2020 Anatomy and Physiology Test

Directions: Please write your name and your team WITH your team number on the top of this page. You are allowed to have one 8.5 x 11 double-sided page containing information from any source and 2 non-programmable, non-graphing calculators. You have 50 minutes to complete this 3 part test, good luck, you may begin.

Points:
Part 1: ___
Part 2: ___
Part 3: ___
Total: ___
Part 1:

1. List 4 functions of the integumentary system:

2. Label this diagram and list the function of each part:

3. Name and describe the stages of hair growth.

4. What is the technical term for our skin?

5. Name the layers of the skin and describe them.

6. What are the 3 factors that influence skin color?
7. ____ cells that produce pigment  
   A. Keratin

8. ____ upper layer of the dermis  
   B. Arrector pili

9. ____ water-repellent protein in the epidermis  
   C. Melanocytes

10. ____ actively mitotic layer in the epidermis  
    D. Hair shaft

11. ____ Cuticle of fingernail  
    E. Papillary layer

12. ____ glands that open into hair follicles  
    F. Eponychium

13. ____ muscle attached to hair follicle  
    G. Stratum Basale

14. ____ visible part of hair  
    H. Sebaceous gland

15. What is the layer of the skin that contains fingerprints?  
   a) Stratum corneum  
   b) Reticular layer of dermis  
   c) Stratum granulosum  
   d) Papillary layer of dermis

16. The skin takes up what percent of the body?  
   a) 20%  
   b) 27%  
   c) 12%  
   d) 16%

17. What type of sweat gland is most widely distributed?  
   a) Eccrine  
   b) Exocrine  
   c) Apocrine  
   d) Hypothalamus

18. In which layer of the skin are sensory receptors and blood vessels embedded in?  
   a) Epidermis  
   b) Dermis  
   c) Hypodermis

19. Which layer of the epidermis is only found in the palms of the hands and the soles of the feet?  
   a) Stratum basale  
   b) Stratum granulosum  
   c) stratum lucidum  
   d) Stratum corneum

20. How thick is the human skin?  
   a) 1-5.5mm  
   b) 0.5-4mm  
   c) 3-5mm  
   d) 1-6.5mm

21. Which cell is located in the epidermis and is known as “touch cells”?  
   a) Corneocytes  
   b) Merkel cell  
   c) Keratinocyte  
   d) Melanocyte

22. What is vasoconstriction caused by?  
   a) when blood vessels relax and widen, increasing blood flow and dropping blood pressure  
   b) when smooth muscles in blood vessel walls tighten, decreasing blood flow  
   c) when blood vessels relax and widen, increasing blood flow and blood pressure  
   d) when resistance and blood flow decreases in blood vessels

23. Which cell in the skin is a dendritic cell?  
   a) Basal cells  
   b) Keratinocyte  
   c) Squamous cells  
   d) Langerhan cells
24. Peter was walking across his front lawn when a nail penetrated the sole of his foot. In which order did the nail penetrate his skin?
   a) Stratum corneum, stratum granulosum, stratum spinosum, stratum basale, papillary layer, reticular layer
   b) Stratum basale, stratum spinosum, stratum granulosum, stratum corneum, reticular layer, papillary layer
   c) Stratum corneum, stratum lucidum, stratum granulosum, stratum spinosum, stratum basale, papillary layer, reticular layer
   d) Stratum corneum, stratum lucidum, stratum spinosum, stratum granulosum, stratum basale, papillary layer, reticular layer

25. Which type of epithelium is found in capillaries (alveoli, glomeruli, etc.)?
   a) Simple squamous epithelium  
   b) Simple cuboidal epithelium  
   c) Simple columnar epithelium  
   d) Transitional epithelium

26. The epidermis is constantly being replaced by new cells, which layer of the epidermis holds the source of new cells for replacement?
   a) stratum granulosum/stratum lucidum  
   b) Papillary layer  
   c) Stratum basale  
   d) Stratum spinosum

27. Where in the skin is melanin produced?
   a) Stratum basale  
   b) Basement membrane  
   c) Stratum spinosum  
   d) Hypodermis

28. If a person has eczema, which layer of their skin isn’t functioning correctly?
   a) Stratum granulosum  
   b) Stratum basale  
   c) Stratum corneum  
   d) Reticular layer

29. What type of burn is painful and exhibits blisters?
   a) 1st degree  
   b) 2nd degree  
   c) 3rd degree

30. What percent of your body has been burned if you receive a burn on your entire right arm?
   a) 4.5%  
   b) 9%  
   c) 15%  
   d) 10.5%

31. Your toenails are tougher than your fingernails because__________
   a) There is more blood flow to the fingers than the toes  
   b) there is a layer of stratum lucidum on the soles of your feet  
   c) your toenails are made up of denser keratine  
   d) the feet experiences more friction and has fungi

32. Which type of gland causes greasy hair?
   a) Sudoriferous glands  
   b) Ceruminous glands  
   c) Sebaceous glands  
   d) Mammary glands

(Skeletal)
Part 3:
33. List 5 basic functions of the skeletal system:

34. Label the sutures of the skull:

1.  
2.  
3.  
4.  
5.  
6.  
7.  
8.  
9.  
10.  
11.  
12.  
13.  
14.  

35. What’s the difference between endochondral and intramembranous ossification? What types of bones do each type of ossification form?

36. Name the steps of endochondral ossification and describe what happens in each of them:

37. What is appositional growth?

38. What is the difference between congenital and neuromuscular scoliosis?

39. Label this long bone:
40. ___ Excessive outward curve of the spine                              A. Ligament
41. ___ Inflammation of fluid filled sacs between joints              B. Metaphysis
42. ___ Injury to a muscle or tendon                                   C. Bursitis
43. ___ Bone below the skull that allows nodding movement of the head D. Sprain
44. ___ Where the epiphysis and diaphysis meet                         E. Strain
45. ___ A bone that allows rotation of the head                        F. Kyphosis
46. ___ Bands of tissue that hold two bones together                  G. Spinal stenosis
47. ___ Injury to the ligament                                        H. Foramen
48. ___ An opening that allows arteries, nerves, etc. to pass through I. Axis
49. ___ Narrowing of the spaces in the spine                          J. Atlas

50. The ______ part of the spine allows the least amount of movement.
    a) Cervical                                                      c) Lumbar
    b) Thoracic

51. What type of bone is most abundant in the human body?
    a) **Long** bone                                                c) Flat bone
    b) Short bone                                                   d) Sesamoid bone

52. What is one of the functions of a flat bone?
    a) Provide leverage                                             c) Provide stability
    b) Act as attachment points for muscles                        d) Allowing some motion

53. Which type of vertebrae has a transverse foramen?
    a) Cervical                                                   c) Lumbar
    b) Thoracic                                                   d) Sacrum

54. Where does the patellar ligament attach the patella to?
    a) Femur                                      c) Fibia
    b) Tibia                                      d) Talus
55. A spiral fracture is when the bone is broken by ________________.
   a) Crushing                  c) Sudden impact
   b) Bending                  d) Twisting

56. Which bone hurts the most to break?
   a) Nasal                    c) Navicular
   b) 5th phalange              d) Femur

57. What is the wrist bone that is directly adjacent to the metacarpal bone of the thumb?
   a) Triquetrum                c) Trapezium
   b) Scaphoid                 d) Trapezoid

58. What type of joint is the acromioclavicular joint?
   a) Hinge joint              c) Ball and socket
   b) Condyloid                d) Plane joint

59. During intramembranous ossification, what type of collagen fibrils are in the extracellular matrix created by osteoblasts?
   a) Type I                    c) Type III
   b) Type II                   d) Type IV

60. Where is the secondary ossification center in a long bone?
   a) Epiphysis                c) Metaphysis
   b) Diaphysis               d) Epiphyseal line

61. What type of cartilage is used to attach the false ribs to the true ribs?
   a) Hyaline cartilage        c) Costal cartilage
   b) Fibrocartilage           d) Elastic cartilage

62. Which muscle’s origin is immediately below anterior superior iliac spine?
   a) Rectus femoris           c) Vastus lateralis
   b) Sartorius               d) Biceps femoris

63. A condyle bone marking would be described as a _____________________________.
   a) large rounded prominence  c) Groove
   b) Prominence feature       d) Moderately raised, prominent border

64. What bone marking would a facet fit into?
   a) Facet                    c) Fossa
   b) Fissure                  d) Foramen

65. On which chromosome is the gene that is mutated causing achondroplasia found?
   a) Chromosome 4             c) X chromosome
   b) Chromosome 21            d) Chromosome 6

Part 5:
(Muscular)

66. List 4 basic functions of the muscular system:
67. Label the diagram below:

68. Label the diagram below.

69. What does BCAAs stand for and how are they important after exercise?
70. What is the all or none principle of muscle contraction?

71. What are the three phases of muscle twitch?

(72-97, one point each)

72. __ Muscle cell membrane
73. __ High energy compound in muscle
74. __ Neurotransmitter at the neuromuscular junction
75. __ Minimal stimulus needed to cause contraction
76. __ Attachment of a muscle that moves during contraction
77. __ Functional unit of muscle
78. __ Broad flat sheet of tendon
79. __ Attachment of a muscle that doesn’t move during contraction

80. What inorganic ion is necessary for myosin heads to bind with receptor sites on actin?
   a) Calcium ions
   b) Sodium ions
   c) Phosphate ions
   d) Potassium ions

81. Where is the origin of semitendinosus?
   a) Upper medial shaft of tibia below gracilis
   b) Upper inner quadrant of posterior surface of ischial tuberosity
   c) Upper outer quadrant of posterior surface of ischial tuberosity
   d) Immediately below anterior superior iliac spine of ischial tuberosity

82. What is the largest muscle of the pelvic diaphragm?
   a) Coccygeus
   b) Levator ani muscle
   c) Iliococcygeus
   d) Piriformis

83. What kind of muscle movement is abduction?
   a) Moving towards midline
   b) Decreasing angle between bones
   c) Moving away from midline
   d) Increased angle between the foot and the leg

84. What protein molecule effectively stores the oxygen for aerobic respiration?
   a) Tropomyosin
   b) Myosin
   c) Actin
   d) Myoglobin

85. What is the brighter central region within the A-band of a myofibril called?
   a) Titin
   b) M-line
   c) I-band
   d) H zone

86. What type of enzyme is myosin?
   a) ATP synthase
   b) ADP synthase
   c) ATP hydrolase
   d) ADP hydrolase
87. What section of the sarcomere does not shorten during contraction?
   a) A band                    c) I-band
   b) Z disc                    d) distance between Z bands

88. How old do you have to be to fall into the transitional stage of muscular dystrophy?
   a) Up to age 7                c) Ages 10-14
   b) Ages 6-9                   d) Ages 15+

89. Which type of muscle contraction lengthen the muscle?
   a) Concentric                 c) Isometric
   b) Eccentric

90. Which one of these muscles allow the adduction of the hip?
   a) Gracilis                    c) tensor fasciae latae
   b) Sartorius                  d) Iliacus

91. How many muscles does it take to smile?
   a) 30                         c) 17
   b) 22                         d) 26

92. Which of the following enzymes interacts directly with the myosin binding site of actin?
   a) ATP hydrolase               c) Calsequestrin
   b) Tropomyosin                d) Troponin

93. Which of the following changes length during sarcomere contraction?
   a) Thick filaments            c) H zone
   b) Thin filaments             d) All of the above

94. What is the function of the calcium in muscles?
   a) It allows tropomyosin to be pulled away from the actin filament
   b) It pulls the tropomyosin off the myosin heads
   c) It releases the myosin head from the active site on actin
   d) It helps move the myosin heads into a high energy position

95. Muscles store enough creatine phosphate to regenerate sufficient ATP to sustain contraction for about ____ seconds.
   a) 15                         c) 10
   b) 20                         d) 4

96. Which muscle is most likely to be affected when an athlete pulls a hamstring?
   a) Soleus                      c) Vastus lateralis
   b) Biceps brachii             d) Semimebranosus

97. Red muscle fibers would be expected to ____________________________.
   a) Contain few mitochondria and tire easily
   b) Contain many mitochondria and be impervious to fatigue
   c) contain many mitochondria and tire easily
   d) Contain few mitochondria and be impervious to fatigue