Name of the Scholar	:	**Mohabbat Ali**
Name of the Supervisor	:	Prof. Quddus Khan
Name of the Co-supervisor:		Dr. Mohammad Shoeb, University Polytechnic, Faculty of Engineering and Technology, Jamia Millia Islamia
Department	:	Applied Sciences & Humanities
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ABSTRACT

Differential geometry provides a framework for studying the geometry of smooth manifolds. Ongoing research in differential geometry often involves exploring new types of manifolds, developing techniques for understanding their curvature, and applying these ideas to various mathematical and physical problems. The present thesis has been written on the same basis and efforts were made to contribute something to the subject. The results in this thesis are well motivated, therefore it might be very helpful to the mathematical society, specially to whom, who works in this direction. Further, these results can be generalized for the various other manifolds. There are some important contributions in the present Thesis and are summarized as follows:

- **Chapter 1.** This chapter is introductory; here we describe basic definitions, formulae and results which are relevant to the subsequent chapters. Although most of these results are available in standard references on the subject, nevertheless we have collected them to make the thesis self-contained.

- **Chapter 2.** This chapter deals with the study of generalized pseudo-projectively symmetric manifold. Exciting geometric properties of this manifold have been obtained under certain curvature conditions. Einstein generalized pseudo-projectively symmetric manifolds are also studied. Next, we discussed an example of a *5*-dimensional generalized pseudo-projectively symmetric manifold. *Results of this chapter have been published in* **Bulletin of the Calcutta Mathematical Society**.

- **Chapter 3.** In this chapter, first we defined a generalized *B*-tensor. Then, we have introduced the notion of weakly cyclic generalized *B*-symmetric manifold. Next, we obtained a sufficient condition for a weakly cyclic generalized *B*-symmetric manifold to be a generalized quasi-Einstein manifold. Moreover, we consider conformally flat weakly cyclic generalized *B*-symmetric manifolds and Einstein weakly cyclic generalized *B*-symmetric manifold. Finally, it is shown that the semi-symmetry and Weyl semi-symmetry are equivalent in such a manifold. *Results of this chapter have been published in* **Communications of the Korean Mathematical Society**.

- **Chapter 4.** In this chapter, we studied an almost pseudo *M*-projectively symmetric manifolds. We have obtained interesting and fruitful results on almost pseudo *M*-projectively symmetric manifolds with constant scalar curvature and Codazzi type tensor. Ricci symmetric almost pseudo *M*-projectively symmetric manifold are also studied. Finally, we discussed an example of almost pseudo *M*-projectively symmetric manifold. *Results of this chapter have been published in* **Novi Sad Journal of Mathematics**.

- **Chapter 5.** In this chapter, we studied special weakly symmetric manifolds under certain curvature conditions. Under this setup, we obtained some interesting and fruitful results on it. Special weakly Ricci symmetric manifold are also studied. In addition, the existence of special weakly symmetric manifold has been shown by a non-trivial example. *Results of this chapter have been published in* **Balkan Society of Geometers Proceedings**.

- **Chapter 6.** In this chapter, we introduced the notion of almost pseudo-Schouten symmetric manifolds. Almost pseudo-Schouten symmetric manifolds with quadratic Killing and Codazzi type tensor are studied. We obtained a sufficient condition for an almost pseudo-Schouten symmetric manifold to be a quasi-Einstein manifold. Also, the existence of this manifold has been shown by an example. Moreover, we studied the hypersurface of an almost pseudo-Schouten symmetric manifolds. *Results of this chapter have been published in* **Facta Universitatis, Series: Mathematics and Informatics**.

- **Chapter 7.** This chapter is devoted to the study of generalized W_3-recurrent Riemannian manifold. We obtained a necessary and sufficient condition for the scalar curvature to be constant in such a manifold. Also, Ricci symmetric and decomposable generalized W_3-recurrent manifolds are studied. Next, we obtained a sufficient condition for such a manifold to be quasi-Einstein manifold. Finally, we discussed an example of a generalized W_3-recurrent manifold. *Results of this chapter have been published in* **Honam Mathematical Journal**.

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