

STELLA MARIS COLLEGE (AUTONOMOUS), CHENNAI – 600 086
(For candidates admitted during the academic year 2019 – 20 & thereafter)
M.Sc., DEGREE EXAMINATION - May 2021
BRANCH I – MATHEMATICS

SUBJECT CODE:19MT/PE/ME15

PAPER: Mechanics

TIME : 90 minutes

MAX. MARKS: 50

SECTION – A

Answer all the following:

(2 x 2 = 4)

1. Define cyclic coordinates.
2. What are Euler angles?

SECTION – B

Answer any two questions:

(2 x 6 = 12)

3. Establish the principle of conservation of angular momentum for a system of particles.
4. Derive Hamilton's canonical equation of motion.
5. Define generating function of a canonical transformation and show that the canonical equations are obtained when the generating function is in any one of the two standard forms.

SECTION – C

Answer any two questions:

(2 x 17 = 34)

6. (a) Derive Lagrange's equation for holonomic, non-conservative system.
(b) Explain and solve Geodesics problem using calculus of variation.
(9 + 8)
7. (a) State and prove Euler's theorem on the motion of a rigid body.
(b) Obtain the expression for the kinetic energy of a rigid body with one point fixed in terms of the inertia coefficients.
(9 + 8)
8. (a) Explain the Routhian procedure in solving a mechanical problem.
(b) State and prove Jacobi's Identity relating Poisson Brackets.
(9+8)
