Cell Cycle and Cell Division

Standard difficulty · 20 questions · 40 marks · Time: 36 minutes

Name: _____ Date: _____ Score: ____ / 40

Show your working for Sections B and C. Answers are on the last page — try every question first!

Section A — Choose the correct answer — 8 × 1 = 8 marks

1. DNA is replicated during the:
(a) G2 phase **(b)** M phase
(c) G1 phase **(d)** S phase of interphase

2. In which stage does this happen: nuclear envelope and nucleolus reappear in mitosis?
(a) Telophase **(b)** Anaphase I **(c)** Metaphase I **(d)** Diakinesis

3. The DNA content of a cell in G1 is 4 pg (2C). The DNA content in anaphase of mitosis (whole cell) is:
(a) 4 pg **(b)** 16 pg **(c)** 2 pg **(d)** 8 pg

4. A cell divides by mitosis every 20 hours. Starting with 10 cells, how many cells are there after 40 hours?
(a) 41 **(b)** 20 **(c)** 40 **(d)** 80

5. How many meiotic divisions are needed to form 100 pollen grains (or sperms)?
(a) 50 **(b)** 25 **(c)** 100 **(d)** 200

6. What is the number of bivalents in metaphase I of a cell with 2n = 28?
(a) 14 **(b)** 28 **(c)** 16 **(d)** 7

7. In a sample of 1000 dividing cells with a 16-hour cycle, 25 are in prophase. About how long does prophase last?
(a) 24 minutes **(b)** 25 minutes **(c)** 48 minutes **(d)** 12 minutes

8. Assertion (A): In an organism with 2n = 36, each cell formed by meiosis I has 18 chromosomes.
Reason (R): Homologous chromosomes separate in anaphase I, so the chromosome number is halved.
(a) Both A and R are true, and R is the correct explanation of A.
(b) Both A and R are true, but R is not the correct explanation of A.
(c) A is true, but R is false.
(d) A is false, but R is true.

Section B — Short answer — 8 × 2 = 16 marks

9. What are the phases of the cell cycle?

10. An organism has 2n = 32 and 12 pg of DNA in a G1 cell. How many chromosomes and how much DNA are there in each cell after meiosis II?

11. Of 200 cells in a root tip with a 24-hour cell cycle, 25 are dividing (in M phase). Find the mitotic index and the length of the M phase.

12. What happens in leptotene?

13. How many megaspore mother cells must undergo meiosis to give 400 embryo sacs? Explain.

14. A cell divides every 20 hours. How many cells come from one in 140 hours, and how long does it take to make 512 cells?

15. A cell with 2n = 24 enters meiosis. How many bivalents, and how many chromatids in all, are there at metaphase I?

16. In an organism with 2n = 44, is the chromosome number in each cell after meiosis I haploid or diploid, and how many chromosomes are there? Is the DNA content 1C, 2C or 4C?

Section C — Word problems — 4 × 4 = 16 marks

17. Describe the stages of mitosis.

18. An organism has 2n = 46, and a G1 cell has 12 pg of DNA. Give the chromosome number and DNA content of: G1 phase, anaphase of mitosis (whole cell), each cell after meiosis I, G2 phase (after S), each cell after meiosis II.

19. A root-tip squash with a 12-hour cell cycle has 1000 cells: 950 in interphase, 25 in prophase, 10 in metaphase, 5 in anaphase, 10 in telophase. (a) Find the mitotic index. (b) How long does each stage last? (c) Which stage is the longest, and why?

20. How many meiotic divisions are needed to produce 120 seeds in a flowering plant? Explain for the male and the female side.

Want another sheet on this chapter? In the Ambiful Worksheets app every sheet is new, with its answer key, and your child never gets the same question twice.
Scan the code to get the free app, or open **worksheets.ambiful.com/get**

Answer key

Cell Cycle and Cell Division · AW-11B-CCD-2026-V1 · For parents — fold back or tear off before handing the sheet to your child.

Q	Answer	Working
1	**(d) S phase of interphase**	—
2	**(a) Telophase**	—
3	**(d) 8 pg**	anaphase of mitosis (whole cell): 4C
4	**(c) 40**	2 cycles: 10 × 2^2
5	**(b) 25**	each meiosis of a microspore mother cell gives four microspores
6	**(a) 14**	one bivalent per pair of homologous chromosomes
7	**(a) 24 minutes**	fraction 25/1000 × 16 × 60 minutes
8	**(a) Both A and R are true, and R is the correct explanation of A.**	A is true: n = 18. R is true and explains A.
9	**Interphase (G1, S and G2), the preparation phase taking more than 95% of the cycle, and the M phase (karyokinesis followed by cytokinesis).**	—
10	**16 chromosomes; 6 pg**	n, 1C
11	**Mitotic index 12.5%; M phase about 180 minutes**	25/200; × 24 × 60 minutes
12	**Chromosomes first become visible in meiosis**	—
13	**400: each meiosis gives four megaspores, but only one survives to form an embryo sac**	—
14	**128 cells; 180 hours**	7 cycles; 512 = 2^9
15	**12 bivalents; 48 chromatids**	each bivalent: 2 chromosomes, 4 chromatids
16	**Haploid (n): 22; 2C**	—
17	**Prophase: chromatin condenses into chromosomes, each of two chromatids; the spindle starts to form; the nucleolus, Golgi and ER disappear. Metaphase: the nuclear envelope has gone; chromosomes line up on the metaphase plate, attached to spindle fibres at their kinetochores. Anaphase: centromeres split and sister chromatids move to opposite poles. Telophase: chromosomes decondense at the poles; nuclear envelopes, nucleoli, Golgi and ER reform. Cytokinesis then divides the cell.**	—

Q	Answer	Working
18	**G1 phase: 46, 12 pg; anaphase of mitosis (whole cell): 92, 24 pg; each cell after meiosis I: 23, 12 pg; G2 phase (after S): 46, 24 pg; each cell after meiosis II: 23, 6 pg**	DNA doubles in S; mitosis restores 2C; meiosis halves twice to 1C
19	**(a) 5%; (b) interphase 11.4 h; prophase 18 min, metaphase 7.2 min, anaphase 3.6 min, telophase 7.2 min; (c) interphase: the cell grows and replicates its DNA, taking over 95% of the cycle**	time in a stage = fraction of cells in it × cycle length
20	**150: 120 megaspore mother cells (one embryo sac each) + 30 microspore mother cells (four pollen grains each)**	each seed needs one egg (one meiosis) and one pollen grain (a quarter of a meiosis)

Ambiful Worksheets · worksheets.ambiful.com · Not affiliated with CBSE / NCERT