

NE MEXICO OIL CONSERVATION COMMISSION

Santa Fe, New Mexico

MISCELLANEOUS NOTICES

Submit this notice in triplicate to the Oil Conservation Commission or its proper agent before the work specified is to begin. A copy will be returned to the sender on which will be given the approval, with any modifications considered advisable, or the rejection by the Commission or its agent, of the plan submitted. The plan as approved should be followed, and work should not begin until approval is obtained. See additional instructions in the Rules and Regulations of the Commission.

Indicate nature of notice by checking below:

NOTICE OF INTENTION TO TEST CASING SHUT-OFF	<input checked="" type="checkbox"/>	NOTICE OF INTENTION TO SHOOT OR CHEMICALLY TREAT WELL	
NOTICE OF INTENTION TO CHANGE PLANS		NOTICE OF INTENTION TO PULL OR OTHERWISE ALTER CASING	
NOTICE OF INTENTION TO REPAIR WELL		NOTICE OF INTENTION TO PLUG WELL	
NOTICE OF INTENTION TO DEEPEN WELL			

Hobbs, N.M.

4-3-37

Place

Date

OIL CONSERVATION COMMISSION,

Santa Fe, New Mexico.

Gentlemen:

Following is a notice of intention to do certain work as described below at the

Shell Petroleum Corp. - State "E" Well No. 2 in NW/4
 Company or Operator Lease
 of Sec. 13, T. 20S, R. 36E, N. M. P. M., Monument Field,
 Lea County.

FULL DETAILS OF PROPOSED PLAN OF WORK

FOLLOW INSTRUCTIONS IN THE RULES AND REGULATIONS OF THE COMMISSION

New 12 1/2" casing was cemented at 142' with 150 sacks of
 cement. We intend to test WSO 4-5-37.

DUPLICATE

Approved APR 16 1937, 19____
 except as follows:

OIL CONSERVATION COMMISSION,

By G. D. MappTitle State Geologist,

Member Oil Conservation Commission.

Shell Petroleum Corporation

Company or Operator

By [Signature]Position District Engineer

Send communications regarding well to

Name Shell Petroleum CorporationAddress Dr. #1457 - Hobbs, N.M.

THE UNIVERSITY OF CHICAGO

CHICAGO, ILLINOIS

PHYSICS DEPARTMENT

PHYSICS 311: QUANTUM MECHANICS
Lecture Notes
Lecture 1: Introduction to Quantum Mechanics
The wave function $\psi(x)$ is a complex-valued function of position x . The probability density is given by $|\psi(x)|^2$. The wave function satisfies the Schrödinger equation:

$$-\frac{\hbar^2}{2m} \frac{d^2 \psi}{dx^2} + V(x) \psi = E \psi$$

where \hbar is the reduced Planck constant, m is the mass of the particle, $V(x)$ is the potential energy, and E is the energy eigenvalue.

The wave function must be normalized such that the total probability is 1:

$$\int_{-\infty}^{\infty} |\psi(x)|^2 dx = 1$$

The expectation value of an observable A is given by:

$$\langle A \rangle = \int_{-\infty}^{\infty} \psi^*(x) A \psi(x) dx$$

where $\psi^*(x)$ is the complex conjugate of $\psi(x)$.

The wave function can be expanded in terms of energy eigenstates:

$$\psi(x) = \sum_n c_n \psi_n(x)$$

where c_n are the expansion coefficients and $\psi_n(x)$ are the energy eigenstates.

The probability of finding the system in state n is $|c_n|^2$.

The wave function must satisfy boundary conditions.

PROBLEM SET 1

1. A particle of mass m is confined to a one-dimensional infinite potential well of width L . The potential is zero inside the well and infinite outside.

(a) Find the energy eigenvalues E_n and the corresponding wave functions $\psi_n(x)$.

(b) Calculate the expectation value of the position $\langle x \rangle$ for the ground state.

ANSWERS

(a) The energy eigenvalues are:

$$E_n = \frac{n^2 \pi^2 \hbar^2}{2mL^2}$$

and the corresponding wave functions are:

$$\psi_n(x) = \sqrt{\frac{2}{L}} \sin\left(\frac{n\pi x}{L}\right)$$

for $0 \leq x \leq L$ and zero elsewhere.

(b) The expectation value of the position is:

$$\langle x \rangle = \frac{L}{2}$$

(c) The probability of finding the particle in the right half of the well is:

$$P = \frac{1}{2}$$

for the ground state. For higher states, the probability is more complex and depends on the state number n .