

25MP24

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Name :

Reg. No :

SECOND SEMESTER M.P.E.S. DEGREE EXAMINATION, APRIL 2026

CC25SPEMIIC1908 – SPORTS ENGINEERING

(2025 Admission – Regular)

Time: 3.00 Hours

Maximum: 75 Marks

Credit : 4

Part A

Answer any **three** questions. Each question carries 15 marks.

1. Compare and contrast qualitative and quantitative methods of human performance assessment in sports.
2. Analyze the interdisciplinary nature of sports engineering by linking biomechanics, electronics, and materials science.
3. Examine how ergonomics principles can be applied to redesign sports equipment handles for better grip and reduced fatigue.
4. Differentiate between rectilinear and curvilinear motion with sports examples and discuss their kinetic implications
5. Apply the requirements of air ventilation and daylight to design an energy-efficient indoor gymnasium
6. Design a cost-optimization strategy for preventive maintenance in sports pavilions over a 20-year period.

(3 × 15 = 45 Marks)

Part B

Answer any **four** questions. Each question carries 5 marks.

7. Create a step-by-step protocol for using human performance assessment data to guide the redesign of a gymnasium floor for multiple sports. Justify each step with engineering rationale.
8. Apply concepts of strain energy and internal forces to assess the structural integrity of a gymnastics vaulting table under repeated impact loading.
9. Evaluate the mechanical principles of lifting and pushing in wheelchair basketball. Propose ergonomic modifications to the wheelchair based on strain energy considerations.
10. Analyze the kinetics of a gymnast performing a vault using work-energy and impulse-momentum methods. Propose technique improvements for higher scores.
11. Apply eco-friendly surrounding and sewage disposal requirements to redesign an existing play park. Analyze sustainability improvements

12. Create a sensitivity analysis for facility life cycle costing of a play park, considering fluctuations in capital and taxation costs. Recommend risk-mitigation measures.

(4 × 5 = 20 Marks)

Part C (Short notes)

Answer any **five** questions. Each question carries 2 marks.

13. Define the term “sports engineering”.
14. Explain how facility designing contributes to athlete safety.
15. Explain briefly the energy method to find displacement of a structure.
16. Differentiate between posture and gait from a biomechanical view
17. Define impulse and momentum.
18. List any four sports infrastructure facilities mentioned in the syllabus.
19. Describe the importance of echo-free sound system in a pavilion.
20. Summarise capital cost and taxation in facility costing.

(5 × 2 = 10 Marks)
