

Total number of printed pages-8

34 (1) BIOM 1.4

2019

BIOMECHANICS

Paper : BIOM-1.4

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

- I. Essay Type : ***(any two)*** 2×10=20
1. Explain in details about the kinematics of tibiofemoral joint with proper diagram.
 2. Define Posture and its types. Write in details about the analysis of standing posture in sagittal plane.
 3. Explain in details about the static and dynamic stabilization of Glenohumeral joint.

Contd.

- II. Short Essay Type : **(any ten)** 10×5=50
1. Explain the load deformation curve.
 2. Discuss the lever system with example.
 3. Define Gait. Explain the phases of gait cycle.
 4. Explain the Extensor Mechanism of hand with proper diagram.
 5. Active and Passive insufficiency.
 6. List the Muscles of ventilation. Explain the Kinematics of Rib Cage in Ventilation.
 7. What are the various dysfunctions of Temporomandibular joint?
 8. Plantar Arches and their functions.
 9. Discuss Open and Closed chain kinematics in relation to hip joint function.
 10. What are the different types of muscle actions? Explain Isometric Length-Tension relationship.
 11. Intervertebral disk function.

12. Justify the use of weight-bearing and non-weight-bearing exercise in case of a patient with Patellofemoral pain.

III. Short Type : **(any five)** 5×2=10

1. Quadriceps lag.
2. Cavus foot and Pes planus.
3. Define Newton's First Law of Inertia.
4. Step Length and Cadence.
5. Scoliosis.
6. Ligaments of Hip joint.
7. Coracoacromial arch.

IV. Multiple Choice Questions : 20×1=20

1. DIP flexion is done by
 - (a) Flexor Digitorum Superficialis
 - (b) Flexor Pollicis Longus
 - (c) Flexor Pollicis Brevis
 - (d) Flexor Digitorum Profundus.

2. ACL of knee is to resist :
- (a) Valgus stress
 - (b) Varus stress
 - (c) Anterior translation of tibia
 - (d) Posterior translation of tibia.
3. Which of the following will not change regardless of the change in position of the object in space ?
- (a) COG
 - (b) LOG
 - (c) BOS
 - (d) None of the above.
4. Which of the following is not a fibrous joint ?
- (a) Sutures
 - (b) Syndesmoses
 - (c) Gomphoses
 - (d) Synchrondrosis.
5. Which of the following most accurately describes a motor unit ?
- (a) A single muscle fibre and a single motor neuron
 - (b) A single motor neuron and all muscle fibres it innervates
 - (c) A single muscle fiber and several motor neurons
 - (d) None of the above.
6. Lateral drop of pelvis is checked by :
- (a) Gluteus maximus
 - (b) Gluteus medius
 - (c) Iliopsoas
 - (d) Rectus femoris.
7. The normal lumbosacral angle is
- (a) 30°
 - (b) 40°
 - (c) 20°
 - (d) 10°.
8. Which of the following sentences is not true ?
- (a) The torque of an external force can be increased by increasing the magnitude of the applied force.
 - (b) The torque of an external force can be increased by increasing the mass of the applied force.
 - (c) The torque of an external force can be increased by applying the force perpendicular to the lever.
 - (d) The torque of an external force can be increased by increasing the distance of the point of application of the force from the joint axis.

9. Movement of the sacrum where the sacral promontory moves anteriorly and inferiorly while the sacral apex moves posteriorly and superiorly is called :
- (a) Nutation
 - (b) Counternutation
 - (c) Anterior pelvic tilt
 - (d) Posterior pelvic tilt.
10. The normal carrying angle of elbow ranges from —
- (a) 8°-15°
 - (b) 10°-20°
 - (c) 5°-10°
 - (d) 15°-30°.
11. The triceps muscles undergoes _____ contraction in elbow flexion.
- (a) Eccentric
 - (b) Concentric
 - (c) Isometric
 - (d) Isotonic
12. A pathologic increase in neck shaft angle of femur is known as
- (a) Coxa vara
 - (b) Coxa valga
 - (c) Femoral retroversion
 - (d) Femoral anteversion.

13. Swing phase of gait is _____ % of gait cycle.
- (a) 60
 - (b) 70
 - (c) 50
 - (d) 40
14. Which of the following is not an ankle bone ?
- (a) Cuboid
 - (b) Scaphoid
 - (c) Calcaneum
 - (d) Talus.
15. Sacrum vertebrae consists of —
- (a) 5 bones
 - (b) 6 bones
 - (c) 4 bones
 - (d) 3 bones.
16. Which part of the vertebrae bears the most weight ?
- (a) Lamina
 - (b) Superior articulating facet
 - (c) Body
 - (d) Inferior articulating facet.

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17. Which of the following planes divides the body into upper and lower halves ?
- (a) Sagittal
 - (b) Transverse
 - (c) Frontal
 - (d) Vertical.
18. In isometric contraction, the muscle
- (a) shortens
 - (b) Lengthens
 - (c) Neither shortens nor lengthens
 - (d) Shortens as well as lengthens.
19. Which of the following does not bear weight ?
- (a) Femur
 - (b) Tibia
 - (c) Fibula
 - (d) Talus.
20. Pronation and supination of the forearm occur at which of the following joints ?
- (a) Proximal radioulnar joint
 - (b) Distal radioulnar joint
 - (c) Both (a) and (b)
 - (d) None of the above.