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Physico-Chemical Analysis of Drinking Water Quality in Vicinity of KanigiriMandal Area, Prakasam District, Andhra Pradesh, India.

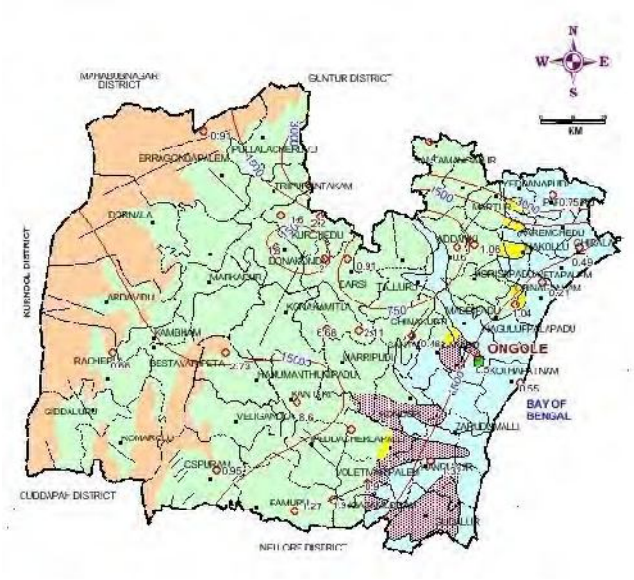
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Abstract: ***The suitability of water quality for drinking purpose in the kanigiriMandal area was assessed by measuring physicochemical parameters, including major cation and anion compositions, pH, total dissolved solid, electrical conductivity, and total hardness. The nitrate concentration ranged between 6 to 45 mg/liter. The chloride concentration range of 125-195mg/liter, where the fluoride concentration ranges from 1.60 to 8.60 mg/liter. The Values obtained for different parameters, are compared with the standard values given by WHO/TSE and suitable suggestion were made in the kanigirimandal area. The water investigation was carried out to identify groundwater quality and its suitability for drinking purpose.***
Keywords: Geochemistry, physico-chemical analysis, anions, cations, drinking water quality,

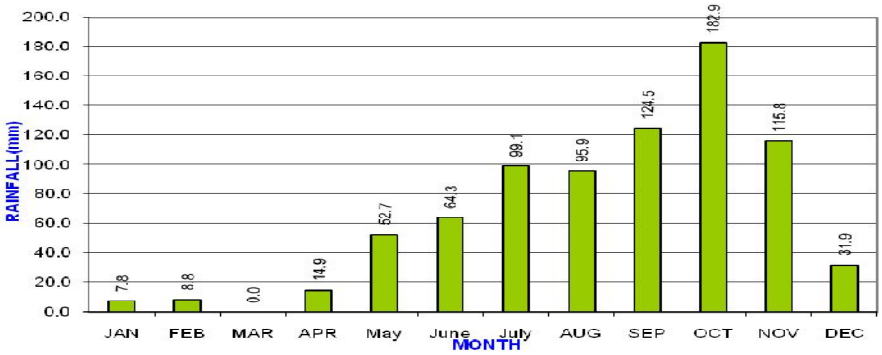
I. INTRODUCTION.

Groundwater is a vital natural resource. Depending on its usage and consumption it can be a renewable or a non renewable resource. It is estimated that approximately one third of the world's population use groundwater for drinking . Groundwater is the major source of water supply for domestic purposes in urban as well as rural parts of India. The WHO has clearly stated that the quality of drinking water is a powerful environmental determinant of health. Drinking-water quality management has been a key pillar in the prevention and control of waterborne diseases. Water is essential for life, but it can and does transmit disease in all countries of the world from the poorest to the wealthiest. Safe drinking water therefore is a basic need and hence, an internationally accepted human right, and reducing the number of people without access to sustainable safe drinking water supply has been enlisted as one of the ten targets of the millennium development goals. The importance of water quality in human health has also recently attracted a great deal of interest . The evaluation and management of groundwater resources require an understanding of hydro chemical investigation and the same was carried out to identify groundwater geochemistry and its suitability for drinking purpose. The Prakasam district with its headquarters at kanigiri is bounded in the North by Guntur district, in the south by Nellore and Cuddapah districts, in the west by Kurnool district and in the East by Bay of Bengal and lying between north latitudes14°57'00": 16°17'00" and East longitudes 78°43'; 80°25'00" in parts of Survey of India toposheet Nos. 56, 57I, 57M, 57N and 65A and 66N respectively. The geochemistry of the kanigiri vicinity, structural and denudational plateaus on proterozoic rocks with pediment and pediplains occur in the North, South and Central parts of the district. Structured hills, denudational hills and valleys on sedimentary rocks and colluvial terraces are see in the North West, Central and South Western parts of the district. The Dharwarschist, Charnockites and peninsular gneisses occur as linear ridges, residual and structural hills and as shallow to moderately weathered pediplaindepos its. In this present work samples are collected in post and pre monsoon seasons and various parameter are study was carried out to report the data.

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Prakasam District Map



Monthly Mean Rainfall Distribution

II. EXPERIMENTAL SECTION

Polyethylene bottles cleaned with HNO3 were used for sample collection. All bottles were rinsed with deionized water. The samples were collected after 10 min of pumping and stored in polyethylene bottles. The following parameter are studied using different methods.

S.NO	PARAMETER	METHODS USED
1	pH	electrometric method
2	Electrical Conductivity	conductometry
3	Total Dissolved Solids	Titration
4	Total Hardness as caco3	Titration
5	Calcium Hardness as caco3-mg/l	EDTA Method
6	Magnesium Hardness as caco3-mg/l	EDTA Method
7	Nitrate	
8	Na+	Flame Photometry
9	K+	Flame Photometry
10	Fluoride	Ion selective eletrode
11	sulphate	ultraviolet absorption
12	Chloridre	Argentometric titration

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III. RESULTS AND DISCUSSIONS.

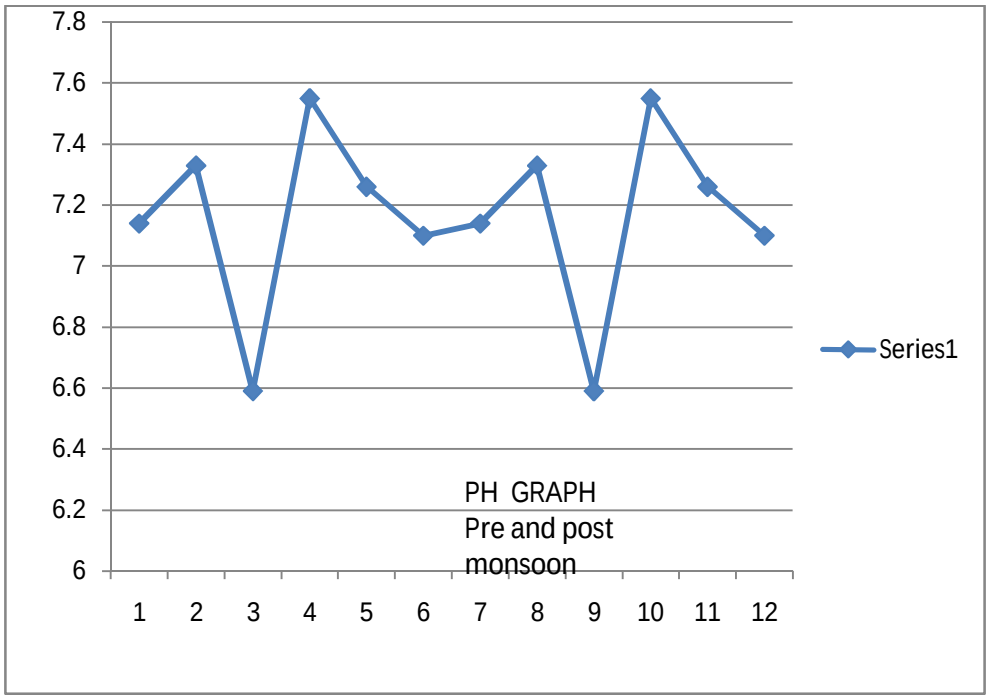
Pre monsoon Sample analysis data expressed in ppm

S.NO	VILLAGE NAME	PH	EC	TDS	TH	F	Ca	Mg	Na	K	Cl^-	NO_3^-	SO_4^{2-}
1	Kanigiri	7.14	681	465	416	1.60	244	172	92	5	173	14	48
2	HM PADU	7.33	850	432	477	2.2	264	192	97	6	194	19	56
3	Krishna Puram	6.59	614	480	352	2.4	213	199	111	5	125	37	114
4	Vangapadu	7.55	785	401	488	3.12	264	224	174	4	184	12	126
5	Baduguleru,	7.26	698	513	398	2.84	211	198	102	5	112	12	95
6	GanugaPenta	7.1	966	412	465	5.4	221	201	88	7	190	29	111

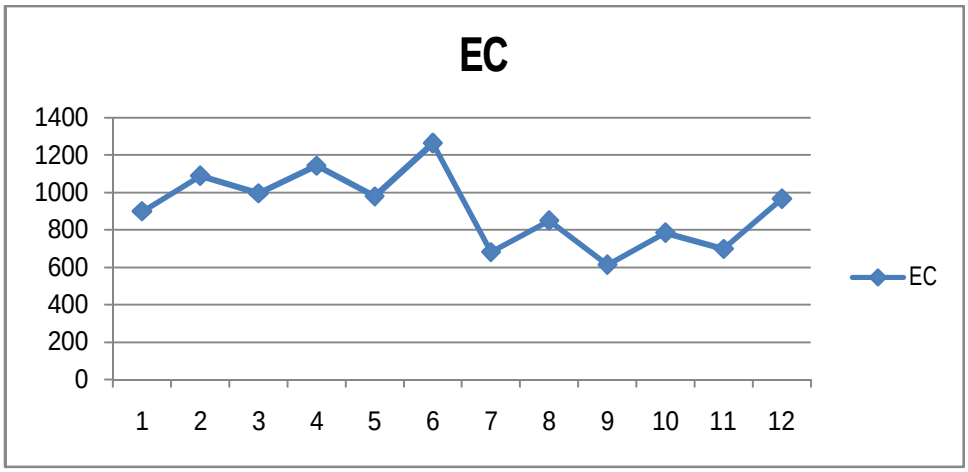
Post monsoon Sample analysis data expressed in ppm

S.NO	VILLAGE NAME	PH	EC	TDS	TH	F	Ca	Mg	Na	K	Cl^-	NO_3^-	SO_4^{2-}
1	Kanigiri	7.14	899	549	416	2.96	221	201	173	4	183	14	52
2	HM PADU	7.33	1089	401	477	3.12	183	201	120	3	194	32	56
3	Krishna Puram	6.59	995	513	352	3.82	245	223	98	4	198	45	144
4	Vangapadu	7.55	1142	412	488	4.12	196	198	89	6	112	27	102
5	Baduguleru,	7.26	978	501	398	2.96	163	206	97	4	156	25	119
6	GanugaPenta	7.1	1263	463	465	7.02	196	203	88	5	195	29	111

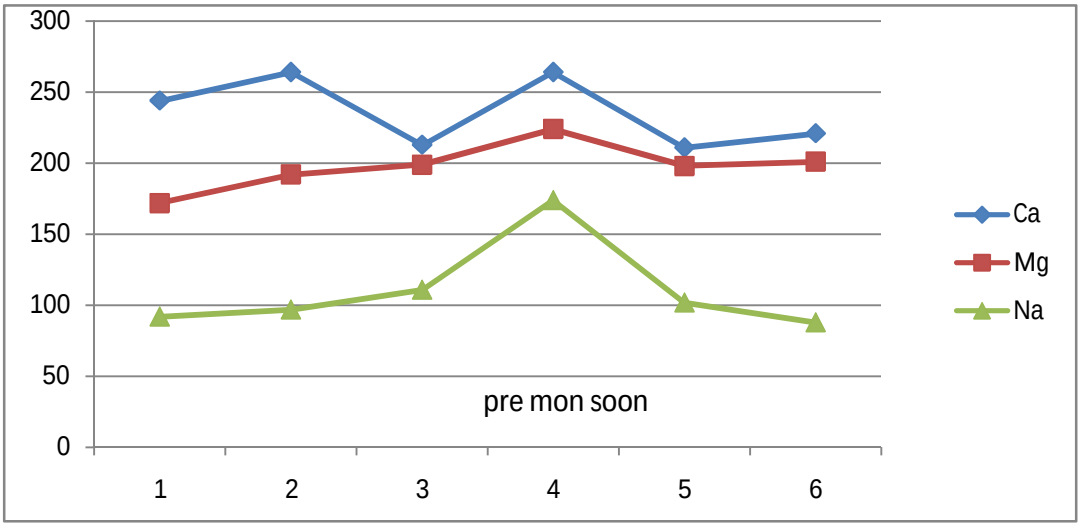
P^H Graph.



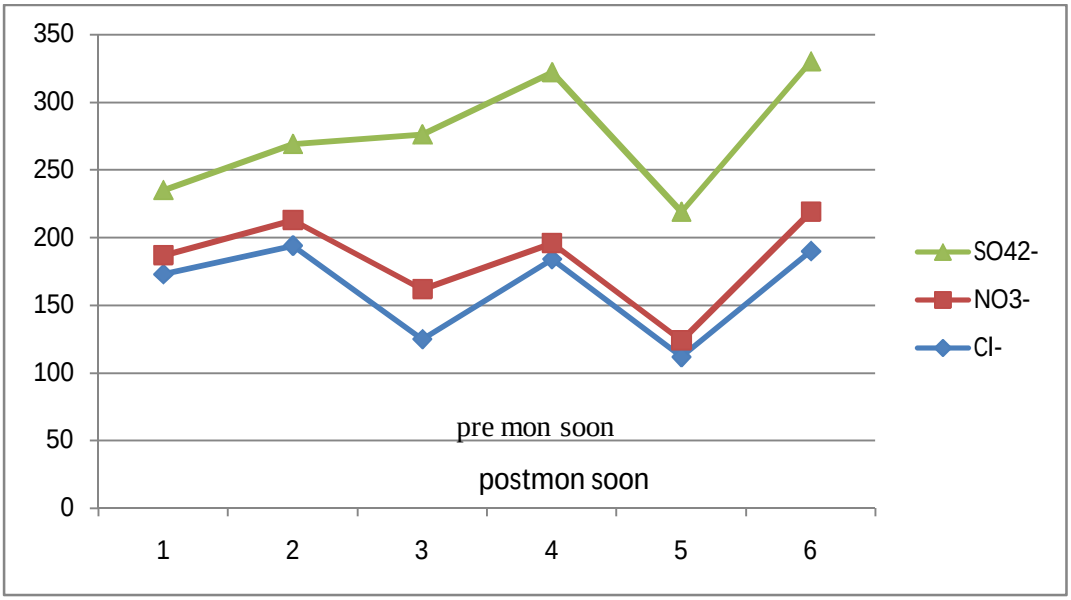
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cation ions graph

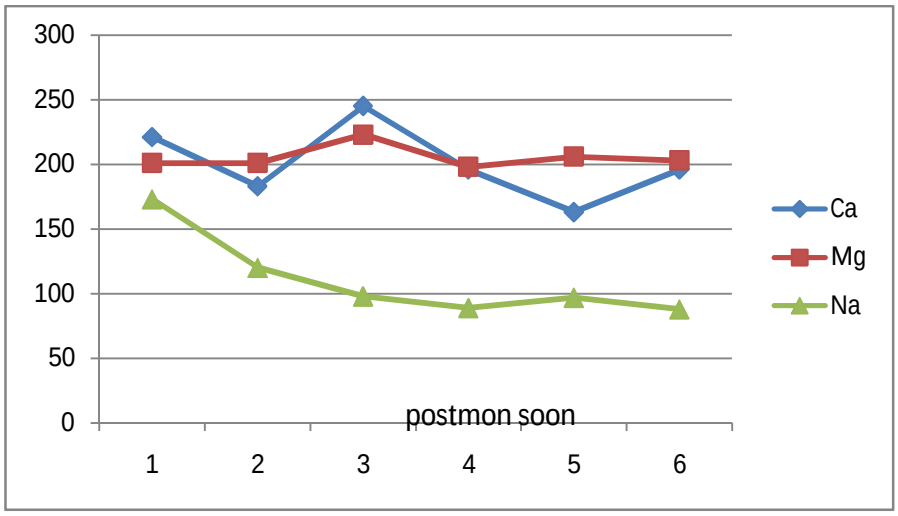


Anions graph

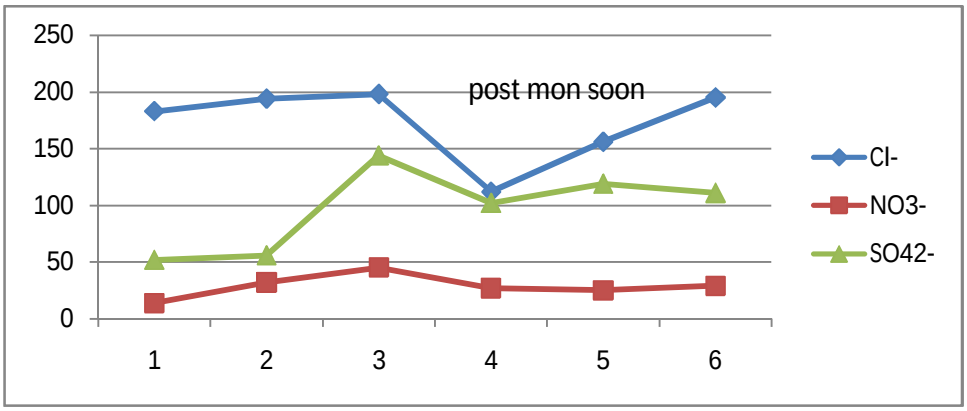


cation ions graph

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Anions graph



IV. CONCLUSION

From the Ground Water Survey the following conclusions are drawn. The pH values of some villages o fkanigiri Mandal. The sample analysis shows acidic range to basic range waters hence use of these waters must be taken with care i.e, they cannot use this water for drinking purpose. High concentrations of chlorides above the permissible limits of 250 mg/L in water very salty and domestic use of these waters is unpleasant .The extreme high Total Alkalinity in the panchayats is almost very high and more than the permissible limits. these Leeds scale formation in the cooking vessels and white precipitate formation in the buckets. The total hardness above the permissible limits given by WHO i.e., 500mg/L. Phosphates concentration was more than the permissible limits given by BIS . the presence of Fluorides permissible limits given by WHO more then in all these 8panchayats.The nitrates are also within permissible limits. Water is the mirror of life and water is essential for drinking purpose. Water and life are inseparable. So protected water supply is very essential for population. In panchayats, municipal water supply i.e., potable water must be supplied total the population to protect their health. There is municipal water supply in Kanigirimandal, it is not sufficient to the inhabitants .Hence use of bore well waters for washing, cooking, bathing etc is inevitable. From the survey it is clear that even the municipal water is having high chloride, alkalinity, total hardness, total dissolved salts and phosphates.

A. Remedial Measures.

1) Purification of water used for drinking
2) Supply of potable water to panchayats
3) To educate the people to boil water, filter and then use them so that the chlorides, alkalinity and hardness may beremoved to some extent.
4) To educate to use toilets in every home.
5) Slogan – Potable water protects the health of consumers.

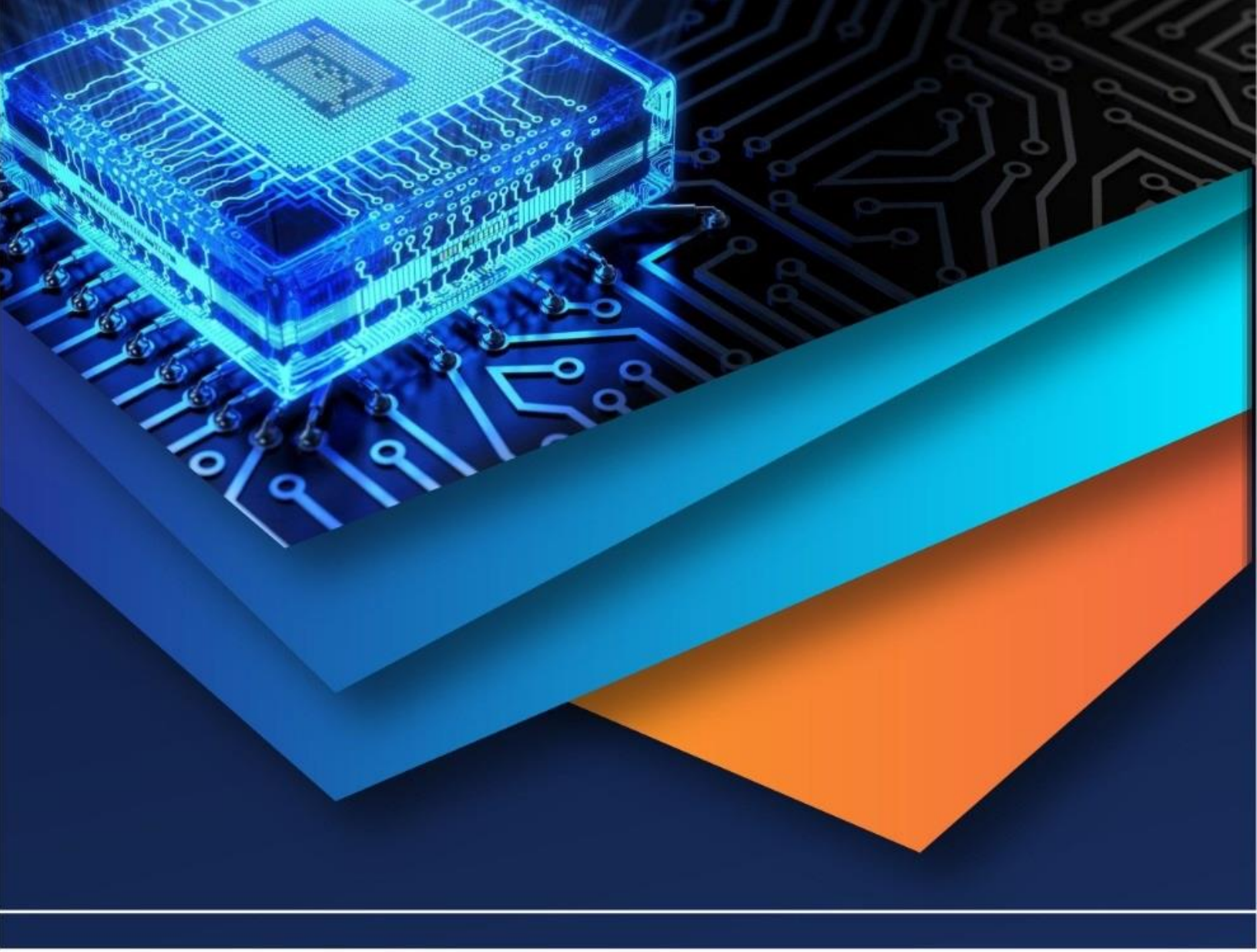
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6) To conduct environment awareness camps at schools.
7) To educate to keep clean environment
8) To encourage to use natural fertilizers.

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