BIOL-8 Exam 02

Modules 08-11: Meiosis through Skeletal System

Date: Tuesday, March 10, 2026

Time: 5:30 PM - 8:40 PM

Total Points: 100

Part A: Multiple Choice (50 points)

Choose the best answer for each question. Each question is worth 2 points.

Module 08: Meiosis

1. The main purpose of meiosis is to produce:
2. A) Two diploid cells
3. B) Four diploid cells
4. C) Two haploid cells
5. D) Four haploid cells
6. Crossing over occurs during:
7. A) Prophase I
8. B) Metaphase I
9. C) Anaphase I
10. D) Prophase II
11. Independent assortment occurs because:
12. A) Homologous chromosomes separate randomly during meiosis I
13. B) Sister chromatids separate during meiosis II
14. C) DNA replicates before meiosis

15. D) Crossing over exchanges genetic material

16. Nondisjunction during meiosis can result in:

17. A) Normal diploid offspring
18. B) Offspring with an abnormal chromosome number
19. C) Identical twins

20. D) Increased genetic variation only

21. Which represents the correct chromosome number change during meiosis in humans?

22. A) 46 → 92 → 46
23. B) 46 → 46 → 23
24. C) 46 → 23 → 23
25. D) 23 → 46 → 23

Module 09: Inheritance

1. A cross between two heterozygous individuals (Aa × Aa) would produce offspring in which ratio?
2. A) 1:1
3. B) 3:1
4. C) 1:2:1

5. D) 9:3:3:1

6. If both parents are carriers for a recessive trait (Aa × Aa), what is the probability their child will express the recessive phenotype?

7. A) 0%
8. B) 25%
9. C) 50%

10. D) 75%

11. Incomplete dominance is demonstrated when:

12. A) One allele completely masks the other
13. B) The heterozygote has a phenotype intermediate between the two homozygotes
14. C) Both alleles are fully expressed in the heterozygote
15. D) The trait is controlled by multiple genes
16. A woman who is a carrier for color blindness (X^cX) has children with a man who has normal color vision (XY). What percentage of their sons will be color blind?
17. A) 0%
18. B) 25%
19. C) 50%
20. D) 100%
21. Blood type in humans is an example of:
    - A) Simple dominance
    - B) Incomplete dominance
    - C) Multiple alleles and codominance
    - D) Polygenic inheritance

Module 10: Tissues

1. Which tissue type is specialized for contraction?
    - A) Epithelial
    - B) Connective
    - C) Muscle
    - D) Nervous
2. Simple squamous epithelium is best suited for:
    - A) Protection from abrasion
    - B) Absorption and secretion
    - C) Diffusion and filtration
    - D) Mucus production

3. Which connective tissue type has a liquid matrix?

    - A) Bone
    - B) Cartilage
    - C) Blood
    - D) Adipose

4. Neurons are the functional cells of which tissue type?

    - A) Epithelial
    - B) Connective
    - C) Muscle
    - D) Nervous

5. The three main types of muscle tissue are:

    - A) Striated, smooth, and rough
    - B) Skeletal, cardiac, and smooth
    - C) Voluntary, involuntary, and mixed
    - D) Fast-twitch, slow-twitch, and intermediate

Module 11: Skeletal System

1. The functions of the skeletal system include all EXCEPT:

    - A) Support
    - B) Blood cell production
    - C) Hormone production
    - D) Mineral storage

2. Compact bone is organized into units called:

    - A) Trabeculae
    - B) Osteons (Haversian systems)
    - C) Lacunae
    - D) Canaliculi

3. Which bone cell is responsible for breaking down bone tissue?

- A) Osteoblast
- B) Osteocyte
- C) Osteoclast
- D) Chondrocyte

4. The epiphyseal plate is important for:

- A) Blood cell production
- B) Bone growth in length
- C) Mineral storage
- D) Muscle attachment

5. Which type of joint allows the greatest range of motion?

- A) Fibrous joint
- B) Cartilaginous joint
- C) Synovial joint
- D) Suture

6. The axial skeleton includes:

- A) Arms and legs
- B) Skull, vertebral column, and rib cage
- C) Pelvic girdle and shoulder girdle
- D) Hands and feet

7. Osteoblasts function to:

- A) Break down bone matrix
- B) Build new bone tissue
- C) Maintain bone tissue
- D) Store calcium

8. Red bone marrow is responsible for:
    - A) Fat storage
    - B) Blood cell production (hematopoiesis)
    - C) Calcium absorption
    - D) Bone remodeling
9. The periosteum is:
    - A) The marrow cavity
    - B) The outer covering of bone
    - C) The growth plate
    - D) The spongy bone layer
10. Osteoporosis is characterized by:
    - A) Increased bone density
    - B) Decreased bone density and increased fracture risk
    - C) Fusion of joints
    - D) Excessive bone growth

Part B: Short Answer (30 points)

Answer each question in 2-4 sentences. Each question is worth 5 points.

1. Compare and contrast mitosis and meiosis in terms of their purposes and outcomes.
2. Explain how crossing over and independent assortment contribute to genetic variation.
3. A father with blood type A (genotype AO) and a mother with blood type B (genotype BO) have children. What are the possible blood types of their offspring?
4. Describe the structural differences between the three types of muscle tissue and relate each structure to its function.
5. Explain the process of bone remodeling and why it is important throughout life.

6. Compare compact bone and spongy bone in terms of structure, location, and function.

Part C: Essay Questions (20 points)

Choose ONE of the following essay questions. Write a well-organized response of at least one page.

Option A: Explain how errors in meiosis (such as nondisjunction) can lead to chromosomal disorders. Include specific examples and describe the consequences for the affected individual.

Option B: Describe the relationship between tissues, organs, and organ systems using the skeletal system as your example. Explain how each of the four tissue types contributes to skeletal system function.

End of Exam 02