

# Certificate

This is to certify that the thesis entitled **GRAPHS ASSOCIATED WITH GROUPS AND SEMIGROUPS** and submitted by **Mr. Sandeep Dalal** to the BIRLA INSTITUTE OF TECHNOLOGY & SCIENCE PILANI, PILANI for the award of the Degree of Doctor of Philosophy, is a record of the original bona fide research work carried out by him under my supervision and guidance. The thesis has reached the standards fulfilling the requirements of the regulations relating to the degree.

The results contained in this thesis have not been submitted in part or full to any other university or institute for the award of any degree or diploma.

PILANI  
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Dr. Jitender Kumar  
Supervisor