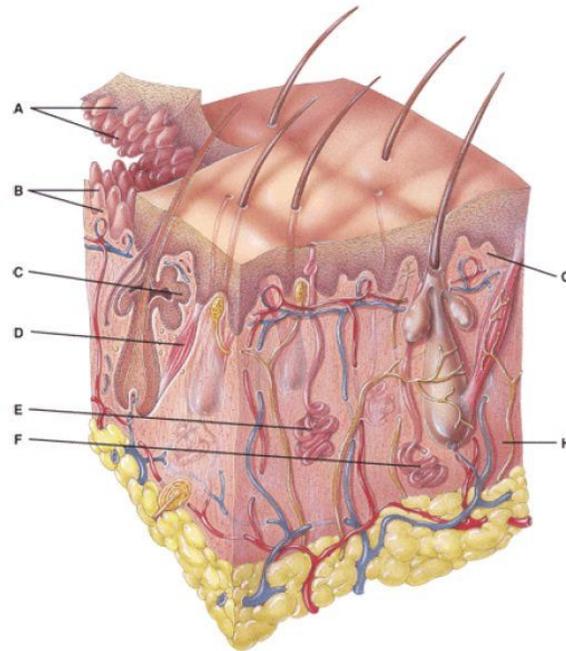


Name(s): _____ Team Name: _____
_____ Team Number: _____

Captains Test: Anatomy & Physiology 2020 (Division C)

- **You have 50 minutes in which to complete this test.**
- **All answers—both multiple choice and free response—must be recorded on your separate answer packet. No credit will be awarded for any work shown or answers written in the test packet.**
- **For multiple choice questions, simply write the CAPITAL LETTER that corresponds to your answer choice on the appropriate line on your separate answer packet.**
- **For questions involving calculations, show all necessary work in the space provided on your separate answer packet.**
- **The number of points awarded for each question or set of questions may be found in brackets at the end of each question or directions for a set of questions in this test packet.**

Total Score: _____/92

Integumentary System

For questions 1-8, correctly match each structure with its corresponding letter in the above diagram [7 points, 1 point each]

- | | |
|--------------------------|----|
| 1) Epidermal Ridges | A. |
| 2) Eccrine Sweat Gland | B. |
| 3) Papillary Layer | C. |
| 4) Reticular Layer | D. |
| 5) Dermal Papillae | E. |
| 6) Sebaceous (Oil) Gland | G. |
| 7) Arrector Pili Muscle | H. |

8) Which of the following statements about Adipose Tissue is FALSE? [1]

- Composed of specialized cells called adipocytes, which are derived from fibroblasts
- Produces the hormones leptin and adiponectin
- Stores most of the body's triglycerides
- Brown adipose tissue is widespread in the fetus and infant, but found in smaller amounts in adults
- There are two types: brown adipose tissue and white adipose tissue

9) Free nerve endings are dendrites that detect all of the following EXCEPT: [1]

- Pain

- b) Temperature
- c) Itch
- d) Tickle
- e) Taste

For questions 10-14, write which integumentary skin layer matches each description. Each of the three options may be used multiple times [5 points, 1 point each]

Layers: Papillary Layer, Reticular Layer, Subcutaneous Layer

10) A thick layer of skin below the epidermis composed of connective tissue rich in collagen and elastin

11) Supplies nutrients to select layers of the epidermis

12) Stores water, regulates body temperature, participates in the production of Vitamin D, cushions the body, and supplies the epidermis with blood

13) Composed mainly of adipose tissue and connective tissue rich in collagen

14) Separates muscle from skin, stores fat, conserves body heat, and protects the inner organs

15) The Sebaceous Oil gland secretes which oily substance that lubricates and waterproofs the skin? [1]

- a) Melanin
- b) Sebum
- c) Secretin
- d) Guanylin
- e) Motilin

16) How many Sebaceous glands may be present per square inch of skin? [1]

- a) 100-700
- b) 1,000-2,000
- c) 2,500-6,000
- d) 9,000-15,000
- e) 22,500-33,000

17) What is the main function of the subcutaneous tissue? [1]

- a) To connect the skin to the underlying tissues such as muscles and periosteum
- b) To connect the skin to bones
- c) Acts as a physical and chemical barrier between the interior body and the exterior environment
- d) Receives nutrients via diffusion of fluids from the dermis
- e) Contains keratinocytes to develop stem cells

18) Areolar connective tissue in the epidermis contains _____ and _____ fibers loosely arranged to allow the skin to stretch and move independently of its underlying structures. [1]

- a) Mast cells; Bursae

- b) Merkel disks; Eccrine
- c) Sebum; Keratin
- d) Langerhans cells; melanocyte
- e) Elastin; Collagen

For Questions 19-22, fill in the blanks using the following words to complete the description regarding the formation of hair. Not all of the words will be used in the response [4 pts, 1 pt each]

Options: Hair Root, Stem Cells, Collagen, Melanocytes, Keratinocytes, Nerve Endings

(19)_____ in the follicle reproduce to form the (20)_____ that eventually form the hair while (21)_____ produce pigment that gives the hair its color. Within the follicle is the (22)_____, the portion of the hair below the skin's surface.

23) Which of the following is NOT an area of the body where Lamellar, or Pacinian corpuscles are found? [1]

- a) Mammary glands
- b) Urinary Bladder
- c) Bronchioles
- d) Pancreas
- e) Genital Organs

24) Which of the following is NOT a classification of sensory receptor? [1]

- a) Chemoreceptors
- b) Thermoreceptors
- c) Mechanoreceptors
- d) Osmoreceptors
- e) Thioreceptors

For Questions 25-30, identify the skin disorder/disease that is being described, and then discuss a possible treatment [6 pts, 1 pt each]

This is a rare, inherited disorder. It reduces the amount of melanin pigment in the skin, hair, and eyes. Sufferers have white hair, pale skin, and blue eyes. Their eyes may seem red in different lighting conditions. Many also have vision problems.

25) What disease/disorder is being described? [1]

26) Name one possible treatment/prevention method [1]

Dark brown to gray-brown, symmetric patches of pigment on the face. Sun exposure, hormones, and birth control pills are thought to cause this.

27) What disease/disorder is being described? [1]

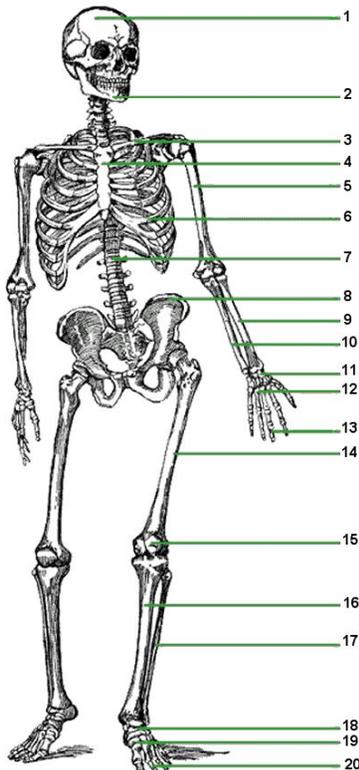
28) Name one possible treatment/prevention method [1]

This causes smooth, white patches on the skin. It is caused by the loss of pigment-producing cells in the skin (melanocytes). It is thought to be an autoimmune disease. The white patches are very sensitive to the sun.

29) What disease/disorder is being described? [1]

30) Name one possible treatment/prevention method [1]

Skeletal System



For questions 31-40, refer to the above diagram. Label each part of the diagram (20 pts, 1 pt each)

31) 1

32) 2

33) 4

34) 5

35) 6

36) 8

37) 9

38) 14

39) 16

40) 17

- 41) How many bones are in the (normal) adult human body? [1]
- a) 300
 - b) 218
 - c) 206
 - d) 222
 - e) 412
- 42) With how many bones are people normally born? [1]
- a) around 300
 - b) around 250
 - c) depends on whether or not their mother smoked during pregnancy
 - d) None. You are a jellyfish.
 - e) About 190
- 43) At what age does bone mass in the skeleton reach maximum density? [1]
- a) 50
 - b) 12
 - c) 21
 - d) Mid-forties
 - e) Late sixties
- 44) How many floating ribs do most people have? [1]
- a) 0
 - b) 4
 - c) Floating ribs occur as a result of chest trauma, so it depends on a person's medical history
 - d) 2
 - e) 8
- 45) The process through which cartilage turns into bone is called: [1]
- a) Osteoformation
 - b) Ossification
 - c) Apoptosis
 - d) Osteoporosis
 - e) Calcification
- 46) What range of motion do synarthroses joints allow? [1]
- a) None
 - b) 90°
 - c) 180°
 - d) 270°
 - e) 360°
- 47) Which joint(s) are "fibrous joints"? (select all that apply) [1]

- a) Knee
 - b) Sutures
 - c) Gamphoses
 - d) Distal
 - e) Elbow
- 48) What prevents friction between bones in a synovial joint? [1]
- a) Cerebrospinal fluid
 - b) Nothing, which is why synovial joints often develop arthritis
 - c) Tendons
 - d) Cartilage
 - e) Ligaments
- 49) Which scan is the most detailed? [1]
- a) MRI
 - b) Molecular Telescopic Image (MTI)
 - c) CT Scan
 - d) X-Ray
 - e) CAT
- 50) What is the biggest disadvantage to the answer chosen in question 49? [1]
- a) It is painful
 - b) There is an unhealthy amount of exposure to radiation
 - c) It can only scan inside the bones
 - d) It is expensive
 - e) It can cause temporary motion sickness

For Questions 51-58, identify which of the following illnesses of the skeletal system is being described, and name one treatment option [8 points, 1 point each]

Illnesses: Osteoarthritis, Osteoporosis, Disc Herniation, Scoliosis

Disease in which the density and quality of bone are reduced. As bones become more porous and fragile, the risk of fracture is greatly increased. The loss of bone occurs silently and progressively. Often there are no symptoms until the first fracture occurs.

51) Which of the illnesses is being described? [1]

52) Name one treatment for the illness [1]

This is a sideways curvature of the spine that occurs most often during the growth spurt just before puberty. While it can be caused by conditions such as cerebral palsy and muscular dystrophy, the cause for most cases is unknown. About 3% of adolescents have this.

53) Which of the illnesses is being described? [1]

54) Name one treatment for the illness [1]

This is the most common form of arthritis, affecting millions of people worldwide. It occurs when the protective cartilage that cushions the ends of your bones wears down over time. Although

this can damage any joint, the disorder most commonly affects joints in your hands, knees, hips and spine.

55) Which of the illnesses is being described? [1]

56) Name one treatment for the illness [1]

This refers to a problem with one of the rubbery cushions (disks) that sit between the individual bones (vertebrae) that stack to make your spine.

57) Which of the illnesses is being described? [1]

58) Name one treatment for the illness [1]

Muscular System

For Questions 59-63, match the muscle type(s) with the corresponding description. [5 pts, 1 pt each]

3 Muscle Types: Smooth Muscle, Cardiac Muscle, Skeletal Muscle

59) Muscles that are striated [1]

60) Connects in intercalated discs [1]

61) Found in hair erectos, pupils gland ducts, esophagus, stomach, and blood vessels [1]

62) Contract involuntarily [1]

63) Maintain flow of fluid and food along hollow structures [1]

For Questions 64-73, answer the questions regarding the location and basic function of each of these muscles: [10 pts, 1 pt each]

64) The *Sternocleidomastoid* is located in the: [1]

- a) Shoulder
- b) Neck
- c) Thorax
- d) Forearm
- e) Thigh

65) The function of the *Sternocleidomastoid* is: [1]

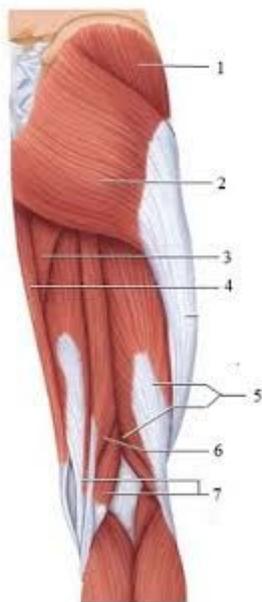
- a) To flex the leg at the knee joint
- b) To depress the ribs, aiding in forced expiration
- c) Abduction of the humerus
- d) Rotates the head to the opposite side
- e) Flexion and abduction of the hand

66) The *Deltoid* is located in the: [1]

- a) Shoulder
- b) Neck
- c) Thorax
- d) Forearm

- e) Thigh
- 67) The function of the *Deltoid* is: [1]
- a) To flex the leg at the knee joint
 - b) To depress the ribs, aiding in forced expiration
 - c) Abduction of the humerus
 - d) Rotates the head to the opposite side
 - e) Flexion and abduction of the hand
- 68) The *Internal Intercostal* is located in the: [1]
- a) Shoulder
 - b) Neck
 - c) Thorax
 - d) Forearm
 - e) Thigh
- 69) The function of the *Internal Intercostal* is: [1]
- a) To flex the leg at the knee joint
 - b) To depress the ribs, aiding in forced expiration
 - c) Abduction of the humerus
 - d) Rotates the head to the opposite side
 - e) Flexion and abduction of the hand
- 70) The *Flexor Carpi Radialis* is located in the: [1]
- a) Shoulder
 - b) Neck
 - c) Thorax
 - d) Forearm
 - e) Thigh
- 71) The function of the *Flexor Carpi Radialis* is: [1]
- a) To flex the leg at the knee joint
 - b) To depress the ribs, aiding in forced expiration
 - c) Abduction of the humerus
 - d) Rotates the head to the opposite side
 - e) Flexion and abduction of the hand
- 72) The *Biceps Femoris* is located in the: [1]
- a) Shoulder
 - b) Neck
 - c) Thorax
 - d) Forearm
 - e) Thigh
- 73) The function of the *Biceps Femoris* is: [1]
- a) To flex the leg at the knee joint

- b) To depress the ribs, aiding in forced expiration
 - c) Abduction of the humerus
 - d) Rotates the head to the opposite side
 - e) Flexion and abduction of the hand
- 74) A muscle cell is made up of what specific bundle of protein? [1]
- a) Tropomyosins
 - b) Myofibrils
 - c) ATP's
 - d) Hydrolyses
 - e) Troponins
- 75) The answer from question 90 is made up of what 2 proteins? [1]
- a) Collagen and Elastin
 - b) Albumin and Selectin
 - c) CFTR and Scramblase
 - d) Actin and Myosin
 - e) Rhodopsin and Integrin



For questions 76-81, use the above diagram to correctly label each muscle in the posterior thigh [6 pts, 1 pt each]

- 76) 1
- 77) 2
- 78) 4
- 79) 5
- 80) 6

81) 7

For the following questions 78-83, identify which disease of the muscular system is being described, and name one treatment option [6 pts, 1 pt each]

This is a highly infectious viral disease, which mainly affects young children. The virus is transmitted from person-to-person mainly through the fecal-oral route, and multiplies in the intestine. Initial symptoms include fever, fatigue, headache, vomiting, stiffness in the neck, and pain in the limbs. In a small proportion of cases, the disease causes paralysis, which is often permanent.

82) What disease is being described? [1]

83) Name one treatment for this disease [1]

This is a serious illness caused by Clostridium bacteria. The bacteria live in soil, saliva, dust, and manure. The bacteria can enter the body through a deep cut, like those you might get from stepping on a nail, or through a burn. The infection causes painful tightening of the muscles, usually all over the body. It can lead to "locking" of the jaw. This makes it impossible to open your mouth or swallow.

84) What disease is being described? [1]

85) Name one treatment for this disease [1]

This disease is an inflammation of the muscles you use to move your body. An injury, infection, or autoimmune disease can cause it. Symptoms include fatigue after walking or standing, tripping or falling, trouble swallowing or breathing, muscle weakness, and a skin rash.

86) What disease is being described? [1]

87) Name one treatment for this disease [1]

Written Work:

For the following questions, respond with full sentences regarding the prompt.

88) Write a short paragraph explaining how the muscles in your upper and lower legs move in conjunction with the bones in order to move your knee. Your response must include the words:
[5]

Bones: Tibia, Femur, Patella

Muscles: Gastrocnemius, Sartorius, Semitendinosus