Cell Cycle and Cell Division

1. **Assertion (A):** Growth and reproduction are characteristics of cells, indeed of all living organism.
Reason (R): Cycle of growth and division allow a single cell to form a structure consisting of millions of cells.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

2. **Assertion (A):** Distribution of replicated chromosomes (DNA) to daughter nuclei by a complex series of events is almost accurate phenomenon.
Reason (R): Such distribution of replicated chromosomes to daughter nuclei by a complex series of events is under genetic control.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

3. **Assertion (A):** Cells in quiscent stage (G_0) are metabolically inactive, so don't show cell division.
Reason (R): Quiscent stage appears on exit of cell from G_2 phase of cell cycle.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

4. **Assertion (A):** In plant cells cell plate method is found for cytokinesis instead of cell furrow method.
Reason (R): Plant cell are enclosed by a relatively inextensible cell wall.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

5. **Assertion (A):** Meiosis involves two sequential cycles of nuclear and cell division called meiosis-I & meiosis-II, but only a single cycle of DNA replication.
Reason (R): Meiosis is aimed to produce reduced cells having half number of chromosome that mother cell.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

6. **Assertion (A):** Meiosis-I is most significant phenomenon from evolution point of view.
Reason (R): Meiosis-I leads to reduction in chromosome so that consistency of chromosome can be maintained.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

7. **Assertion (A):** Zygotene is characterized by formation of synaptonemal complex.
Reason (R): Synaptonemal complex helps in synapsis of non homologous chromosomes.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

8. **Assertion (A):** During pachytene crossing over takes place which is dependent on recombinase.
Reason (R): Recombinase is the group of enzymes involved in crossing over and crossing over in an enzyme dependent process.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

9. **Assertion (A):** Telophase-I leads to formation of diad of cells.
Reason (R): Telophase-I is marked by completion of karyokinesis and cytokinesis as well.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

10. **Assertion (A):** During meiosis-I there is no division of chromosome.
Reason (R): During meiosis-I there is separation and movement of homologous, in order to reduce the number of chromosome half in daughter cells.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

11. **Assertion (A):** In meiosis, each bivalent is composed of four chromatids.
Reason (R): Pairing of homologous chromosomes take place in meiosis.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

12. **Assertion (A):** Replication of DNA not occurs during interkinesis.
Reason (R): Division of chromosomes takes place during meiosis-II.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

13. **Assertion (A):** Meiosis is also known as reduction division.
Reason (R): Meiosis reduces the number of chromosomes in daughter cells.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

14. **Assertion (A):** Meiosis is necessary for sexual reproduction.
Reason (R): Meiosis produces genetical identical cells.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

15. **Assertion (A):** Crossing over take place during pachytene stage.
Reason (R): It is a process of interchange of chromatid material between non sister chromatid of homologous chromosomes.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

16. **Assertion (A):** M-phase represents the phase when the actual cell division occurs.
Reason (R): Interphase represents the phase between two successive M-phase.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

17. **Assertion (A):** During S-phase, amount of DNA per cell doubles.
Reason (R): During S-phase, there is no increase in chromosome number.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

18. **Assertion (A):** G_0 (quiscent) stage is an inactive stage.
Reason (R): In G_0 stage, cells remain metabolically active.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

19. **Assertion (A):** M-phase is the most dramatic period of the cell cycle.
Reason (R): It involves a major reorganization of virtually all components of the cell.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

20. **Assertion (A):** Small cells are metabolically less active.
Reason (R): K.I. of small cells is less.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

21. **Assertion (A):** Crossing over is the only difference between mitosis & meiosis cell divisions.
Reason (R): Mitosis and Meiosis both are important to bring genetic variations.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

22. **Assertion (A):** Crossing over take place during pachytenesub stage.
Reason (R): It is a process of interchange of chromatid material between chromatid of nonhomologous chromosomes
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

23. **Assertion (A):** In meiosis II division is equational.
Reason (R): Homologous chromosomes are separated in anaphase II.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

24. **Assertion (A):** Cell division is a very important process in all living organisms.
Reason (R): During the division of a cell, DNA replication and cell growth also take place.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

25. **Assertion (A):** The interphase of the cell cycle is also called the resting phase.
Reason (R): No metabolic activity takes place inside the cell during the interphase.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

26. **Assertion (A):** Meiosis ensures the production of haploid phase in the life cycle of sexually reproducing organisms.
Reason (R): Syngamy restores the diploid condition in sexually reproducing organisms.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

27. **Assertion (A):** Metaphase is the stage at which morphology of chromosomes is most easily studied.
Reason (R): At this stage, metaphase chromosome is made up of two sister chromatids, which are held together by the centromere.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

28. **Assertion (A):** The cells that do not divide further exit G_1 phase to enter an inactive stage called quiescent stage (G_0) of the cell cycle.
Reason (R): Cells in G_0 stage no longer remain metabolically active and no longer proliferate unless called on to do so depending on the requirement of the organism.
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

29. **Assertion (A):** Meiosis conserves specific chromosome number of each species across generations in sexually reproducing organisms.
Reason (R): Meiosis, per se, results in reduction of chromosome number by half. In the light of the above statements choose the correct answer from the options given below:
(1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
(2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
(3) (A) is true but (R) is false
(4) Both (A) and (R) are false

Directions: In the following questions, a statement of assertion is followed by a statement of reason.
Mark the correct choice as:
(a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
(c) If Assertion is true but Reason is false.
(d) If both Assertion and Reason are false.

30. **Assertion :** Interphase is resting stage.
Reason: The interphase cell is metabolically inactive.

31. **Assertion :** DNA synthesis occurs in G 1 and G 2 periods of cell cycle.
Reason : During G 1 and G2 phase, the DNA content become double.

32. **Assertion :** Every chromosome, during metaphase has two chromatids.
Reason : Synthesis of DNA takes places in the S-phase of interphase.

33. **Assertion:** Meiosis results in production of haploid cells.
Reason: Synapsis occurs during leptotene.

34. **Assertion :** Meiosis II is known as equational or homotypic division.
Reason : Meiosis II produces same number of chromosome in cell.

35. **Assertion :** The stage between two mitotic divisions is called interkinesis.
Reason : Interkinesis is generally long lived.

36. **Assertion :** Diplotene is characterized by the presence of chiasmata.
Reason : Diplotene can last for months and years in oocytes of some vertebrates.

37. **Assertion:** Crossing over leads to recombination of genetic material on the two chromosomes.
Reason: It is the exchange of genetic material between two homologous chromosomes.

38. **Assertion :** Meiotic division takes place in reproductive cells.
Reason : Synapsis occurs during zygotene of meiosis.

39. **Assertion:** Karyokinesis occurs in M-phase.
Reason : Cell division stops in M-phase.

40. **Assertion:** Prophase is the first stage of mitosis which follows S and G_1 phases of interphase.
Reason: Prophase is marked by the initiation of clusters of chromosomes.

41. **Assertion :** Meiotic division results in the production of haploid cells.
Reason : Synapsis occurs during zygotene of meiosis.

42. **Assertion:** The process of pairing of the chromosomes is called synapsis.
Reason : Synapsis occurs during leptotene stage.

43. **Assertion:** Variations are critical for the process of evolution.
Reason : Meiosis increases the genetic variability in the population of organisms from one generation to the next.

44. **Assertion:** Cell growth is a continuous process in terms of cytoplasmic increase.
Reason: DNA synthesis occurs only during two specific stages in the cell cycle.

ANSWER KEY																			
Que.	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Ans.	1	1	4	1	1	2	3	1	1	1	2	2	1	3	2	2	2	2	1	4
Que.	**21**	**22**	**23**	**24**	**25**	**26**	**27**	**28**	**29**											
Ans.	4	3	3	2	1	2	2	3	2											

30.	31.	**32.**	33.	34.	35.	36.	37.	38.	39.	40.	41.	42.	43.	44.		
c	d	a	c	a	d	b	a	b	d	d	a	c	b	c		