In this paper, the fluid flow and heat transfer, in pipes and tubes, using the two critical methods of heat transfer, which are known as conduction and convection, are reviewed. Furthermore, the enhancement in pipes/tubes using nanofluids are comprehensively studied. The review starts with describing convection, which can be further classified into: forced, granular, gravitational, natural and thermomagnetic. In recent years, numerous investigations on convective heat transfer, in circular pipes using nanofluids, have been studied. The numerical and experimental studies on the effects of heat transfer rate, in an annular tube, having horizontal, inclined and vertical directions fluid flow are also highlighted. Additionally, the effects of Darcy, Grashof, Prandtl, Rayleigh and Reynolds numbers on heat transfer, in concentric and eccentric annular pipes, are also studied. The findings from the research articles, which are presented in this review paper, includes: methods, results and conclusions. We investigated the conjugate heat transfer behaviour in pipes/tubes and the enhancement of heat transfer using nanofluids. The methods used for the enhancements includes various methods such as; varying nanofluids techniques, base fluids, additives, types and shapes of nanoparticles, and heat transfer mechanisms. This review concentrates on Horizontal, Vertical and Inclined flow in both traditional and nanofluids. The details are further defined in their relevant sections later in the paper. Lastly, it provides the conclusion of the findings and suggestions for future works.