

GOVERNMENT NOTICE No. 71

TRINIDAD AND TOBAGO

THE CENTRAL BANK ACT, 1964

ORDER

MADE BY THE GOVERNOR-GENERAL UNDER SECTION 23(2) OF THE
CENTRAL BANK ACT, 1964

DECLARATION OF CHANGE IN THE PAR VALUE OF THE
TRINIDAD AND TOBAGO DOLLAR, ORDER, 1976

WHEREAS it is provided by subsection (2) of section 23 of the Central Bank Act, 1964, that the Governor-General may from time to time declare by Order published in the *Gazette* any change in the par value of the Trinidad and Tobago dollar whether expressed in terms of gold or in some other standard:

Now, therefore, I, ELLIS EMMANUEL INNOCENT CLARKE, do by this Order declare that the par value of the Trinidad and Tobago dollar is 0.416667 of the par value of the United States dollar, effective from Friday, 28th May, 1976.

Dated this 27th day of May, 1976.

ELLIS CLARKE
Governor-General

THE UNIVERSITY OF CHICAGO

PHYSICS DEPARTMENT

PHYSICS 311

LECTURE 10

THE HARMONIC OSCILLATOR

1. THE CLASSICAL HARMONIC OSCILLATOR

Consider a particle of mass m moving in a potential $V(x) = \frac{1}{2}kx^2$.

The equation of motion is $m\ddot{x} = -kx$.

The general solution is $x(t) = A\cos(\omega t) + B\sin(\omega t)$.

where $\omega = \sqrt{k/m}$.

The period of oscillation is $T = 2\pi/\omega$.

The energy of the oscillator is $E = \frac{1}{2}kA^2$.

2. QUANTUM MECHANICS OF THE HARMONIC OSCILLATOR

The Schrödinger equation is $-\frac{\hbar^2}{2m}\psi'' + \frac{1}{2}kx^2\psi = E\psi$.

The energy eigenvalues are $E_n = \hbar\omega(n + \frac{1}{2})$.

The energy eigenfunctions are $\psi_n(x) = N_n H_n(\alpha x) e^{-\alpha^2 x^2/2}$.

where $\alpha = \sqrt{mk/\hbar^2}$.

3. THE CLASSICAL LIMIT

As $\hbar \rightarrow 0$, the energy levels become continuous.

The wavefunctions become localized around the classical trajectory.

4. THE QUANTUM CLASSICAL CORRESPONDENCE

The expectation value of the position is $\langle x \rangle = \frac{1}{\omega} \frac{dE}{dt}$.

The expectation value of the momentum is $\langle p \rangle = -m\omega x$.