Stella Maris College (Autonomous), Chennai - 600 086

(For candidates admitted during 2015 academic year and thereafter)

B.Sc. Degree Examination, April 2021

Code: 15MT/MC/PM65

Principles of Mechanics

Max. Marks: 50 Duration: 90 mins.

Section A

Answer all the questions (3 × 2 = 6)

1. Define moment of a force
2. Define angle and co-efficient of friction.
3. State parallel axis theorem.

Section B

Answer any three questions (3 × 8 = 24)

4. Two forces *P* and *Q* acting at a point have a resultant *R*. If *Q* be doubled, *R* is also doubled. And if *Q* be reversed in direction only, then also *R* is doubled. Show that $P^2:Q^2:R^2 = 2:3:2$.

5. State and prove Lami's theorem.
6. Find the moment of inertia of a circular lamina of radius *a*.
7. A particle falls under gravity in a medium whose resistance varies as the square of the velocity. Discuss the motion.

Section C

Answer any one question (1 × 20 = 20)

8. a) State and prove Varignon's theorem.

   b) A ladder rests in limiting equilibrium with its lower end on a rough horizontal plane and the other end against a rough vertical wall. The centre of gravity divides the ladder into two portions of length a and b. Find the position of limiting equilibrium.

   (10 + 10)

9. a) Define a common catenary and derive the cartesian equation of the common catenary.

   b) The span of a suspension bridge is 100 meters and the sag at the middle of the chain is 10 meters. If the total load on each chain is 750 quintals, find the tension at the lowest point and maximum tension. (10 + 10)

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