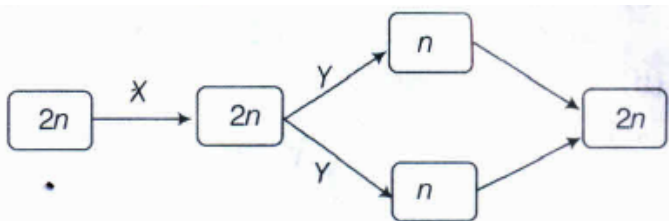
23) Label the following structures labelled as A-F in the diagram.

5



24) The diagram below represents the changes in the number of chromosomes during several processes that occur in an animal cell.

5



(i) Name the process of cell division occurring at X and Y.

(ii) State two differences in the behaviour of chromosomes between X and Y.

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**Section-A**

- 1) 90 min. approximately. 1
- 2) Colchicine drug shows inhibitory effect. 1
- 3) True 1
- 4) Tetrads are formed during pachytene of prophase-I (meiosis-I).At this stage crossing over occurs. 1
- 5) Neuron stops dividing soon after the birth of a child. 1
- 6) Bivalent of meiosis-I consists of four chromatids and two centromeres. 1
- 7) Chromosomes seem to be beaded during leptotene(prophase-I) of meiosis. 1
- 8) Cell divides in M-phase of cell cycle. 1
- 9) True, anaphase is the shortest phase of mitosis. 1
- 10) Zygotene 1

### Section-B

- 11) 2  
The non-sister chromatids of homologous pair of chromosomes undergo crossing over in pachytene stage of meiosis.
- 12) 2  
When a meristematic plant cell were exposed to the substance W, the separation of sister chromatids will be inhibited.
- 13) 2  
The main reason for the difference between the two is that the separating sister chromatids during the meiosis-II differ genetically due to crossing over that had occurred during prophase-I.
- 14) 2  
It happens so because it is physically easier for short and compact chromosomes to move through the cytoplasm than the very long twisted interphase chromosomes.
- 15) It is the equatorial plane at the centre of cell on which chromosomes arrange during metaphase. 2
- 16) 2

Differences between metaphase of mitosis and metaphase-I of meiosis are

Mitotic Metaphase	Meiotic Metaphase
The chromosomes at the metaphase are arranged in such a way that the centromeres lie at the metaphase plate and the arms of chromosomes are free.	The chromosomes at the metaphase (meiosis-I) are arranged in such a way that the centromeres of homologous chromosomes lie on either side of the metaphase plate, pointing towards the opposite poles.
A chromosome is connected to both the spindle poles due to the presence of two tractile fibrils.	In metaphase-I, a chromosome is connected to only one spindle pole of its side due to the presence of a single tractile fibril.

- 17) Syncytium is the term given to multinucleated condition of the cell. 2
- 18) Mitosis is divided into 4 stages which are prophase, metaphase, anaphase and telophase in order. 2

19) (i) It is a meiotic division showing synapsis and it is in the zygotene stage of prophase - I of meiosis-I. 2  
(ii) A-centromere, B-chromatid.

20) 2

Three main events that occur in interphase are

G<sub>1</sub>-phase (post-mitotic or pre-synthetic phase), S-phase (synthesising phase) and G<sub>2</sub>-phase (post-synthetic or pre-mitotic phase).

Major events of each phase are

(i) G<sub>1</sub>-phase is the longest phase during which synthesis of RNA and DNA takes place.

(ii) S-phase is the phase during which chromosomes replicated and prepare themselves for equal distribution.

(iii) G<sub>2</sub> -phase, is the phase in which synthesis DNA gets stopped. However, formation of RNA takes place.

### Section-C

21) 5

Centrioles play an important role in formation of spindle during cell division. They organise the mitotic spindle and thus, help in the completion of cytokinesis. They generate the cell's cytoskeleton and help in the formation of the mitotic spindles. In organisms with flagella and cilia, the position of these organelles is determined by the mother centriole, which becomes the basal body.

22) 5

(i) Stages and type of cell division are (A) Metaphase -I-meiosis(B) Anaphase-I-meiosis

(ii) For metaphase-I : It is the stage followed by prophase (same as mitosis).

Following changes are observed during this stage

(i) The bivalents during this phase arrange themselves on the two parallel equatorial plates.

(ii) The centromeres project little bit towards periphery. Since, there are two centromeres in each bivalent. Thus, each centromere is joined by chromosomal fibres.

(iii) The fibres of the homologous chromosomes are always in the opposite directions.

23) A-Chromosomes B-Cell membrane 5

C-Spindle fibre D-Centromere

E-Chromatid F-Spindle organiser

24) 5

(i) X-Mitosis Y-Meiosis

(ii) (a) In X, there is no association of homologous chromosomes, but in Y, homologous chromosomes pair up together to form bivalents during prophase-I.

(b) In X, there is no crossing over as there is no formation of chiasmata, but in Y, crossing over occurs at the chiasmata whereby some genes are swapped between homologous chromosomes.