

BIOLOGY

40 PROBLEM SETS

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BIO-001A - IT21S1

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1. Which of the following best defines morphology in biology
 - A. The study of the internal structure of cells
 - B. The study of the physical form and external structure of organisms
 - C. The study of the genetic makeup of organisms
 - D. The study of the chemical processes within living organisms

2. Which of the following structures is present in plants but absent in animals?
 - A. Nucleus
 - B. Mitochondria
 - C. Cell wall
 - D. Ribosomes

3. The main function of stomata in plant leaves is to:
 - A. Absorb water
 - B. Exchange gases
 - C. Store nutrients
 - D. Provide structural support

4. In which part of the plant would you find xylem and phloem?
 - A. Leaf
 - B. Root
 - C. Stem
 - D. All of the above

5. The outermost layer of a root is called the:

- A. Cortex
- B. Endodermis
- C. Epidermis
- D. Pericycle

6. Which of the following is the main function of root hairs?

- A. Anchorage
- B. Water absorption
- C. Photosynthesis
- D. Reproduction

7. Which structure is responsible for water transportation in plants?

- A. Phloem
- B. Xylem
- C. Chloroplast
- D. Stomata

8. In animals, which of the following tissues forms the outer covering of the body?

- A. Muscular tissue
- B. Epithelial tissue
- C. Connective tissue
- D. Nervous tissue

9. The specialized structure responsible for gas exchange in insects is the:

- A. Spiracle
- B. Gills
- C. Alveoli
- D. Trachea

10. The exoskeleton of arthropods is primarily made of:

- A. Keratin
- B. Cellulose
- C. Chitin
- D. Calcium carbonate

11. Which of the following animals exhibit radial symmetry?

- A. Fish
- B. Jellyfish
- C. Lizard
- D. Earthworm

12. Which plant tissue is responsible for transporting food from the leaves to other parts of the plant?

- A. Phloem
- B. Xylem
- C. Epidermis
- D. Cortex

13. Which of the following is NOT a characteristic of monocot plants?

- A. Fibrous root system
- B. Parallel leaf venation
- C. One cotyledon
- D. Taproot system

14. The type of symmetry seen in human bodies is:

- A. Radial
- B. Bilateral
- C. Asymmetrical
- D. None of the above

15. The basic unit of muscle contraction in animals is called a:

- A. Sarcomere
- B. Myofibril
- C. Axon
- D. Hemoglobin

16. In flowering plants, the male reproductive structure is the:

- A. Stigma
- B. Ovary
- C. Anther
- D. Petal

17. What is the primary function of the cuticle in plants?

- A. Water absorption
- B. Gas exchange
- C. Water retention
- D. Photosynthesis

18. Which of the following is a feature of dicot plants?

- A. Flower parts in multiples of 3
- B. Net-like venation
- C. Scattered vascular bundles
- D. One cotyledon

19. What is the correct term for the jointed appendages in arthropods?

- A. Tentacles
- B. Pseudopodia
- C. Antennae
- D. Exoskeleton

20. Which of the following is a characteristic feature of amphibians?

- A. Scales
- B. External fertilization
- C. Feathers
- D. Cartilaginous skeleton

21. The phase of mitosis where the nuclear membrane re-forms is:

- a) Prophase
- b) Metaphase
- c) Anaphase
- d) Telophase

22. The exchange of genetic material between homologous chromosomes is called:

- a) Independent assortment
- b) Crossing over
- c) Linkage
- d) Mutation

23. Which structure is responsible for the separation of chromosomes during cell division?

- a) Centromere
- b) Spindle fibers
- c) Nucleus
- d) Ribosomes

24. In meiosis, how many daughter cells are produced, and how many chromosomes do they have compared to the parent cell?

- a) 2 daughter cells, same number of chromosomes
- b) 4 daughter cells, half the number of chromosomes
- c) 4 daughter cells, same number of chromosomes
- d) 2 daughter cells, half the number of chromosomes

25. Which genetic principle states that alleles for different genes usually segregate independently of one another?

- a) Principle of Dominance
- b) Law of Independent Assortment
- c) Law of Segregation
- d) Pleiotropy

26. The functional units of heredity made up of DNA are called:

- a) Chromatids
- b) Genes
- c) Centrioles
- d) Ribosomes

27. During which stage of meiosis do tetrads form?

- a) Prophase I
- b) Metaphase II
- c) Anaphase I
- d) Telophase II

28. In a dihybrid cross of heterozygous parents ($RrYy \times RrYy$), what is the expected phenotypic ratio?

- a) 3:1
- b) 9:3:3:1
- c) 1:1
- d) 1:2:1

29. What is the primary purpose of meiosis?

- a) Growth and repair
- b) Asexual reproduction
- c) Formation of gametes
- d) Energy production

30. A mutation that affects a single nucleotide is known as:

- a) Chromosomal mutation
- b) Point mutation
- c) Frameshift mutation
- d) Polyploidy

31. In humans, how many autosomes are present in a somatic cell?

- a) 23
- b) 44
- c) 46
- d) 22

32. What type of inheritance pattern involves both alleles being expressed equally in the phenotype?

- a) Codominance
- b) Incomplete dominance
- c) Complete dominance
- d) Sex-linked inheritance

33. The cell division process that leads to two identical daughter cells is known as:

- a) Meiosis
- b) Binary fission
- c) Mitosis
- d) Budding

34. In a pedigree chart, a filled symbol represents:

- a) A male
- b) An unaffected individual
- c) A female
- d) An affected individual

35. Which of the following describes a zygote?

- a) A haploid cell resulting from meiosis
- b) A diploid cell formed by fertilization
- c) A cell formed during mitosis
- d) A gamete

36. What type of cross would you perform to determine the genotype of an organism displaying a dominant trait?

- a) Dihybrid cross
- b) Monohybrid cross
- c) Test cross
- d) Back cross

37. A red flower crossed with a white flower produces pink offspring. This is an example of:

- a) Codominance
- b) Incomplete dominance
- c) Polygenic inheritance
- d) Dominant-recessive inheritance

38. In meiosis, non-disjunction can result in:

- a) Identical twins
- b) Chromosomal abnormalities
- c) Increased genetic variation
- d) Complete separation of homologous chromosomes

39. If a cell has 20 chromosomes before mitosis, how many chromosomes will each daughter cell have after mitosis?

- a) 10
- b) 20
- c) 40
- d) 15

40. Which organelle is primarily involved in cellular respiration?

- a) Chloroplast
- b) Ribosome
- c) Nucleus
- d) Mitochondrion

Answer Key:

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|-----|---|-----|---|
| 1. | B | 21. | D |
| 2. | C | 22. | B |
| 3. | B | 23. | B |
| 4. | D | 24. | B |
| 5. | C | 25. | B |
| 6. | B | 26. | B |
| 7. | B | 27. | A |
| 8. | B | 28. | B |
| 9. | D | 29. | C |
| 10. | C | 30. | B |
| 11. | B | 31. | B |
| 12. | A | 32. | A |
| 13. | D | 33. | C |
| 14. | B | 34. | D |
| 15. | A | 35. | B |
| 16. | C | 36. | C |
| 17. | C | 37. | B |
| 18. | B | 38. | B |
| 19. | D | 39. | B |
| 20. | B | 40. | D |