AIN SHAMS UNIVERSITY
FACULTY OF ENGINEERING

RESPONSE OF OFFSHORE STRUCTURES TO ENVIRONMENTAL FORCES

BY

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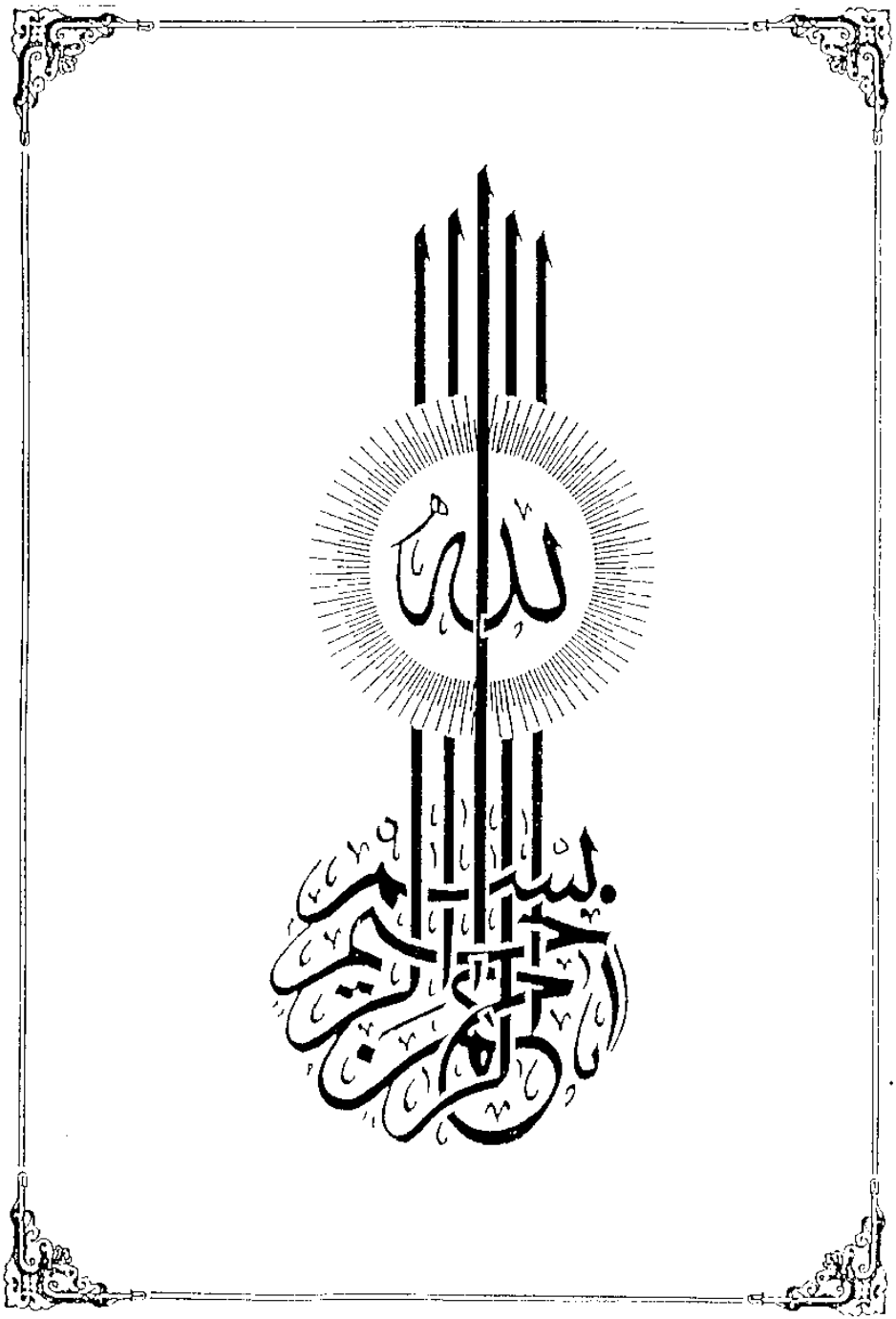

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STATEMENT

This dissertation is submitted to Ain Shams University for the degree of **Doctor of Philosophy** in Civil Engineering (Structural).

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Title " *Response of Offshore Structures to Environmental Forces* "

Doctor Of Philosophy, Faculty Of Engineering, Ain Shams University.

ABSTRACT

This thesis deals with the static and dynamic analysis of offshore structures subjected to environmental forces. A study of the different methods for simulation of environmental forces especially, wave forces current forces and wind forces has been performed .

The mathematical equations for simulation by multiregressive method are derived taking into account the variation of frequency and height of waves . A method for predicting the static and dynamic response of linear and non - linear structures is developed . The proposed method of analysis is based upon step by step response calculation in the time domain in which equilibrium of the forces at the end of each time step is established by minimization of the total potential work using the method of conjugate gradient .

The environmental forces and the effect of support conditions have been introduced into the mathematical formulation .The complete theory has been developed in terms of the Newmark equations . Numerical studies of the behavior of different offshore structures are presented . The effects of many factors on their static and dynamic response are discussed . The results of this study are discussed and summarized

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