

Total number of printed pages-8

34 (1) BIOM 1-4

2018

BIOMECHANICS

Full Marks : 100

Time : Three hours

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

- I. Essay Type : (answer **any two**) 2×10=20
1. Define lever and lever parameters. Explain about the orders of lever with suitable mechanical and anatomical examples.
 2. Explain in detail about bio-mechanics of cervical spine.
 3. Describe the mechanically related structural components of hip and discuss the stability of hip joint in single leg stance.

Contd.

II. Short Essay Type : (answer any ten) 10×5=50

1. What is Centre of gravity ? How does it vary with body position ? Explain with examples.
2. Explain the various joints present in the thorax.
3. Explain creep and stress-relaxation.
4. Kinematics of Temporomandibular joint.
5. Static stabilization of shoulder.
6. Explain the role of intrinsic muscles of hand.
7. Mobility of Elbow joint.
8. Discuss Supination twist and pronation twist.
9. Describe the biomechanics of sacroiliac joint.
10. Determinants of gait.
11. Screw-home mechanism. *MSB*
12. Hand arches and their functions.

III. Short type : (answer any five) 5×2=10

1. Agonist and antagonist
2. Claw toe and hammer toe
3. Law of Inertia
4. Coxa Valga
5. Patella alta
6. Posture (Definition and types)
7. Role of Menisci.

IV. Multiple Choice Questions : 20×1=20

1. Which type of lever is used while we curl our biceps ?
(a) Class I
(b) Class II
(c) Class III
(d) None of the above.
2. Elevation of the shoulder girdle takes place in which plane ?
(a) Sagittal
(b) Frontal
(c) Horizontal
(d) Transverse.

3. In anatomical position, the elbows are _____ while the radioulnar joints are _____.
- (a) Extended/Supinated
 - (b) Extended/Pronated
 - (c) Flexed/Pronated
 - (d) Flexed/Supinated.
4. Which of the following can never be treated as a hinge joint ?
- (a) The Elbow
 - (b) The Knee
 - (c) The Wrist
 - (d) The Ankle.
5. Which of the following corresponds to opening of the mouth ?
- (a) Mandibular Elevation
 - (b) Mandibular Depression
 - (c) Mandibular Protrusion
 - (d) Mandibular Retrusion.
6. Which of the following motions is a translatory motion ?
- (a) Inferior glide of MTP joint
 - (b) Flexion of Elbow joint
 - (c) A ball thrown by a baseball pitcher
 - (d) Abduction of shoulder joint.

7. The tibial plateau slopes posteriorly approximately —
- (a) 6° to 9°
 - (b) 7° to 10°
 - (c) 8° to 10°
 - (d) None of the above.
8. Lumbosacral angle in optimal erect posture —
- (a) 10°
 - (b) 20°
 - (c) 30°
 - (d) 40° .
9. During knee flexion quadriceps undergo —
- (a) Concentric
 - (b) Eccentric
 - (c) Isometric
 - (d) Isotonic.
10. Bursae located between skin and bone —
- (a) Subtendinous
 - (b) Submuscular
 - (c) Subcutaneous
 - (d) None of the above.

11. Muscles which cause the joints bend are —
- (a) Flexors
 - (b) Extensors
 - (c) Abductors
 - (d) Adductors.
12. Synovial joint is —
- (a) Slightly movable
 - (b) Freely movable
 - (c) Both (a) and (b)
 - (d) None of the above.
13. Which of the following is a fibrous joint?
- (a) Joints of the skull
 - (b) Joints of fingers
 - (c) Joints of ribs
 - (d) All of the above.
14. A forward upward movement of the foot at the ankle joint is —
- (a) Plantar flexion
 - (b) Dorsiflexion
 - (c) Inversion
 - (d) Eversion.

15. Lordosis is also called —
- (a) Round back
 - (b) Hollow back
 - (c) Lateral back
 - (d) Back curve.
16. Which of the following statement is NOT TRUE ?
- (a) Biomechanics is the application of mechanical principles in the study of any mechanical system.
 - (b) Kinesiology is the study of human movement.
 - (c) Kinematics is the study of description of motion regardless of force.
 - (d) Anthropometry is the study related to the dimensions and weights of a body segment.
17. Which statement is True ?
- (a) Degree of toe-out increases as speed of walking decreases in normal men.
 - (b) Degree of toe-out increases as speed of walking increases in normal men.
 - (c) Degree of toe-out decreases as speed of walking decreases in normal men.
 - (d) Degree of toe-out decreases as speed of walking increases in normal men.

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18. Angle of inclination of humerus is —
- (a) $110^{\circ} - 120^{\circ}$
 - (b) $120^{\circ} - 130^{\circ}$
 - (c) $130^{\circ} - 150^{\circ}$
 - (d) $150^{\circ} - 160^{\circ}$.
19. Classification of muscle based on role —
- (a) Agonists
 - (b) Agonist and Antagonists
 - (c) Synergists and Antagonists
 - (d) Agonist, Antagonists and Synergists.
20. Function of lateral collateral ligament of knee joint is to resist —
- (a) Valgus stress
 - (b) Varus stress
 - (c) Anterior translation of tibia
 - (d) Posterior translation of tibia.