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భావవీణ

కళలు, సాహిత్య సాంస్కృతిక భాషాధ్యయన పత్రిక

ज्ञान-विज्ञान विमुक्तये
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VISCOMETRIC STUDY ON BINARY LIQUID MIXTURES OF PROPIOPHENONE WITH ANILINE AND N-ALKYL SUBSTITUTED ANILINES, AT 303.15 TO 318.15 K

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ABSTRACT

Densities and viscosities of binary mixtures of Propiophenone with Aniline, N-methylaniline, N, N- dimethylaniline, N, N- diethylaniline were measured over the entire composition range at T = (303.15 to 318.15) K (with 5K interval) and atmospheric pressure. Experimental data were used to calculate the deviation of viscosity Δη, excess Gibb's free energy G*E activation of viscous flow for each binary system, and these excess thermodynamic properties were fitted to the Redlich-Kister polynomial equation to obtain the fitting coefficients and standard deviations. McAllister's three-body /four-body interaction models were used for the correlation of viscosity data. The studied systems exhibit good intermolecular interactions due to hydrogen ion transfer and charge dispersion in the carbonyl group and NH2 groups of Aniline and Alkyl Substituted Anilines. Experimental results are useful in various pharmaceutical industries.

Keywords: Viscosity, Deviation in Viscosity, McAllister's Models, Viscosity Relations.

RASĀYAN *J. Chem.*, Vol. 15, No.1, 2022

INTRODUCTION

Viscosity properties of the binary liquid mixtures are important for fluid transport, chemical industries, pharmaceutical processes, and food products. Excess thermodynamic properties of the binary liquid mixtures of Propiophenone with Aniline, N-Methylaniline, N, N- Dimethyl aniline and N, N-Diethyl aniline were calculated based on the values of densities, ρ, and viscosities, η, over the entire composition range at T = (303.15 to 318.15) K. Propiophenone is used as an intermediate in the industrial processes.[1] Aromatic anilines and substituted alkyl anilines are also useful in making dyes. Literature survey reveals some studies on Aniline with other compounds.[2–7] Hence, no studies were made on the current binary mixtures. Measured values of density and viscosity data were used to calculate Δη, one interaction parameters of d12, G*E, Wvis/RT, H12, and T12, (Grunberg and Nissan, Gibb's free energy, Katti and Chaudhary, Hind et.al., and Tamara-Kurata respectively) for the studied binary liquid mixtures. McAllister's three and four body, Auslander and Jouyban-Acree relations for two and three adjustable interaction parameter equations were used to correlate and to understand the intermolecular interactions. Experimental viscosity data was compared with the calculated values of having no adjustable parameter relations such as Bingham, Arrhenius, Kendall and Monroe, and Kendall. The values of Δη and G*E of binary mixtures were fitted to the Redlich Kister polynomial equation to estimate the coefficients and standard deviations between the experimental and theoretical values.

EXPERIMENTAL

The purities of the selected solvents are as shown in Table-1 and they are purchased from S.D. Fine chemicals Ltd, India.

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Assay of Tiagabine.Hcl (Tia) Using Chromogenic Reagents by Spectrophotometric Methods

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Submitted: 05-04-2022 Revised: 14-04-2022 Accepted: 17-04-2022

ABSTRACT
Simple, accurate and reproducible UV-Visible spectrophotometric methods were established for the assay of TIA based on the redox reaction and internal salt formation. Redox reaction of the TIA with NBS/CB.reagent is proposed in method A. Method B includes internal salt formation of the TIA with Citric acid/ Acetic anhyddride reagent .The optical characteristics such as Beers law limits, molar absorptivity and Sandell's sensitivity for the methods (A-B) are given. Regression analysis using the method of least squares was made to evaluate the slope(b), intercept(a) and correlation coefficient (r) and standard error of estimation (Se) for each system. Determination of TIA in bulk form and in pharmaceutical formulations were also incorporated

KEY WORDS : Redox, Tiagabin, Complex formation , Anticonvulsant

I. INTRODUCTION:

Tiagabine.HCl (TIA) [1-3], is an anticonvulsant drug used to help control some types of seizures in the treatment of epilepsy. This medicine cannot cure epilepsy and will only work to control seizures for as long as you continue this drug. Its official status has been presented in Table 1.The characteristics, therapeutic importance, chemical names, structure, analytically useful functional groups and commercially available formulations of TIA are presented in (Tables 1& 2).

A very few physico-chemical methods appeared in the literature for the determination of TIA in pharmaceutical formulations LC-MS[4,5]and HPLC[6,7]. As the analytically important functional groups of TIA were not fully exploited, there is a scope to develop sensitive and flexible suitable spectrophotometric and HPLC methods. Based on the above feature the author had attempted to develop new UV-Visible Spectrophotometric and HPLC methods for its determination in bulk and pharmaceutical formulations.

The methods developed by the author are based on the different chemical reactions (reactivity of functional groups) of TIA with various dyes and chromgenic reagents that produced colored species with reasonable stability paving the possibility for visible spectrophotometric determination of TIA in its bulk form and in pharmaceutical formulations. A reported spectroscopic method was chosen as reference method for compa ring the accuracy of the results obtained by the proposed methods.

SPECTROPHOTOMETRIC METHODS FOR THE ASSAY OF TIAGABINE HCl USING CHROMOGENIC REAGENTS

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Abstract: **Simple, accurate and reproducible UV-Visible spectrophotometric methods were established for the assay of Tiagabine HCl (TIA) based on the redox and complex reactions. Redox reaction of the TIA with NBS/PMAP-SA is proposed in method A. Method B includes complex formation of TIA with SNP-HA. The optical characteristics such as Beers law limits, molar absorptivity and Sandell's sensitivity for the methods (A-B) are given. Regression analysis using the method of least squares was made to evaluate the slope (b), intercept (a) and correlation coefficient (r) and standard error of estimation (Se) for each system. Determination of TIA in bulk form and in pharmaceutical formulations were also incorporated.**

Keywords: Estimation, Tiagabine, Spectrophotometric method, Validation, Chromogenic rearents

I. INTRODUCTION

Tiagabine.HCl (TIA) [1-3], is an anticonvulsant drug used to help control some types of seizures in the treatment of epilepsy. This medicine cannot cure epilepsy and will only work to control seizures for as long as you continue this drug. **A** very few physico-chemical methods appeared in the literature for the determination of TIA in pharmaceutical formulations LC-MS[4,5]and HPLC[6,7]. As the analytically important functional groups of TIA were not fully exploited, there is a scope to develop sensitive and flexible suitable spectrophotometric and HPLC methods. The aim of this study was to develop and validate two UV-Visible spectrophotometric methods for the determination of tiagabine in the presence of formulation The methods developed by the author are based on the different chemical reactions (reactivity of functional groups) of **TIA** with various dyes and chromgenic reagents that produced colored species with reasonable stability paving the possibility for visible spectrophotometric determination of TIA in its bulk form and in pharmaceutical formulations. A reported spectroscopic method was chosen as reference method for comparing the accuracy of the results obtained by the proposed methods.

II. Methods and Materials

Apparatus: An Elico, UV-Visible digital spectrophotometer (SL - 159) with 1cm matched quartz cells were used for the spectral and absorbance measurements. An Elico LI-120 digital pH meter was used for pH measurements.

Reagents and standards:

The stock solution (1mg/mL) of TIA was prepared by dissolving 100mg of it in 100mL with distilled water. This solution was further diluted step wise with distilled water to obtain working standard solution of corresponding concentration 200 μgmL^{-1}[, $\mathbf{M_A}$, $\mathbf{M_B}$]

Method A:

NBS solution: Prepared by dissolving 88mg of N-Bromo succinimide in 100mL of distilled water and standardized iodometrically.

PMAP solution: Prepared by dissolving 300mg of p-N-methylaminophenol sulphate in 100mL of distilled water.

SA solution: Prepared by dissolving 200mg of sulphanilamide in 2.5mL of 0.05M HCI followed by dilution to 100mL with distilled water.

Method B:

SNP solution: Prepared by dissolving 500mg of sodium nitroprusside in 100mL of distilled water.

HA solution: Prepared by dissolving 500mg of hydroxylamine hydrochloride in 100mL of distilled water.

Na_2CO_3 solution: Prepared by dissolving 10gms of sodium carbonate in 100mL of distilled water

Analysis of Pharmaceutical formulation:
Twenty tablets were powdered and mixed thoroughly. An amount equivalent to 20 mg of Tiagabine was weighed accurately and extracted with isopropyl alcohol to eliminate any interference from excipients. It was filtered through Whatmann No. 42 filter paper and the residue was washed well with isopropyl alcohol for complete recovery of the drug. The isopropyl alcohol was evaporated to dryness and the drug was dissolved in doubly distilled water and diluted to 100 mL with doubly distilled water. It was further diluted if needed and then analyzed following the recommended procedures.

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VALIDATED SPECTROPHOTOMETRIC METHOD FOR THE ESTIMATION OF TIAGABINE HCl IN BULK AND FORMULATIONS

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Abstract : Simple, accurate and reproducible UV-Visible spectrophotometric methods were established for the assay of Tiagabine HCl(TIA) based on ion association complex reactions. Ion association complex reaction of the TIA with SFNO and MB is proposed in method 1 and 2. The optical characteristics such as Beers law limits, molar absorptivity and Sandell's sensitivity for the methods (1-2) are given. Regression analysis using the method of least squares was made to evaluate the slope(b), intercept(a) and correlation coefficient (r) and standard error of estimation (Se) for each system. Determination of TIA in bulk form and in pharmaceutical formulations were also incorporated

Keywords - Estimation, Tiagabine, Spectrophotometric method , Validation, Chromogenic rearents.

INTRODUCTION

Tiagabine.HCl (TIA) (K.E.Andersen etal., 1993; C.L.Faingold etal., 1994; Mengel and Helle, 1994) is an anticonvulsant drug used to help control some types of seizures in the treatment of epilepsy. This medicine cannot cure epilepsy and will only work to control seizures for as long as you continue this drug. **A** very few physico-chemical methods appeared in the literature for the determination of TIA in pharmaceutical formulations LC-MS(L.E.Gustavson and S.chu, 1992)and HPLC (Chollet, D.F etal., 1999, Rustum etal., 1998). As the analytically important functional groups of TIA were not fully exploited, there is a scope to develop sensitive and flexible suitable spectrophotometric and HPLC methods. The aim of this study was to develop and validate two UV-Visible spectrophotometric methods for the determination of tiagabine in the presence of formulation The methods developed by the author are based on the different chemical reactions (reactivity of functional groups) of **TIA** with various dyes and chromgenic reagents that produced colored species with reasonable stability paving the possibility for visible spectrophotometric determination of TIA in its bulk form and in pharmaceutical formulations. A reported spectroscopic method was chosen as reference method for comparing the accuracy of the results obtained by the proposed methods.

Methods and Materials

Apparatus: An Elico, UV-Visible digital spectrophotometer (SL - 159) with 1cm matched quartz cells were used for the spectral and absorbance measurements. An Elico LI-120 digital pH meter was used for pH measurements.

Reagents and standards:The stock solution (1mg/mL) of TIA was prepared by dissolving 100mg of it in 100mL with distilled water. This solution was further diluted step wise with distilled water to obtain working standard solution of corresponding concentration 100 μgmL^{-1}[, **M_1 , M_2]**

Method 1& 2: SFNO solution :

Prepared by dissolving 200mg of safranin O in 100mL of distilled water and subsequently washed with chloroform.

MB solution : Prepared by dissolving 200mg of MB in 100mL of distilled water and subsequently washed with chloroform.

Buffer solution (pH 9.8)$NH_4OH - NH_4$ Cl: 7gms of NH_4Cl and 6.8mL of liquid Ammonia solutions were mixed and diluted to 100mL with distilled water and pH was adjusted to 9.8.

Analysis of Pharmaceutical formulation:

Twenty tablets were powdered and mixed thoroughly. An amount equivalent to 20 mg of Tiagabine was weighed accurately and extracted with isopropyl alcohol to eliminate any interference from excipients. It was filtered through Whatmann No. 42 filter paper and the residue was washed well with isopropyl alcohol for complete recovery of the drug. The isopropyl alcohol was evaporated to dryness and the drug was dissolved in doubly distilled water and diluted to 100 mL with doubly distilled water. It was further diluted if needed and then analyzed following the recommended procedures.

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EMPOWERING WOMEN AND STRENGTHENING COMMUNITY HEALTH: A STUDY ON "OSTEOPOROSIS" IN DIFFERENT AGE GROUPS OF PEOPLE IN ELURU, W.G.DT, A.P

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ABSTRACT
Menopause is described as a period of psychological difficulties that changes the lifestyle of women in multiple ways. Menopausal women require more information about their physical and psychosocial needs. Empowerment during the menopause can contribute to improving the perception of this stage and the importance of self-care. The National osteoporosis Foundation says that one in two women and one in eight men over 50 will have an osteoporosis related fracture in their life time. This study can help to understand, recognize about the causes, symptoms, treatment and prevention of Osteoporosis. The aim of this study was to promote women's empowerment for better health outcome of community.

KEYWORDS: Osteoporosis, Menopause, Women Empowerment.

INTRODUCTION
The fundamental right to the highest attainable standard of health including physical, mental and social well being has been recognized in many global, regional and national declarations and charters. There is now substantial evidence that healthy populations are a foundation for sustainable social, economic and environmental development and for peace and security and vice versa.

Osteoporosis is often called the Silent disease, because bone loss occurs without symptoms. People often don't know that they have the disease until a bone breaks, frequently in a minor fall that wouldn't normally cause a fracture. Many people confuse osteoporosis with arthritis and believe they can wait for symptoms such as swelling and joint pain to occur before seeing a doctor. It should be stressed that the mechanisms that cause arthritis are entirely different from those in osteoporosis which usually becomes quite advanced before its symptoms appear. The National osteoporosis Foundation says that one in two women and one in eight men over 50 will have an osteoporosis related fracture in their life time. Thirty-three percent of women over 65 will experience a fracture of the spine and as many as 20% of hip fracture. This is a major health problem for older adults, who comprise an increasingly greater proportion of the general population. Over 10 million adults in the United States are estimated to have osteoporosis and an additional 43 million to have low bone mass.[7] Osteoporosis poses a serious worldwide health economics issue, though secular and temporal trends differ considerably by region.[2]

LITERATURE
"Osteoporosis" meaning "porous bones", is a disease that causes structural deterioration of the bone tissue with no detectable symptoms. It is related to the loss of bone mass that occurs as a part of the natural process of aging. It results in conditions where there is excess bone loss without adequate replacement. It becomes apparent in a dramatic fashion, causing fractures even after a normal activity such as bending or twisting or falling from the standing position. The broken bones, affect the daily life causing disability to do the daily tasks. Women of all ages and men over age 50 suffer from this disease. Millions of women and men are already at risk for osteoporosis. This is a major health problem for older adults, which comprise an increasingly greater proportion of the general population.[6,8]

Pathophysiology of bone loss and fractures
Low bone mass is a major feature of Osteoporosis. An inverse relationship exists between "Bone mass Density"

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RESEARCH ARTCLE

DETERMINANTS OF RURAL NON-FARM EMPLOYMENT IN WEST GODAVARI DISTRICT OF ANDHRA PRADESH

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ABSTRACT

The present paper is an attempt to find out the factors behind the growth of rural non-farm employment and to analyse the determinants of rural non-farm employment in the sample villages of West Godavari District of Andhra Pradesh. A sample of 845 respondents were administered a structured schedule, and the data was collected, quantified, analyzed and interpreted. It is observed from the literature that agricultural development, infrastructure, urbanization, literacy, commercialization of agriculture, public investment, irrigation etc. are the prominent factors behind the growth of rural non-farm employment. The regression result for the total sample reveals the fact that the explanatory variables like level of education of the non-farm workers and size of household are highly significant with positive impact on on-farm employmentwhile age of the respondents is highly significant with negative impact on rural non-farm employment.

Introduction

Poverty, unemployment and underemployment are the prominent problems faced by the rural economy in most of the less developed countries in the world. It is a well-known fact that agriculture or farm sector has always been considered as the core of economic growth of these economies.It occupies a pivotal place in the national economy of these countries both in terms of its contribution to GDP and employment generation and it represents a major source of foreign exchange, supplies the bulk of basic food and provides subsistence and income to the large rural population.But this sector is now unable to provide additional opportunities of gainful employment in the wake of increasing population. In most developing countries like India, the rural labour force is growing rapidly, but employment opportunities are not keeping pace with it. At this juncture the development of various non-farm activities offers great potential for creating additional rural job opportunities and hence for stimulating the further growth of rural economies.The significance of the Rural Non-Farm Sector can hardly be denied when seen in relation with the increasing saturation in growth of agricultural employment and the growing rural-urban divide in a globalizing India.The sector helps in creating "insight

Category III

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"MATHEMATICAL APPLICATIONS IN BIOLOGY"

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ABSTRACT

Nowadays experimental techniques used to investigate biological systems are generating more amounts of data. This is the reason for which researchers are turning to mathematical and computational models to understand and make quantitative predictions of data as to how biological systems will behave in different conditions. The advancement of mathematical modeling, computer equipment, and computational methods has made it possible to describe in detail systems consisting of many billion atoms, while the achievements of molecular biology have helped to acquire large amounts of data from experiments. These prerequisites laid the foundation for new scientific disciplines, such as mathematical biology, bioinformatics etc., which study the structure, operation of living systems and proceeding. The main applied tasks of these disciplines are computer-aided design of medications, nanobioelectronics, and analysis of individual genetic information. Heavy metals with its high metallic weight and density are accumulated depending on the period of exposure causing notable changes in physiology and anatomy. Jointly with toxicology, human genome mass sequencing and mathematical biology form the basis for the national development.

KEYWORDS: Mathematical biology, Computational methods, Bioaccumulation, Statistics Toxicology.

INTRODUCTION

What is biomaths or bio-math·e·mat·ics?. The definition biomathematics is the application of math to the field of biology or using mathematical principles and applications to understand biology better. Mathematical biology aims at the mathematical representation and modeling of biological processes, using techniques and tools of applied mathematics. Mathematical and Theoretical biology is a branch f biology which employs theoretical analysis, mathematical models and abstractions of the living organisms to investigate the principles that govern the structure, development and behavior of the systems, as opposed to experimental biology which deals with the facts on experimental basis. Mathematical biology is a broad topic that can cover a large range of length scales, from the submicron lengths of DNA polymers to the kilometer length scales of migration patterns of animal herds. Where Math is used: Biologists use math as they plot graphs to help them understand equations, run small "trial and error" tests with some sample numbers, developing algorithms, and use the R project (Reverse phase analysis) for analyzing protein sequences and structures Yates .A, et al. (2004) Is there math in Biology? One key role of math in biology is the creation of mathematical models. These are equations, formulas, graphs, models, tables, methods that can predict or describe natural occurrences, such as organism behavior, patterns, population changes or bioaccumulation over time. The Malthusian growth model is the grand daddy of all population

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Alternative Sources of Engine Fuel-Bio Diesel With Reference To Vegetable Oils

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Abstract: *Vegetable oil can be used as an alternative fuel in diesel engines and in heating oil burners. When vegetable oil is used directly as a fuel, it is referred to as straight vegetable oil (SVO) or pure plant oil (PPO). Conventional diesel engines can be modified to help ensure that the viscosity of the vegetable oil is low enough to allow proper atomization of the fuel. This prevents incomplete combustion, which would damage the engine by causing a build-up of carbon. Straight vegetable oil can also be blended with conventional diesel or processed into biodiesel or bio liquids for use under a wider range of conditions.Transportation industry is part and parcel of every nations economic growth. Motor fuel or diesel is the main ingredient which decides the transportation cost. Small Arab countries are able resources. Petroleum is a liquid gold for any country. But it is a non-renewable source, which takes hundred years to be replenished. Nation's like India do not have enough petroleum resources and have to spend a major part of its foreign exchange to import oil. The position is same for many other developing countries also. So search for renewable motor fuels gained importance.*

Keywords: *Preparation, Methods to reduce viscosity, Benefits, Physical properties.*

I. Introduction

Research for alternative renewable motor fuels like Bio-diesel started in scientific community way back in 1895. Doctor Rodolf diesel engine to run on vegetable oil (peanut oil). In 1911 he stated that "The diesel engine can be fed with vegetable oils and would help considerably in the development of agriculture of the countries which use it." This statement is very much true and apt in case of India whose economy is dependent mainly on agriculture. Preparation of Bio-diesel is a simple process. It can be produced in backyard of the house itself using cooked vegetable oil with some safety measures. The following are some of the methods of preparation of Bio-diesel. Vegetable oils are chosen for chosen for production of Bio-diesel because of their better lubricity, but its viscosity is higher than petrol-diesel. Hence following methods are adopted to reduce its viscosity.

Method 1: Esters of vegetable oils formed by trans-esterification process of vegetable oil with alcohol in the presence of a catalyst gives Bio-diesel. The vegetable oil may be fresh or used vegetable oil (WVO). The other processes are pyrolysis, micro-emulsion, and blending and thermal, polymerization. These processes decrease the high viscosity of vegetable oil to be used as diesel fuels. The viscosity of the Bio-diesel now matches the European standard EN 14214, American ASTM standards.

Method 2: SVO or straight vegetable oil can also be used as diesel fuel. SVO can be used in vehicles by fitting two fuel tanks, the first containing petro-based diesel and the second, vegetable oil. The engine starts on petro-oil and runs for a short time while the vegetable oil in the second tank is warmed up by hot fluid form the engines cooling system. When oil reaches a specific temperature, the engine switches from petro-oil to vegetable oil.

Method 3: In another system, there will be only one fuel tank and the vegetable oil is heated up to appropriate temperature by an electric coil so that its viscosity decreases before it enters the high pressure pump.

Method 4: In this method blends of bio-diesel and petro-diesel or SVO & petro-diesel in proportions of B-20, B-30 etc are used in the fuel tanks. It facilitates improvement in performance of the engine, enhanced lubricity and reduction in toxic emissions.

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RESEARCH ARTCLE

IMPACT OF RURAL NON-FARM EMPLOYMENT AND FACTORS BEHIND THE GROWTH OF RURAL NON-FARM EMPLOYMENT-EVIDENCE FROM THE HOUSEHOLD SURVEY IN WEST GODAVARI DISTRICT OF ANDHRA PRADESH

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Abstract

The present paper is an attempt to study the impact of rural non-farm employment on the standard of living of the sample rural non-farm workers from eight villages of West Godavari district. It also attempts to find out the factors behind the growth of non-farm employment in the study villages. A sample of 845 respondents were administered a structured schedule, and the data was collected, quantified, analyzed and interpreted. The study reveals the fact that level of income, expenditure and standard of living of rural non-farm workers increased after entering into non-farm employment as the non-farm sector is capable of providing gainful employment and regular income. The study also signifies that the growth of rural non-farm employment in the district is mainly distress oriented or push effect

Introduction:

It is a universally accepted fact that agricultural sector is by itself, incapable of creating additional opportunities of gainful employment in the wake of increasing population. In most developing countries like India, the rural labour force is growing rapidly, but employment opportunities are not keeping pace with it. Rural non-farm sector (RNFS) is being given wide recognition in recent years as an instrument for alleviating rural poverty and providing gainful employment to the growing rural workforce. The significance of the Rural Non-Farm Sector can hardly be denied when seen in relation with the increasing saturation in growth of agricultural employment and the growing rural-urban divide in a globalizing India. The sector helps in creating "insight jobs" associated with higher wages, which can also create opportunities especially for women and can act as the vehicle for reduction of gender gaps in the rural India.(M.Jatav and S,Sen, 2013).

Definition of Rural Non-Farm Activities:

It is very difficult to identify non-farm activities in rural areas due to variations in definitions. The World Bank (1978) in its publication also mentioned the difficulties in presenting a clear cut classification of farm and non-farm activities due to lack of well-established and consistent set of definitions. Several research scholars have defined the non-farm sector from different point of views.

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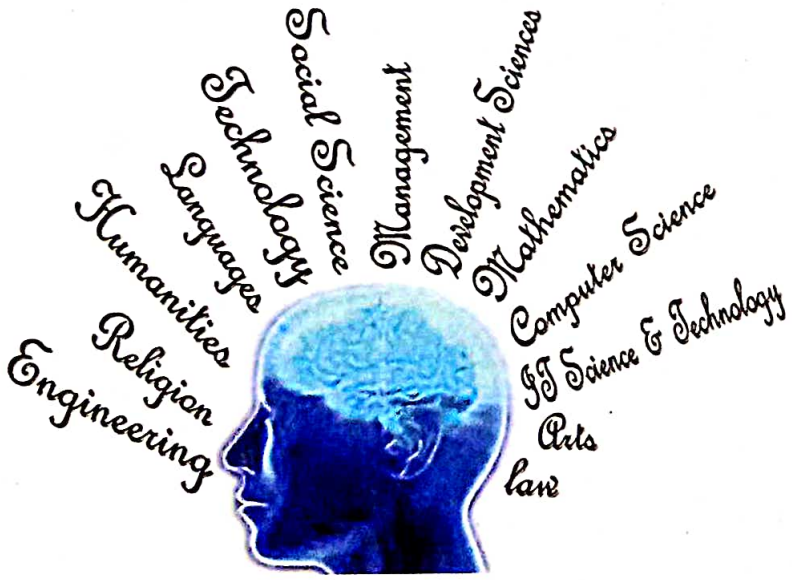

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