## Certificate

This is to certify that the thesis titled "Cu<sub>2</sub>ZnSnS<sub>4</sub> related Chalcogenide Absorbers: Thin Films and Heterostructure Photovoltaic Devices", submitted by Goutam Kumar Gupta (PG201381002) to the Indian Institute of Technology Jodhpur for the award of the degree of Doctor of Philosophy, is a bonafide record of the research work done by him under our supervision. To the best of our knowledge, the contents of this report, in full or in parts, have not been submitted to any other Institute or University for the award of any degree or diploma.

Ambesh Dixit Ph.D. Thesis Supervisor