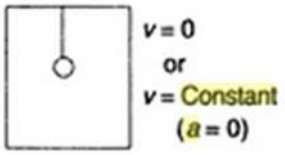
Answer on Question #48465-Physics-Other

Time period of a simple pendulum in lift. Here it is if a lift goes up and down with constant velocity then how the time period change? When it will decrease or increase?

If the lift moves with constant acceleration then how the time period will change?

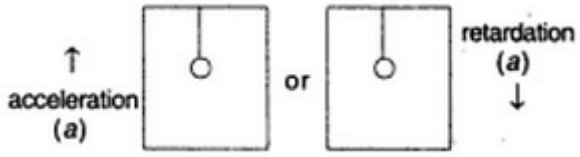
Solution

Simple pendulum in a lift



First case. If lift is at rest ($v = 0$) or lift is moving up or down with constant velocity, then the value of g in the lift doesn't change. Hence time-period of simple pendulum $T = 2\pi\sqrt{\frac{l}{g}}$ doesn't change.

Second case. If lift accelerates upwards with acceleration (a) or retards downwards with retardation (a), then the value of g in the lift increases from g to $g + a$. Hence time-period of simple pendulum decreases to $T = 2\pi\sqrt{\frac{l}{g+a}}$.



Third case. If lift accelerates downwards with acceleration (a) or retards upwards with retardation (a), then the value of g in the lift increases from g to $g - a$. Hence time-period of simple pendulum increases to $T = 2\pi\sqrt{\frac{l}{g-a}}$.

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