CHAPTER 4 QUIZ (45 marks)

Part A) Knowledge/Understanding (29 marks)

Multiple Choice: For each question, select the best answer from the four alternatives. (10 marks)

1. How many chromosomes are found in a human somatic cell?

(a) 6

(b) 32

(c) 46

(d) 78

2. Which process is an example of asexual reproduction?

(a) a plant producing seeds

(b) a bird attracting a mate

(c) a protist undergoing mitosis and cytokinesis

(d) a dog giving birth to a litter of puppies

3. In what process are traits passed from parent to offspring?

(a) heredity

(b) genetics

(c) fragmentation

(d) cytokinesis

4. Which structure carries genetic information for a trait?

(a) a gene

(b) a chromosome

(c) a genome

(d) a DNA molecule

5. During interphase, what form does the genetic material in the cell take?

(a) sister chromatids

(b) spindle fibres

(c) chromatin

(d) homologous chromosomes

6. During which part of the cell cycle is genetic material duplicated?

(a) anaphase

(b) interphase

(c) metaphase

(d) prophase

7. The somatic cells of a dog each contain 78 chromosomes. What is (are) the product(s) of gametogenesis in a male dog?

(a) 1 sex cell containing 39 chromosomes

(b) 2 sex cells, each containing 78 chromosomes

(c) 4 sex cells, each containing 39 chromosomes

(d) 4 sex cells, each containing 78 chromosomes

8. Chromatids from homologous chromosomes may break and recombine during which phase of meiosis?

(a) prophase I

(b) anaphase I

(c) metaphase II

(d) telophase II

9. Which genetic disorder occurs when an individual has an extra copy of chromosome 21?

(a) Down syndrome

(b) Edward syndrome

(c) Klinefelter syndrome

(d) Turner syndrome

10. An adult human with a non-disjunction disorder can have

(a) 22 chromosomes

(b) 46 chromosomes

(c) 47 chromosomes

(d) none of the above

Indicate whether each statement is true or false. If you think the statement is false, rewrite it to make it true. (12 marks)

11. A typical gene has hundreds, or even thousands, of chromosomes.

12. Generally, offspring produced by sexual reproduction have greater genetic variation than offspring produced by asexual reproduction.

13. The cytoplasm of a cell is divided and organelles are distributed among two daughter cells during cytokinesis.

14. Sister chromatids contain two chromosomes that contain different genetic information and are held together at the centromere.

15. A hermaphroditic species contains individuals that produce both male and female sex cells.

16. When non-disjunction occurs during meiosis, each gamete receives an extra copy of one chromosome.

17. Organisms that reproduce asexually inherit half their genetic information from one parent.

18. Gametogenesis produces sex cells with half the number of chromosomes as a body cell.

19. A human body cell has 46 chromosomes.

20. Some organisms reproduce by cell division alone.

21. Budding is a form of sexual reproduction.

22. During meiosis I, sister chromatids are separated.

Matching: Match each term with the most appropriate description below (4 marks)

23. (a) anaphase I

(b) metaphase II

(c) prophase I

(d) telophase II

(i) each sister chromatid undergoes synapsis with a sister chromatid from its matching homologous chromosome

(ii) completion of the second nuclear division

(iii) chromosomes, each with two sister chromatids, line up across the middle of the cell

(iv) reduction division occurs

Short Answer: Write a short answer to each of the following questions. (3 marks)

24. Prior to crossing over, how are homologous chromosomes similar and how are they different? (2 marks)

25. Compare the genetic material of cells before and after cell division (mitosis). (1 mark)

Part B: Application (8 marks)

26. Describe the relationship between TWO of the following pairs of terms: (4 marks)

(a) reproduction and heredity

(b) DNA and chromosomes

(c) genetic information and gene

(d) diploid and haploid

27. Mating calls of birds and peacock tails are classic examples of features related to sexual reproduction. Explain what advantages and disadvantages might be associated with one of these examples. (4 marks)

Part C: Thinking/Inquiry (8 marks)

28. There are many applications of cloning technology. (a) What is an application that you think is most acceptable? Explain your reasoning. (2 marks)

(b) What is an application that you think is least acceptable? Explain your reasoning. (2 marks)

29. (a) List 3 key differences between mitosis and meiosis. (3 marks)

(b) How are they similar (1 mark)