

12. a) Deduce the canonical equations of motion from variational principle

(OR)

- b) Construct the equation of motion in Poisson bracket notation.
13. a) Determine the expression for motion of a particle falling under the influence of gravitational field through H-J method

(OR)

- b) Justify the statement that Hamilton's principal function is the solution of Hamilton – Jacobi equation.
14. a) Derive the Euler's equations for the motion of a Rigid body with one point fixed.

(OR)

- b) Construct Euler's transformations equations for the successive rotation of a rigid body
15. a) Compare stable and unstable equilibrium

(OR)

- b) Write a note on normal frequencies of vibrations.

SECTION – C

(5 X 8 = 40 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS.

(K4 (Or) K5)

16. a) Discuss the variational techniques and deduce the Euler's Lagrange differential equation.

(OR)

- b) What are known as cyclic coordinates? Arrive the expressions for conservation of linear momentum and energy.

17. a) Deduce Lagrange's equation of motion from Hamilton's principle.

(OR)

- b) State and prove principle of least action .

18. a) Obtain the solution for Kepler's planetary motion through Hamilton Jacobbi method.

(OR)

- b) Setup a Hamiltonian for one dimensional simple harmonic oscillator and find the solution by Hamilton Jacobi method

19. a) Give the theory of Euler angles for different rotation and give their transformation matrices.

(OR)

- b) Derive Euler's equations of motion for a rigid body with a fixed point and extend it to fixed axis.

20. a) List the properties of T, V and ω with discussions on small oscillations.

(OR)

- b) Set up a equation of motion for a linear triatomic molecule and derive the expression for frequency of oscillation.
