

VISVESVARAYA TECHNOLOGICAL UNIVERSITY
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A project report on

**“DEVELOPMENT OF PORTABLE MICRO
REFRIGERATION SYSTEM USING PELTIER EFFECT FOR
MEDICAL APPLICATIONS”**

(KSCST Sponsored Project)

*Submitted in partial fulfillment of the requirement for the award of degree of
Bachelor of Engineering in*

Mechanical Engineering

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ABSTRACT

In this study, experimental and theoretical studies on thermoelectric cooler (TEC) performance for cooling a refrigerated object (water in a tank) were performed. Micro channel heat sinks fabricated with etched silicon wafers were employed on the TEC hot side to dissipate heat. The measurements show that the temperature of the refrigerated object decreased with time. A theoretical model based on a lumped system was established to predict the transient behavior of the variation in temperature for the refrigerated object with time. The theoretical predicted temperature variation was in good agreement with the measured data. The relationship among the heat sink thermal resistances, TEC electric current input and minimum refrigerated object temperature was examined based on the theoretical model. The calculated minimum temperatures were showed for the several cases of heat sink thermal resistance on the TEC hot side and electric current input. The minimum temperature can be obtained by increasing the electrical current input and decreasing the heat sink thermal resistance.