

Total number of printed pages-8

**34 (1) BIOM 1-4**

**2021**

**( Held in 2022 )**

**BIOMECHANICS**

*Full Marks : 100*

Time : Three hours

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

- I. Essay type : (*Answer any two*) 10×2=20
1. Explain the structure and component of the shoulder complex. Explain dynamic stabilization in details.
2. Write about the structure of a typical vertebra. Explain the kinematics of the vertebral column.
3. Define posture and factors affecting posture. Explain sagittal plane analysis of posture.

*Contd.*

II. Short essay type : (*Answer any ten*)  
5×10=50

1. Explain lever system in details.
2. Describe the types of joints.
3. Explain in detail about the kinematics of rib cage.
4. Write about the temporomandibular joint and the movements of the T M Joint.
5. Explain in detail about the prehension.
6. Write about the kinematics and kinetics of lumbar vertebrae.
7. Explain in detail about the gait cycle.
8. Describe the structure and functions of plantar arches in detail.
9. Discuss the composition of muscle fiber.
10. Explain the ligaments of hip joint and musculature of hip joint with functions.

11. Write about the kinematics of knee joint.
12. Discuss in detail about the structure of elbow joint.

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

1. Palmar Arches.
2. Pes Planus and Pes Cavus.
3. Convex-concave rule.
4. Define COG and LOG.
5. What is Q-angle ?
6. What is motor unit ?
7. Write about subtalar joint.

IV. Multiple Choice Questions : 1×20=20

1. Stance phases is \_\_\_\_\_ of gait cycle.  
(a) 40%  
(b) 50%  
(c) 60%  
(d) 70%

2. Weight of HAT is about \_\_\_\_\_ of body weight.
- (a) 40%
  - (b) 50%
  - (c) 60%
  - (d) 70%
3. Which force acts parallel to a surface ?
- (a) Shear
  - (b) Compression
  - (c) Tension
  - (d) Bending
4. Strongest ligament of hip joint is —
- (a) iliofemoral
  - (b) ischiofemoral
  - (c) pubofemoral
  - (d) None of the above
5. The flexibility of bone is provided by —
- (a) water
  - (b) calcium carbonate
  - (c) calcium phosphate
  - (d) collagen
6. Normal carrying angle is —
- (a) 0–20°
  - (b) 0–30°
  - (c) 0–10°
  - (d) 0–40°
7. Which knee joint ligament help in locking ?
- (a) ACL
  - (b) PCL
  - (c) LCL
  - (d) Posterior capsule
8. Hyaline cartilages are found in —
- (a) IVD
  - (b) ears
  - (c) epiglottis
  - (d) joints
9. Which force exerts a pull on a body ?
- (a) Shear
  - (b) Compression
  - (c) Tension
  - (d) All of the above

10. Which muscle is involved in elevation of arm ?  
(a) Deltoid  
(b) Biceps  
(c) Triceps  
(d) Quadriceps
11. Which of the following is an example of bi-axial joint ?  
(a) Hinge  
(b) Pivot  
(c) Both (a) and (b)  
(d) None of the above
12. Imaginary line passing laterally from one side to other is called —  
(a) Sagittal axis  
(b) Vertical axis  
(c) Sagittal plane  
(d) Lateral axis
13. Carpometacarpal joint is an example of —  
(a) Condyloid joint  
(b) Saddle joint  
(c) Ball and socket joint  
(d) Gliding joint
14. Ligamentum flavum limits —  
(a) vertebral flexion  
(b) vertebral extension  
(c) vertebral lateral flexion  
(d) None of the above
15. The portion of sarcomere contains both thick and thin filaments is —  
(a) A-band  
(b) I-band  
(c) H-zone  
(d) None of the above
16. Mature bone cells are called —  
(a) Osteocytes  
(b) Osteoblasts  
(c) Osteoclasts  
(d) Osteoporosis
17. Hamstring muscle —  
(a) extends knee  
(b) flexes knee  
(c) extends elbow  
(d) flexes elbow

18. Sideways bending of trunk is an example of movement in —
- (a) Sagittal plane ; lateral axis
  - (b) Frontal plane ; transverse axis
  - (c) Sagittal plane ; sagittal axis
  - (d) Frontal plane ; sagittal axis
19. Transverse foramina are only present in —
- (a) Lumbar vertebrae
  - (b) Cervical vertebrae
  - (c) Thoracic vertebrae
  - (d) All of the above
20. In which type of lever, the force is in between weight and fulcrum ?
- (a) Type I
  - (b) Type II
  - (c) Type III
  - (d) All of the above