CANDIDATE'S DECLARATION

I hereby certify that the work which is being presented in the major project entitled **"PARAMETRIC STUDY OF VAPOUR-COMPRESSION VAPOUR-ABSORPTION CASCADE REFRIGERATION SYSTEM"** in partial fulfilment of the requirements for the award of the degree of Master of Engineering in Thermal Engineering, submitted to the Department of Mechanical Engineering, is an authentic record of my own work carried under the supervision of **Dr. B.B. ARORA**, Associate Professor and **Prof. R.S. MISHRA,** Professor of Mechanical Engineering Department, Faculty of Technology, University of Delhi, Delhi.

I have not submitted the matter embodied in this major project as whole or in part, for the award of any other degree.

GIRISH KUMAR
College Roll No. 05/Thr/2008
University Roll No. 13842

CERTIFICATE

This is to certify that the above statement made by GIRISH KUMAR is true to the best of my knowledge and belief.

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ABSTRACT

The study carried out to analyse a refrigeration system in cascade with a compression system at the low temperature stage and an absorption system at the high temperature stage to generate cooling at low temperatures. NH_3 has been considered as refrigerant in the compression stage and the pair LiBr–H_2O in the absorption stage. The analysis has been realized by means of a mathematical model of the refrigeration system implemented in a computer program and the study also carried out the effect of efficiency of the condenser-evaporator heat exchanger on the COP of the cascade system. The intermediate temperature level is an important design parameter that causes an opposite effect on the COP of the compression and absorption systems. Therefore, the cascade system COP presents a maximum when the intermediate temperature is varied. The intermediate temperature that produces the maximum COP depends on the evaporation temperature of the compression system.

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NOMENCLATURE

COP	Coefficient of Performance
E	Electrical power (kW), Exergy
EEE	Equivalent Electric Efficiency
P	Pressure (kPa)
Q	Heat (kW)
Q_0	Cooling Duty (kW)
T	Temperature (^{0}C)

Subscripts

a	Absorption System
c	Compression System
com	Compression, Compressor
con	Condensation, Condenser
eva	Evaporation, Evaporator
g	Global, Cascade
gen	Generation, Generator
int	Intermediate
p	Pump
w	Water
she	Solution Heat Exchanger
X	Mass Fraction of Lithium Bromide (%)
$\Delta \psi$	Availability Difference
ψ	Availability (kJ/kg)
1-22	Stations in the Cascade Refrigeration Cycle (see Fig. 3.1)