

22BP43

(Pages: 2)

Name:

Reg. No:

FOURTH YEAR B.P.E. (INTEGRATED) DEGREE EXAMINATIONS, APRIL 2026

(Regular/Supplementary/Improvement)

CC15UBPE4T19 / CC19UBPE4T19 – BIOMECHANICS

(2015 Admission onwards)

Time: Three Hours

Maximum: 75 Marks

Part A

Answer any **one** question. The question carries 15 marks.

1. Write about the need & importance of biomechanics in competitive sports.
2. Explain the mechanical differences between walking and running.

(1 × 15 = 15 Marks)

Part B

Answer **all** questions. Each question carries 5 marks.

Explain the following:

3. What is spin? Explain its role in sports & games.
4. Define Newton's three laws of motion.
5. Explain the concept of levers and classify them into different types.

(3 × 5 = 15 Marks)

Part C

Answer **all** questions. Each question carries 5 marks.

Explain the following:

6. Explain the factors that influence the trajectory of a projectile.
7. Define biomechanics.
8. Define motion and describe its different types.

(3 × 5 = 15 Marks)

Part D

Answer **all** questions. Each question carries 1 mark.

Fill in the blanks:

9. _____ is defined as a push or pull exerted on an object, causing it to move, stop, or change direction.
10. The angle between the line of pull of a muscle and the bone on which it acts is known as the _____.
11. The effectiveness of force application depends on key principles such as magnitude, direction, and _____.
12. A _____ lever always has the effort arm longer than the resistance arm, providing a mechanical advantage greater than one.
13. Buoyancy depends on the _____ of the object and the fluid in which it is submerged.

(5 × 1 = 5 Marks)

Part E

Answer **all** questions. Each question carries 1 mark.

State True or False:

14. An object sinks in a fluid when the buoyant force is greater than its weight.
15. A lower center of gravity improves stability in an object.
16. The direction of the applied force influences an object's motion.
17. In sports, applying topspin to a ball reduces its forward speed after bouncing.
18. The center of gravity of an object is always located at its geometric center.

(5 × 1 = 5 Marks)

Part F

Answer **all** questions. Each question carries 1 mark.

Answer in one word:

19. Which type of equilibrium exists when an object returns to its original position after being disturbed?
20. In which class of lever is the load positioned between the effort and the fulcrum?
21. What is the ideal angle for maximum horizontal distance in projectile motion?
22. Which type of motion occurs along a curved path?
23. What is defined as a push or pull exerted on an object?
24. What is the technique to resist impact by distributing force over time?
25. What term describes the continuous change in position of an object?
26. Which type of spin in volleyball causes a ball to dip faster in the air?
27. What is the state in which all forces acting on an object are balanced?
28. Which law states that an object at rest stays at rest unless acted upon by an external force?

(10 × 1 = 10 Marks)

Part G

Answer **all** questions. Each question carries 1 mark.

Match the following:

- | | | |
|--------------------------|---|---|
| 29. Center of mass | - | a. Product of mass & acceleration |
| 30. Javelin throw | - | b. Acceleration due to gravity |
| 31. Unstable equilibrium | - | c. Dumbbell lateral raise for deltoid |
| 32. Buoyancy | - | d. Angle between muscle force and bone |
| 33. Inertia | - | e. Newton's Third Law of Motion |
| 34. 9.8 m/s ² | - | f. Projectile |
| 35. Third-class lever | - | g. Vrikshasana |
| 36. Springboard | - | h. Athlete even runs after finishing line |
| 37. Angle of pull | - | i. Upward force exerted by fluid |
| 38. Force | - | j. Point where body's weight is equally distributed |

(10 × 1 = 10 Marks)
