**KENYA MEDICAL TRAINING COLLEGE**

**FACULTY OF CLINICAL SCIENCES**

**CAT EXAM**

**FOR**

**DEPARTMENT OF ORTHOPAEDIC AND TRAUMA MEDICINE**

**MAKINDU CAMPUS**

**MARCH 2022 CLASS**

**PAPER: BIOMECHANICS**

**Exam Instructions:**

1. This paper consists of two sections:

 SECTION A: 30 Multiple Choice Questions

 SECTION B: 2 Short Answer Questions

1. Attempt all Questions in the Sections provided

 **SECTION A: MULTIPLE CHOICE QUESTIONS**

1. A gait cycle is
2. The period in gait when both lower extremities are in contact with walking surface in reference limb
3. Number of steps per unit of time
4. A series of motions that occur between the time of heel strike of reference limb until heel strike of same reference limb
5. Distance between successive contact points of opposite limbs
6. Which is not a correct statement regarding stance phase

A. Is usually about 60% of the cycle

B. Begins at toe off

C. Ends at toe off of reference limb

D. Begins at heel strike

1. Which is not a true statement regarding swing phase
2. Is 40 % of the cycle
3. Ends at heel strike
4. Begins at toe off
5. Begins at heel strike
6. The distance between successive contact points of opposite limbs

A. Double stance

B. Step length

C. Cadence

D. Stride length

1. Period in gait when both lower extremities are in contact with walking surface in reference limb

A. Step length

B. Cadence

C. Double stance

D. Stride length

1. Double stance is a period of gait that consumes what % of gait time?

A. 60%

B. 40%

C. 22%

D. 55%

1. The distance between successive contact of the same limb is called

A. Step length

B. Cadence

C. Stride length

D. Double stance

1. Difference between mass and weight is:
2. Mass is a force and weight is a quantity
3. Mass and weight both are force
4. Mass and weight both are quantities
5. Mass is quantity and weight is force
6. Reluctance of the object to change its state of rest or motion is termed as
7. Mass
8. Time
9. Weight
10. Inertia
11. Density of a substance is defined as
12. density = Mass × Volume
13. density = Mass ⁄ Volume
14. density = Volume ⁄ Mass
15. None of the above
16. Passengers are pushed back when a bus starts abruptly. Which of the following is an example of this?
17. The first law of Newton
18. The second law of Newton
19. The third law of Newton
20. None of Newton’s laws apply to you.
21. What is the mass of a body that accelerates at a rate of 2.6 m/s2 with a force of 90 N?
22. 44.6 kg
23. 34.6 kg
24. 54.6 kg
25. None of the mentioned
26. What are the components required to calculate the momentum of a body?
27. Mass and acceleration
28. Velocity and mass
29. Displacement and mass
30. None of the mentioned
31. What will happen if a force is applied to a body moving with a constant speed along a straight line?
32. The speed increases
33. The direction changes
34. The momentum decreases
35. Continues to move with uniform velocity
36. ‘Hunch back’ is also known as
37. Back pain
38. Scoliosis
39. Lordosis
40. Kyphosis.
41. Neck joint’ is an example of
42. Pivot joint
43. Hinge joint
44. Saddle joint
45. Synovial joint
46. Which type of lever is most effective in sport movements?
47. Third class
48. Second class
49. First class
50. None of the above.
51. Number of bones in the appendicle skeleton is
52. 120
53. 180
54. 126
55. 116
56. Which of the following is an example of uniaxial joint?
57. Condyloid
58. Saddle
59. Hinge
60. Condyloid and saddle both.
61. The skeleton of thorax is made up of
62. Cartilage
63. Bone
64. Both (a) and (b)
65. None of the above.
66. Which muscle is involved in the elevation of arm?
67. Deltoid
68. Biceps
69. Triceps
70. Quadriceps.
71. Factors associated with moving systems & can be divided into kinetics and kinematics
72. Dynamics
73. Mechanics
74. Statics
75. Kinetics
76. Involves the time, space and mass aspects of a moving system
77. Kinetics
78. Biomechanics
79. Kinematics
80. Mechanics
81. Science of study of human motion it brings together the fields of anatomy physiology, biomechanics, physics & geometry relating them to human nature
82. Kinematics
83. Kinetics
84. Kinesiology
85. Statics
86. Which of the following should be constant for a body to have a constant momentum?
87. Acceleration
88. Force
89. Velocity
90. All of the above
91. Antalgic gait is
92. Swing, steppage
93. Weak hip
94. None
95. HS, painful, avoid weight bear and caused by spur, burn or blister
96. If patient has a stroke, which type of gait might you expect to see?
97. Hemiplegic
98. Ataxic
99. Antalgic
100. Neuropathic
101. A patient with long-standing, uncontrolled diabetes mellitus might display \_\_\_\_\_ gait due to damage to the peripheral nerves in the legs.
102. Neuropathic
103. Antalgic
104. Ataxic
105. Hemiplegic
106. Bending of head towards right or left side of the shoulder is
107. Extension
108. Flexion
109. Lateral flexion
110. Lateral extension.
111. Movements possible in condyloid joint are
112. Flexion and extension
113. Circumduction only
114. Flexion, extension abduction, addu­ction
115. Flexion, extension, abduction addu­ction and circumduction.

**SECTION B: SHORT ANSWER QUESTIONS**

1. State five main variables of kinematics (5 marks)
* *Type of motion or displacement.*
* *The location.*
* *The direction.*
* *The magnitude.*
* *Rate of the motion or displacement.*
1. State five types of Diarthrodial joints (5 marks)
* *Arthrodial (Gliding) joints*
* *Ginglymus (Hinge) joint*
* *Trochoid (Pivot) joint*
* *Condyloid (Knuckle Joint)*
* *Enarthrodial*
* *Sellar (Saddle) Joint*