PHY401A: Weekly Quizzes (Odd semester: 2022-23)

Total points: 5x10= 50 Date: Tuesday Time: 13h15-13h25

Quiz no. 3 (more than one answer may be correct)

11. A Lagrangian can be a function of

(a) q
(b) t
(c) $\dot{q}$
(d) $\dot{q}$ and t only

12. Lagrangian of a mechanical system is given by $T - V$ when

(a) the system is conservative
(b) the system is subject to a periodic external force
(c) the system has kinetic energy which is a quadratic function of generalized velocities
(d) the Lagrangian is positive definite for all generalized coordinates and velocities

13. If the kinetic energy of a mechanical system is independent of the generalized coordinates, then the Lagrangian

(a) will no longer satisfy the Euler-Lagrange equation
(b) is a constant of motion
(c) can be an explicit function of time
(d) may sometimes represent a conservative system

14. If the Lagrangian of a particle is given by $L = q^2 - \dot{q}^2 - t^2$, the particle moves with

(a) constant acceleration
(b) periodic velocity
(c) uniform velocity
(d) constant angular momentum

15. A particle of unit mass is moving in a plane (r, θ). If the generalized momentum p_r is always equal to p_θ, in $r - \theta$ plot, the particle trajectory is given by a

(a) circle
(b) cycloid
(c) parabola
(d) none of these