Chapter 04

Cell Cycle and Cell Division

RANKER'S STUFF

Q.1 Which one is correct for G_0 stage?

I. It is a quiescent stage.
II. In this phase cell cycle is stopped
III. G_0 cells do not grow or proliferate but metabolically active
IV. G_0 cells may divide in response to some stimulus

(1) All are correct
(2) I, II, III are correct
(3) I, II are correct
(4) Only I and IV are correct

Q.2 Which of the following is not correctly matches a phase of the cell cycle with its function?

	Column–I	Column–II
(1)	Second gap phase	Period of cytoplasmic growth
(2)	First gap phase	Most of the organelle duplication
(3)	Interphase	Phase of preparation for cell division
(4)	DNA synthesis phase	Doubling of number of chromosomes in cell

Q.3 Match the column–I with column–II and select the correct answer:

Column-I		Column-II	
(A)	Pachytene	(i)	Compaction of Chromosomes starts
(B)	Zygotene	(ii)	Chiasmata visible
(C)	Diplotene	(iii)	Terminalisation
(D)	Leptotene	(iv)	Distinct tetrad
(E)	Diakinesis	(v)	Synapsis

(1) A–i, B–ii, C–iii, D–iv, E–v
(2) A–iv, B–v, C–ii, D–i, E–iii
(3) A–iii, B–iv, C–v, D–ii, E–i
(4) A–ii, B–iii, C–iv, D–i, E–v

Q.4 In a diploid cell after S phase quantity of DNA is 20 pg (pico gram), after Telophase–II situation will be, in each daughter nucleus:

(1) Diploid, 10 pg DNA
(2) Haploid, 10 pg DNA
(3) Haploid, 5 pg DNA
(4) Diploid, 5 pg DNA

Q.5 Mark incorrect statements:

(A) Meiosis involves only a single cycle of DNA replication
(B) Four haploid cells are formed at the end of meiosis–I
(C) Mitosis usually restricted to diploid cells only
(D) In yeast, cell cycle takes about 90 minutes.

(1) A and B (2) A and C
(3) B and C (4) All are correct

Q.6 Interval between mitosis and initiation of DNA replication is called:

(1) G_2 – Phase (2) G_1 – phase
(3) Karyokinesis (4) s–phase

Q.7 Recombinase enzyme is involved in which phase of meiosis:

(1) Pachytene (2) Diplotene
(3) Diakinesis (4) Zygotene

Q.8 Diploid cell in human, where cell division does not occur:

(a) Heart cell (b) Muscle cell
(c) Nerve cell

(1) Only c (2) b and c
(3) a and c (4) a, b and c

Q.9 In yeast, duration of cell cycle is about:
(1) 80 minutes (2) 99 minutes
(3) 1.30 hrs. (4) 60 minutes

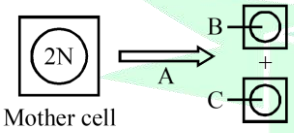
Q.10 In which phase of the cell cycle centrioles move towards opposite poles of the cell.
(1) Anaphase (2) Metaphase
(3) Telophase (4) Prophase

Q.11 The M-phase starts with the:
(1) G_1 (2) Karyokinesis
(3) Cytokinesis (4) Telophase

Q.12 The events shown below occur during different phases:
A. Centromere splits, chromatids separate and move to opposite poles, chromatids are now called chromosome
B. Chromosomes cluster at opposite poles, decondensation of chromosome, reappearance of NM, GB and ER.
C. DNA replication
D. Kinetochores attach to spindle fibres and chromosome are arranged at equatorial plate
E. Condensation of chromosomal materials
Which of the following correctly identifies each of the phases described:

S.No.	Inter -phase	Pro -phase	Meta -phase	Ana -phase	Telo -phase
(1)	C	E	D	A	B
(2)	C	D	E	A	B
(3)	C	E	D	B	A
(4)	C	A	D	E	B

Q.13



Mother cell
Identify A to C

S.No.	A	B	C
(1)	Meiosis	N	N
(2)	Meiosis	2N	2N
(3)	Mitosis	N	N
(4)	Mitosis	2N	2N

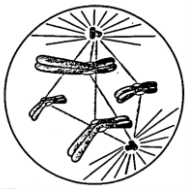
Q.14 Synaptonemal complex is a nucleoprotein structure. It is visible or found from:
(1) zygotene through pachytene
(2) laptotene through diplotene
(3) zygotene through metaphase
(4) pachytene through diplotene

Q.15 Which one of the following is correctly matched?
(1) Leptotene - formation of bivalents
(2) Diplotene - chiasmata formation
(3) Pachytene - chiasmata terminalisation
(4) Zygotene - formation of bouquet

Q.16 Arrange the following events of meiosis in the correct sequence:
A. Terminalisation of chiasmata
B. Crossing over
C. Synapsis
D. Disjunction of chromosomes
E. Dissolution of synaptonemal complex
The correct sequence is:
(1) A → B → C → D → E
(2) E → D → C → B → A
(3) C → B → D → E → A
(4) C → B → E → A → D

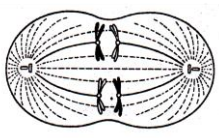
Q.17 Significance of meiosis lies in:
(1) production of genetic variability
(2) maintaining the number of chromosomes through generations
(3) forming the basis of evolution
(4) All of the above

Q.18 Identify the following diagram:



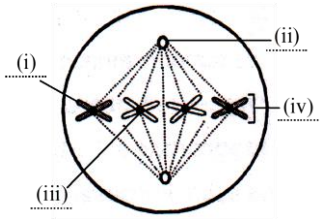
(1) Transition to Metaphase (mitosis)
(2) Transition to Anaphase-II (meiosis)
(3) Transition to Metaphase-I (meiosis)
(4) Transition to Anaphase (mitosis)

Q.19 The drawing below shows a cell whose diploid chromosome number is four. This cell is in:-



(1) Metaphase
(2) Anaphase of mitosis
(3) First metaphase of meiosis
(4) Second anaphase of meiosis

Q.20 Label the structure indicated by (i), (ii), (iii) and (iv):



(1) (i)-Chromatid, (ii)-Centriole, (iii)-Centromere, (iv)-Chromosome
(2) (i)-Chromosome, (ii)-Centriole, (iii)-Centromere, (iv)-Chromatid
(3) (i)-Chromatid, (ii)-Centromere, (iii)-Centriole, (iv)-Chromosome
(4) (i)-Chromosome, (ii)-Centromere, (iii) Centriole, (iv)-Chromatid

Directions: (Q.21-25) In each of the following questions, a statement of assertion, a statement of Assertion is given followed by corresponding statement of Reason. Of the statements, mark the correct answer as

(A) If both A and R are true and R is the correct explanation of A
(B) If both A and R are true, but R is not the correct explanation of A
(C) If A is true, but R is false
(D) If A is false, but R is true

Q.21 **Assertion:** Every chromosome, during metaphase has two chromatids.
Reason: Synthesis of DNA takes places in the S-phase of interphase.
(1) A (2) B (3) C (4) D

Q.22 **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.
(1) A (2) B (3) C (4) D

Q.23 **Assertion:** Cell growth results in disturbing the ratio between the nucleus and cytoplasm.
Reason: Mitosis helps the cell to restore the nucleocytoplasmic ratio
(1) A (2) B (3) C (4) D

Q.24 **Assertion:** G_1 phase is the interval between mitosis and initiation of DNA replication.
Reason: The cell is metabolically inactive during G_1 phase.
(1) A (2) B (3) C (4) D

Q.25 **Assertion:** Meiosis increases the genetic variability in the population of organisms from one generation to the next.
Reason: Meiosis result in reduction of chromosome number by half.
(1) A (2) B (3) C (4) D

Directions: (Q.26-28) In the light of the above statements, choose the correct answer from the options given below:

(A) Both Statement-I and II are correct.
(B) Statement-I is correct and Statement-II is incorrect.
(C) Statement-I is incorrect and Statement-II is correct.
(D) Both Statement-I and II are incorrect.

Q.26 **Statement-I:** Diplotene can last for months or years in oocytes of some vertebrates.
Statement-II: In telophase-I, chromosome do not reach the extremely extended state of the interphase nucleus.
(1) A (2) B (3) C (4) D

Q.27 **Statement-I:** Mitotic divisions in the meristematic tissues- the apical and the lateral cambium, result in a continuous growth of plants throughout their life.
Statement-II: The cells of the upper layer of the epidermis, cells of the lining of the gut and blood cells are being constantly replaced.
(1) A (2) B (3) C (4) D

Q.28 **Statement-I:** Daughter cells are exactly similar in all respect in case of mitosis.
Statement-II: Daughter cells have half the number of chromosomes as compared to mother cell in mitosis.
(1) A (2) B (3) C (4) D

ANSWER KEY

RANKER'S STUFF

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