

Contents

1	Introduction	1
1.1	General Relativity	1
1.2	Cosmological Constant	3
1.3	Cosmology and Cosmological Model	4
1.4	Bianchi Space-time	5
1.5	Energy-Momentum Tensors	6
1.5.1	Perfect Fluid	6
1.5.2	Viscous fluid	7
1.5.3	Electromagnetic field	7
1.6	Lyra's Geometry	8
1.7	Sen-Dunn Theory	10
1.8	Mathematical Formulation of Sen-Dunn Theory	11
1.9	Work related to Sen-Dunn theory	13
1.10	Work related to Bianchi space-time	15
1.11	Hubble's law and Parameter	24
1.12	Deceleration Parameter	26
1.13	Expansion Scalar	27
1.14	Anisotropic Parameter	27
1.15	Shear Tensor:	27
1.16	Energy condition	28

1.17	Λ CDM model	29
1.18	Dark Energy and Dark Matter	29
1.19	Jerk and Statefinder parameter:	31
1.20	Aims and Objective of the Research Work	32
1.21	Methodology and Tools	32
1.22	Importance of the study	33
2	Bianchi Type-VI_0 Dark Energy Cosmological Model with Variable Deceleration Parameter in Sen-Dunn Theory of Gravitation	35
2.1	Introduction	35
2.2	Metric and Field Equations	36
2.3	Solution of the Field Equations	38
2.4	Model's Physical and Geometrical Properties	41
2.5	Conclusion	45
3	Viscous Bianchi Type-IX Dark Energy Cosmological Model in Sen-Dunn Theory of Gravitation	47
3.1	Introduction	47
3.2	Metric and Solutions of field equations	48
3.3	Physical and Geometrical properties of the model	51
3.4	Energy Condition and Statefinder Parameter	55
3.5	Conclusion	58
4	Magnetized Bianchi Type-VI_0 Cosmological Model with Variable Deceleration Parameter in Sen-Dunn Theory of Gravitation	60
4.1	Introduction	60
4.2	Metric and Field Equation	61
4.3	Solutions of the field equation	63
4.4	Energy Conditions, Statefinder Parameter	68

4.5	Conclusion	70
5	Viscous Bianchi Type-III Cosmological Model with Bilinear Deceleration Parameter in Sen-Dunn Theory of Gravitation	72
5.1	Introduction	72
5.2	Line Element and Field Equations	73
5.3	Solution of the Field Equations	75
5.4	Model's Physical and Geometrical Properties	78
5.5	Conclusion	82
6	Magnetized Bianchi Type-IX Cosmological Model with Bilinear Deceleration Parameter in Sen-Dunn Theory of Gravitation	84
6.1	Introduction	84
6.2	Metric and Field Equation	85
6.3	Solutions of the field equation	87
6.4	Cosmological parameters of the model	89
6.5	Conclusion	92
7	Bianchi Type-III Cosmological Model with Electromagnetic Field in Sen-Dunn Theory of Gravitation	94
7.1	Introduction	94
7.2	Metric and Field Equation	95
7.3	Solution of the Field Equations	96
7.4	Model's Cosmological parameters	98
7.5	Energy condition and Statefinder parameter	101
7.6	Result and Discussion	103
7.7	Conclusion	104
8	Concluding Remarks and Future Aspects	106

Bibliography	110
List of Annexures: List of publications and Seminar paper presented	135