Course outline

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Assignment 7

The due date for submitting this assignment has passed.

Due on 2021-03-10, 23:59 IST.

As per our records you have not submitted this assignment.

1) A particle of mass m is moving vertically,under the action of gravity and resistive force numerically equal to c times its velocity $\dot{y}$.Which of the following is/are the form of it's Hamilton's principle equation ? *1 point*

- $\delta \int_{t_1}^{t_2} \left(\frac{1}{2}m\dot{y}^2 + mg\dot{y}\right) dt - \int_{t_1}^{t_2} c\dot{y}\delta y dt$
- $\delta \int_{t_1}^{t_2} \left(\frac{1}{2}m\dot{y}^2 - mgy\right) dt + \int_{t_1}^{t_2} c\dot{y}\delta y dt$
- $\delta \int_{t_1}^{t_2} \left(\frac{1}{2}m\dot{y}^2 + mgy\right) dt - \int_{t_1}^{t_2} c\dot{y}\delta y dt$
- $\delta \int_{t_1}^{t_2} \left(\frac{1}{2}m\dot{y}^2 + mgy\right) dt + \int_{t_1}^{t_2} c\dot{y}\delta y dt$
- $\delta \int_{t_1}^{t_2} \left(\frac{1}{2}m\dot{y}^2 + mgy\right) dt - \int_{t_1}^{t_2} cy\delta y dt$
- $\delta \int_{t_1}^{t_2} \left(\frac{1}{2}m\dot{y}^2 + mgy\right) dt + \int_{t_1}^{t_2} cy\delta y dt$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\delta \int_{t_1}^{t_2} \left(\frac{1}{2}m\dot{y}^2 + mgy\right) dt - \int_{t_1}^{t_2} c\dot{y}\delta y dt$

2) Three masses are connected in series to a fixed support,by linear springs. Let x_i represent displacement from equilibrium and k_i be the spring constants. Assuming that only the spring forces are present,what would be the lagrangian function(s) of the system ? *1 point*

- $L = \left[m_1\dot{x}_1{}^2 + m_2\dot{x}_2{}^2 + m_3\dot{x}_3{}^2 - k_1x_1^2 - k_2(x_2 - x_1)^2 - k_3(x_3 - x_2)^2\right]$ +constant
- $L = \frac{1}{2}\left[m_1\dot{x}_1{}^2 + m_2\dot{x}_2{}^2 + m_3\dot{x}_3{}^2 + k_1x_1^2 + k_2(x_2 - x_1)^2 + k_3(x_3 - x_2)^2\right]$
- $L = \frac{1}{2}\left[m_1\dot{x}_1{}^2 + m_2\dot{x}_2{}^2 + m_3\dot{x}_3{}^2 - k_1(x_1 - x_3)^2 - k_2(x_2 - x_1)^2 - k_3(x_3 - x_2)^2\right]$ +constant
- $L = \frac{1}{2}\left[m_1x_1{}^2 + m_2x_2{}^2 + m_3x_3{}^2 - k_1x_1^2 - k_2(x_2 - x_1)^2 - k_3(x_3 - x_2)^2\right]$ +constant
- $L = \frac{1}{2}\left[m_1\dot{x}_1{}^2 + m_2\dot{x}_2{}^2 + m_3\dot{x}_3{}^2 + k_1x_1^2 - k_2(x_2 - x_1)^2 + k_3(x_3 - x_2)^2\right]$ +constant
- $L = \frac{1}{2}\left[m_1\dot{x}_1{}^2 + m_2\dot{x}_2{}^2 + m_3\dot{x}_3{}^2 - k_1x_1^2 - k_2(x_2 - x_1)^2 - k_3(x_3 - x_2)^2\right]$ +constant

No, the answer is incorrect.
Score: 0

Accepted Answers:
$L = \frac{1}{2}\left[m_1\dot{x}_1{}^2 + m_2\dot{x}_2{}^2 + m_3\dot{x}_3{}^2 - k_1x_1^2 - k_2(x_2 - x_1)^2 - k_3(x_3 - x_2)^2\right]$ +constant

3) A particle moves on the surface $\phi(x, y, z) = 0$ from the point (x_1, y_1, z_1) to the point (x_2, y_2, z_2) in time T. If it moves in such a way that the integral of it's kinetic energy over that time is minimum, which of the following equations must the coordinates of the particle satisfy ? *1 point*

- $\frac{\ddot{x}}{\phi_x} = \frac{\ddot{y}}{\phi_y} = \frac{\ddot{z}}{\phi_z}$
- $\frac{\dot{x}}{\phi_x} = \frac{\dot{y}}{\phi_y} = \frac{\dot{z}}{\phi_z}$
- $\frac{x}{\phi_x} = \frac{y}{\phi_y} = \frac{z}{\phi_z}$
- $\frac{\ddot{x}}{\phi_x} = \frac{y}{\phi_y} = \frac{z}{\phi_z}$
- $\frac{x}{\phi_x} = \frac{y}{\phi_y} = \frac{\ddot{z}}{\phi_z}$
- $\frac{x}{\phi_x} = \frac{\ddot{y}}{\phi_y} = \frac{z}{\phi_z}$

No, the answer is incorrect.
Score: 0

Accepted Answers:
$\frac{\ddot{x}}{\phi_x} = \frac{\ddot{y}}{\phi_y} = \frac{\ddot{z}}{\phi_z}$