



SCIENCE OLYMPIAD
— AT THE —
UNIVERSITY OF FLORIDA

Northern Regional: January 18th, 2020

Anatomy and Physiology C - Key

I. Integumentary System

Multiple Choice: Each question is worth **one** point.

- | | | |
|------|-------|-------------------|
| 1. A | 8. B | 15. C TB#1 |
| 2. B | 9. A | 16. D |
| 3. D | 10. C | 17. A |
| 4. A | 11. D | 18. D |
| 5. B | 12. B | 19. C |
| 6. C | 13. A | 20. C |
| 7. A | 14. E | |

Labeling: Each letter is worth **one** point.

- | | |
|--|---|
| A. Epidermal ridges | N. Adipose tissue |
| B. Dermal papillae | O. Cutaneous vascular plexus |
| C. Capillary loop | P. Hair shaft |
| D. Sweat pore | Q. Papillary vascular plexus |
| E. Sebaceous (oil) gland | R. Free nerve ending |
| F. Corpuscle of touch (Meissner corpuscle) | S. Epidermis |
| G. Arrector pili muscle | T. Papillary region |
| H. Hair follicle | U. Reticular region |
| I. Hair root | V. Dermis |
| J. Eccrine sweat gland | W. Subcutaneous layer/hypodermis/subQ layer |
| K. Apocrine sweat gland | X. Vein |
| L. Lamellated (pacinian) corpuscle | Y. Artery |
| M. Sensory nerve | |

Diagram-based Questions: Each question is worth **one** point unless otherwise stated.

1. Pacinian corpuscle
2. vibration (1) and pressure (1) (2 points total)
3. Large
4. 250 (2)
5. Lamellae (2)
6. First node of Ranvier (accept node of Ranvier) (2)
7. 92% (2)
8. False
9. True
10. False

Pathology: Each question is worth **one** point but partial credit is awarded for semi-correct answers.

1. Boil (give 0.5 points for infection)
2. Athlete's foot (give 0.5 points for infection)
3. Impetigo (give 0.5 points for infection)
4. Squamous cell carcinoma (give 0.5 points for skin cancer/cancer)
5. Basal-cell carcinoma (give 0.5 points for skin cancer/cancer)
6. Malignant melanoma/melanoma (give 0.5 points for skin cancer/cancer)
7. Poison ivy rash/urushiol-induced contact dermatitis (give 0.5 points for allergy)
8. Carbuncle (give 0.5 points for infection)
9. Nickel allergy (give 0.5 points for allergy)
10. Second degree burn (give 0.5 points for burn. Do **not** give credit for first degree burn or third degree burn).

II. Skeletal System

Multiple Choice: Each question is worth **one** point.

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|------|-------|-------------------|
| 1. C | 8. A | 15. A |
| 2. D | 9. B | 16. C TB#2 |
| 3. C | 10. C | 17. D |
| 4. B | 11. A | 18. B |
| 5. C | 12. B | 19. B |
| 6. C | 13. E | 20. A |
| 7. A | 14. A | |

Diagram-based Questions: Each question is worth **one** point unless otherwise stated.

- | | |
|-----------------------|----------|
| 1. Cervical | 6. False |
| 2. C3 (2) TB#3 | 7. True |
| 3. Vertebral arch | 8. False |
| 4. Transverse process | 9. False |
| 5. 3 (2) | 10. True |

Labeling: Each letter is worth **one** point.

- A. Compact spongy bone
- B. Spongy bone
- C. Periosteum
- D. Medullary cavity
- E. Medullary cavity
- F. Trabeculae
- G. Inner circumferential lamellae
- H. Interstitial lamellae
- I. Outer circumferential lamellae
- J. Concentric lamellae
- K. Blood vessels
- L. Canaliculi
- M. Osteocyte
- N. Lacuna
- O. Periosteal vein
- P. Periosteal artery
- Q. Outer fibrous layer of the periosteum
- R. Inner osteogenic layer of the periosteum
- S. Central canal
- T. Perforating canal
- U. Perforating (Sharpey's) fibers
- V. Compact bone
- W. Spongy bone
- X. Osteon

Pathology: Each letter is worth **one** point.

1.

- A. Osteoporosis
- B. Give **one** point for any of the following: back pain caused by a fractured or collapsed vertebrae, loss of height overtime, stooped posture, bone that breaks easier
- C. Women
- D. Older people
- E. Estrogen

2.

- A. Scoliosis
- B. Give one point for any of the following: uneven shoulders, one shoulder blade that appears more prominent than the other, uneven waist, one hip higher than the other.
- C. neuromuscular conditions (cerebral palsy or muscular dystrophy), birth defects affecting spine development, injuries or infections of the spine
- D. Women
- E. Mild

III. Muscular System

Multiple Choice: Each question is worth **one** point.

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|------|-------------------|-------|
| 1. B | 8. A | 15. C |
| 2. C | 9. B | 16. B |
| 3. C | 10. B | 17. D |
| 4. D | 11. C | 18. B |
| 5. C | 12. D | 19. D |
| 6. D | 13. A TB#4 | 20. A |
| 7. C | 14. A | |

Labeling: Each letter is worth **one** point.

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|----------------------------|----------------------------|
| A. I band | L. Thin filament (actin) |
| B. Z disc | M. Thick filament (myosin) |
| C. H zone | N. M line |
| D. M line | O. Titin filament |
| E. A band | P. Z disc |
| F. Thick filament (myosin) | Q. Sarcomere |
| G. Thin filament (actin) | R. Zone of overlap |
| H. Z disc | S. H zone |
| I. I band | T. A band |
| J. Sarcomere | U. I band |
| K. Z disc | |

Diagram-based Questions: Each question is worth **one** point unless otherwise stated.

1. Cardiac
2. Na⁺ (1) and Ca²⁺ (1) (sodium and calcium ions) (2 points total)
3. (2) intercalated discs
4. 1
5. (2) I band **TB#5**
6. False
7. True
8. True
9. False
10. False

Pathology: Each question is worth **one** point.

1. Myositis
2. Myasthenia gravis
3. Poliomyelitis
4. Tetanus
5. Tetanus
6. Poliomyelitis
7. Muscular dystrophy
8. Muscular dystrophy (Duchenne-type; accept muscular dystrophy)
9. Myasthenia gravis
10. Myositis