Khoj

An Interdisciplinary Journal of Research

|| आ नो भद्राः क्रतवो यन्तु विश्वतः ||

VIVEKANANDA GLOBAL UNIVERSITY, JAIPUR

Vivekananda Group of Institutions

Arise   Awake   Achieve

Education is the manifestation of the perfection already in man". These are the words of the great philosopher and educator Swami Vivekananda. The contributions of the great people who devoted their life for the cause of education and youth have always inspired the promoters and, therefore, following the preaching of Swami Vivekananda, the promoters established VIT Campus, comprising of Vivekananda Institute of Technology and Vivekananda Institute of Technology (East), in 2008, to usher in technology revolution by using modern management techniques and harnessing potential of India. Another feather in the crown of Vivekananda Group of Institutions is Vivekananda Global University, established in the year 2012. Vivekananda Global University, Jaipur has been formed keeping in mind his teaching and mentoring ideals. The overall development of the techno-managers with a seeking spirit towards education is VGU's vision for its students. It Promises to develop as an institution with a commitment to excellence in education, research and consultancy and promote human advancement. Swami Vivekananda advocated the concept of 'total development' which includes physical, mental and spiritual. He also advocated incorporation of science and technology in curricula and laid emphasis on technical education that will develop industries. Our core values are inspired by Swami Vivekananda philosophy, and our institution is founded on his thoughts and ideas. To meet these ends, Vivekananda Global University encourage development of student's physical, mental, emotional, secular and spiritual faculties.

If you think that you are bound, yor remain bound; you make your own bondage. If you know that you are free, you are free this moment. This is knowledge, knowledge of freedom. Freedom is the goal of all nature.

Swami Vivekananda

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AIMS & SCOPE

The aim of "Khoj - An Interdisciplinary Journal of Research" is to promote research activities through papers and articles publication in developing streams of Science and Technology. It aims at cooperation and growth of various organizations in the field of research and development. The Journal invites original manuscripts, review articles, and short communications in any aspect of engineering, applied sciences as well as management stream, that are not published or accepted for publication elsewhere. The Editor in Chief, in consultation with the editorial committee, reserves the right to accept or reject any manuscript or discussion.

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Synthesis & Characterization of Layered ZnTe Thin films

Sarita Boolchandani[1], Swati Arora[2], Subodh Srivastav[3], Y.C. Sharma[1], Y.K.Vijay[3]
[1] Vivekananda Institute of Technology-East Jaipur
[2] Swami Keshvananda Institute of Technology, Jaipur
[3] Vivekananda Global University Jaipur

Abstract
In this work, results on the preparation and characterization of ZnTe thin films obtained by the vacuum evaporation technique are presented. The layers as-grown and annealed for different temperatures were characterized by X-ray energy dispersive analysis, Scanning Electron Microscopy (SEM) and photo absorbance studies. Optical measurements were done on these samples which gave a clear band edge near 2.1 eV which is quite close to the accepted room temperature value of 2.25 eV for ZnTe. SEM micrographs clearly indicate cluster growth at the surface of thin film of $Zn_{50}:Te_{50}$ composition. However no prominent cluster growth has been observed at other stoichiometric ratios.

Keywords: ZnTe Thin films, I-V characteristics, Surface Morphology, optical band gap

Introduction

ZnTe is the most attractive material of II-VI semiconducting materials because of its potential application in variety of devices such as LEDs, photodetectors and various optoelectronic and microelectronic devices [1-5]. ZnTe thin films are extensively studied for electrical, optical & structural properties because of above applications. Many researches have been done on the structural, optical and electrical properties of ZnTe thin films [6-8], hence, in this paper we have carried out systematic investigations on structural, optical and electrical properties of thermally evaporated ZnTe thin films.

Experimental

A. Substrate Cleaning

The most important part of experiment is the substrate cleanliness. The cleaning procedure includes complete drying the substrate after final washing so that no chemical reaction occurs that would change the property of thin films for their long term stability. The most widely used substrates for thin films are glass, fused silicon and ceramics.

B. Thin Film preparation

ZnTe thin films of different thicknesses were deposited on properly cleaned glass substrates using a vacuum coating unit (fig. 1) at vacuum of 10^{-5} torr. High purity Zn (99.99%) **granules**, Te (99.99%) metal powder were taken in the stoichiometric proportion for the preparation of Zn_xTe_{1-x} where x= 0.5, 0.2 and 0.8. Each material of Zn_xTe_{1-x} was weighed by an electronic balance which has a resolution of ±0.0001 g,

according to percentage of composition to be used. Prior to deposition of the thin films, high purity aluminum electrodes were vacuum evaporated on the properly cleaned glass substrates on which the films were then deposited.
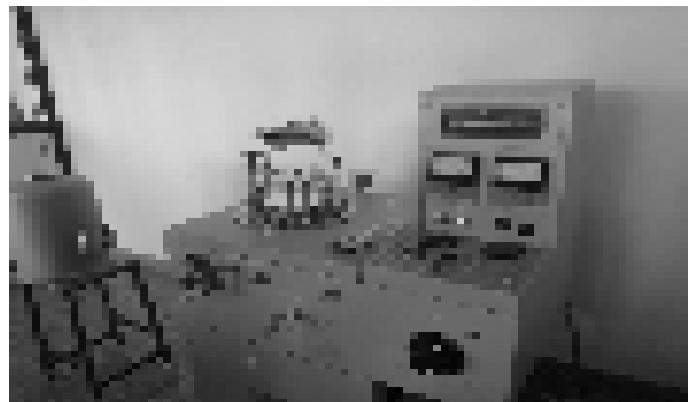
Fig 1: Vacuum Coating Unit

The material to be coated is placed in a tungsten boat. After reaching the high vacuum (10^{-5} mbar) in the chamber, the material is heated indirectly by passing the current slowly to the electrodes. All the films were prepared at room temperature. The rate of evaporation and thickness of the as-deposited films were measured using quartz crystal monitor fixed to the unit. Initially deposited Zn layer then Te layers was deposited with varying composition with x= 0.5, 0.2 and 0.8 respectively to obtain as-grown ZnTe stacked layers shown in fig. 2 for $Zn_{50} Te_{50}$.

Fig 2: Layer sketch of ZnTe

Measurements

Thickness of the films was measured through quartz crystal monitor (**"Hind Hivac" Digital Thickness Monitor Model–DTM–101**). I-V characteristics of as-grown samples have been recorded using four probe method. All the measurements have been performed at room temperature.

Results & Discussion

Surface Morphology

SEM micrographs shown clearly indicate cluster growth at the surface of thin film of $Zn_{50}:Te_{50}$ composition in Fig. 3(a) annealed at 373K. The figures 3(b) and 3(c) shows that the cluster grown becomes uniform with increase in annealing temperature. However no prominent cluster growth has been observed at other stoichiometric ratios.
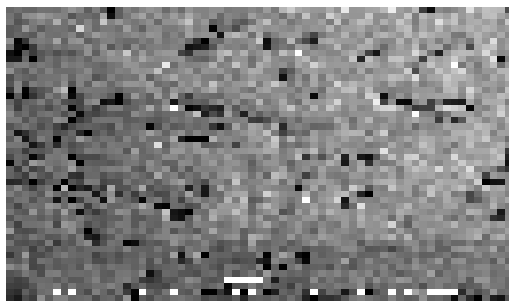
(a) At 373 K
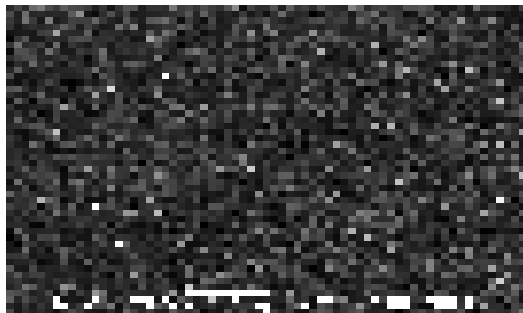
(b) At 423 K
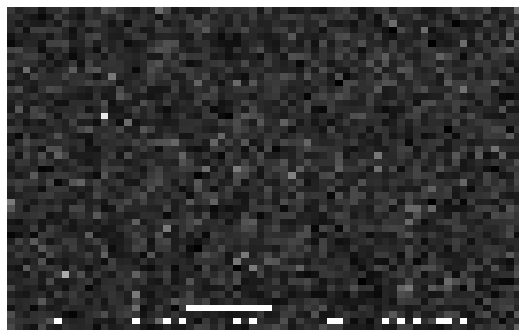
(c) At 573 K

Fig 3: SEM of $Zn_{50}Te_{50}$ at different temperatures

Optical Properties

Absorbance spectra of $Zn_{50}Te_{50}$ thin films has been taken at different temperatures with the help of Systronics spectra photometer model number 117. Energy band gaps of the films were calculated with the help of absorbance spectra, using Tauc (1974) relation $h\cdot = A (h\cdot - E_g)^n$, where $h\cdot$ is photon energy, the absorption coefficient, Eg the band gap, A the constant is 0.5 for direct band gap material and n is 2 for indirect band gap material so, in the present work, we have taken $n = 2$ for calculation. Figure 4 shows spectral variation for ZnTe thin films deposited on the glass substrate extrapolating the lines gives the values of optical gap. It is observer that annealing decreases the band gap which confirms the mixing of Zn and Te to form ZnTe film. The band gap obtained for annealing temperature 573K is very close to reported values.
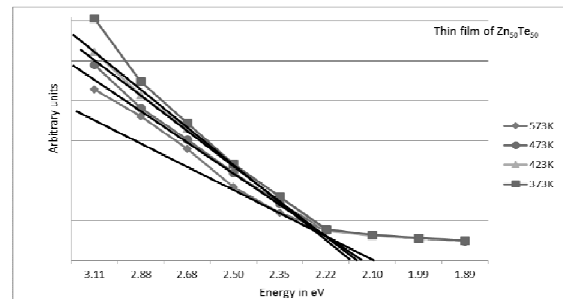
Fig 4: Spectral variation for ZnTe thin films

Energy Dispersive X-ray Analysis (EDAX) graphs of ZnTe

The EDAX values (fig. 5) show the signatures of Zn, Te and other materials present in the glass substrate on which the films are grown. The photographs shown represent thin films of various stoichiometric ratios without annealing.
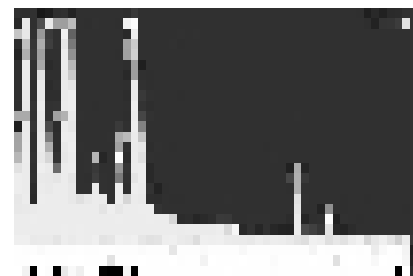
(a) Zn (50) :Te (50)

(b) Zn (20) :Te (80)
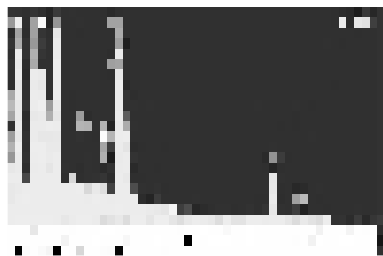
(c) Zn (80): Te (20)

Fig 5:Energy Dispersive X-ray Analysis graphs of ZnTe

Conclusion
From the above results it can be concluded that ZnTe for x= 0.1 & 0.2 thin films could be prepared using thermal evaporation method. EDAX of the ZnxTe1-x thin film reveal mix phase of ZnTe Optical band gap was calculated as 2.1 ev from the absorption data which is quite close to the accepted room temperature value of 2.25 eV for ZnTe.

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Concurrent Engineering and Its Importance in Manufacturing Sector

B. K. Sharma[1], Pawan Sharma[2]
[1,2]**Department of Mechanical Engineering**
Vivekananda Institute of Technology (East), Jaipur

Abstract

Today, business has become an important part our society. Every wants to to open a manufacturing unit or an Entrepreneur to have more amount of money in their hand as compared to the person getting money from job. But doing a business is not an easy task, as we are not the only person in the market. There is lot of competitors in the market and everybody is trying their level best to win the race. There are also various other constraints in the way of a successful entrepreneur. So, in order to overcome difficulties and to increase the productivity and improve the efficiency1. of a firm, a new technology has emerged i.e., Concurrent Engineering and its demand is increasing in an exponential manner. So the focus of this project is to understand the concept of concurrent engineering and its applications in the manufacturing sector.

Keywords: Concurrent Engineering, Traditional Engineering, New Product Development

Introduction

Concurrent Engineering (CE) is widely used as a common term for new approaches towards engineering. CE is difficult to understand in theory without actually "doing". Aspects of CE implementation strategies have been documented: the what, why, benefits and pitfalls but what is missing is the "how". This is even true of the success stories which omit details of the mechanics of Implementation [1].Engineering systems are increasing in scale, scope, versatility, competitiveness, and complexity. Consequently, an interdisciplinary approach is required that appropriately reacts to increasingly complex• situations concerning not only technological, but also factors external to the project (e.g., socio-economic and environmental factors). Similarly, decisions and processes made within a product development environment have important implications not just to customers and competitors but also for the macroeconomic environment. Concurrent engineering (CE) is an• engineering management philosophy and a set of operating principles that guide a product development process through an accelerated successful completion.

Literature Review

Concurrent Engineering has set a new trend in the market to achieve the goals in a faster way. Concurrent Engineering (CE) has a great deal of importance in design and development of new products in automobile industry and is posing a big challenge to Indian firms in the wake of globalization. Success of CE demands that major areas of product design and development of an organization need to be under constant focus [2]. Concurrent Engineering has wide variety of applications like it is used in the development of Knowledge Management architecture and tool [3]. Today internet is playing an important role in joining people from different departments of an industry and thus we can rectify the defects easily without loss of energy and capital. So, CE has emerged as blessing from the God for the manufacturing sector.

What does Concurrent Engineering Really Mean?

Concurrent Engineering is a strategy where all the tasks involved in product development are done in parallel. It is used to minimize the product development timescales by maximizing the degree of overlap of design activities. Concurrent engineering is a dynamic approach to integrated product development that emphasis on the response to customer expectations. It embodies team values of cooperation, trust and sharing, in such a manner that decisions making is by consensus, involving all perspectives in parallel, from the beginning of the product lifecycle.

It can also be defined as :

"Concurrent engineering is a structured and controlled way of managing product or service development with respect to integrating resources and calendar time, sharing common goals and accurate information throughout".

3.1 Traditional Engineering

Now, the basic question arises what is traditional engg. And how does it differ from CE.

Traditional or Sequential Engineering is the process of marketing, engineering design, manufacturing, testing and production where each stage of the development process is carried out separately, and the next stage cannot start until the previous stage is finished. Therefore, the information flow is only in one direction.

This is also known as over the wall engineering as each stage blindly throws the development to the next stage over the wall.

Fig.1. Traditional Engineering Process

Fig.2. Concurrent Engineering Process

New Product Development

Product is an important part of an industry where CE technology is implemented, so product and its development is taken into study. In business and engineering, new product development (NPD) is the complete process of bringing a new product to market. A product is a set of benefits offered for exchange and can be tangible (that is, something physical you can touch) or intangible (like a service, experience, or belief). There are two parallel paths involved in the NPD process: one involves the idea generation, product design and detail engineering; the other involves market research and marketing analysis.

4.1. Stages in New Product Development

1. **Idea Generation is often called the "NPD" of the NPD process.**

- Ideas for new products can be obtained from basic research using a SWOT analysis (Strengths, Weaknesses, and Opportunities & Threats). Market and consumer trends, company's R&D department, competitors, focus groups, employees, salespeople, corporate spies, trade shows, or ethnographic discovery methods (searching for user patterns and habits) may also be used to get an insight into new product lines or product features.
- Lots of ideas are generated about the new product. Out of these ideas many are implemented. The ideas are generated in many forms. Many reasons are responsible for generation of an idea.

2. **Idea Screening**

- The object is to eliminate unsound concepts prior to devoting resources to them.
- The screeners should ask several questions:
- Will the customer in the target market benefit from the product?
- What is the size and growth forecasts of the market segment / target market?
- What is the current or expected competitive pressure for the product idea?

3. Concept Development and Testing

- Develop the marketing and engineering details
- Investigate intellectual property issues and search patent databases
- Who is the target market and who is the decision maker in the purchasing process?

- What product features must the product incorporate?
- What benefits will the product provide?

4. Business Analysis

- Estimate likely selling price based upon competition and customer feedback
- Estimate sales volume based upon size of market and such tools as the Fourt-Woodlock equation
- Estimate profitability and break-even point

5. Beta Testing and Market Testing

- Produce a physical prototype or mock-up
- Test the product (and its packaging) in typical usage situations
- Conduct focus group customer interviews or introduce at trade show.

6. Technical Implementation

- New program initiation
- Finalize Quality management system
- Resource estimation
- Requirement publication
- Publish technical communications such as data sheets

7. Commercialization (often considered post-NPD)

- Launch the product
- Produce and place advertisements and other promotions
- Fill the distribution pipeline with product
- Critical path analysis is most useful at this stage

8. New Product Pricing

- Impact of new product on the entire product portfolio
- Value Analysis (internal & external)
- Competition and alternative competitive technologies

1.2. Product Life Cycle (PLCM) and Product Life Cycle Management (PLCM)

Fig.3. Product Life Cycle

Product Life Cycle is the Life cycle of a Product in which a product goes from its initiation to the completion of its services. Product lifecycle management (PLM) is the process of managing the entire lifecycle of a product from its conception, through design and manufacture, to service and disposal [4]. PLM integrates people, data, processes and business systems and provides a product information backbone for companies and their extended enterprise. PLCM is the succession of strategies

used by business management as a product goes through its life-cycle. The condition in which a product is sold (advertising, saturation) changes over time and must be managed as it moves through its succession of stages.

Concurrent Engineering Workflow

Concurrent Engineering is a workflow that instead of working sequentially through stages, carries out a number of tasks in parallel.

Although this does not necessarily reduce the amount of manpower required for a project, as more changes are required due to the incomplete and changing information, it does drastically reduce lead times and thus time to market.

It adopts a problem prevention method as compared to the problem solving and re-designing method of traditional sequential engineering.

5.1. Distributed Concurrent Engineering

Distributed CE functions off the same basic concepts as local concurrent engineering.

It takes a step further by utilizing the abundant availability of broadband internet to connect engineers, managers and users that might be scattered throughout the entire world to create a distinct product.

One of the main reasons for this push is that as products and systems have increased in complexity, expertise is often no longer available in a local setting. For this reason, distributed design has become an important aspect that any design team must take into effect.

Need of Concurrent Engineering

The basic premise for concurrent engineering revolves around two concepts. The first is the idea that all elements of a product's life-cycle, from functionality, productibility, assembly, testability, maintenance issues, environmental impact and finally disposal and recycling, should be taken into careful consideration in the early design phases. The second concept is that the preceding design activities should all be occurring at the same time, or concurrently. The overall goal being that the concurrent nature of these processes significantly increases productivity and product quality, aspects that are obviously important in today's fast-paced market. So CE is needed because of the following reasons:

- Pace of market change has increased.
- Companies must keep pace with changing markets.
- Decisions made sooner rather than later.
- Reduces/eliminates repetition of tasks.
- Reduces waste and reworking of design.
- Product is reaching quicker to market.
- It Maximises company profit.
- Company operates more efficiently as different departments work in coordination to each other.

It refers to an approach used in product development in which functions of design engineering, manufacturing engineering and other functions are integrated to reduce the elapsed time required to bring a new product to the market.
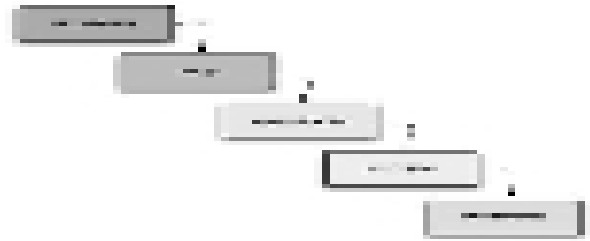
Fig.4. Concurrent Engineering Stages

How it works?

Concurrent Engineering as we know is the parallelization of the tasks. This technology is a great boost to the growth and life of the manufacturing industry. But this technology is implemented only when one knows fully about its working and the whole process of concurrent engineering implementation is shown in fig. given below.
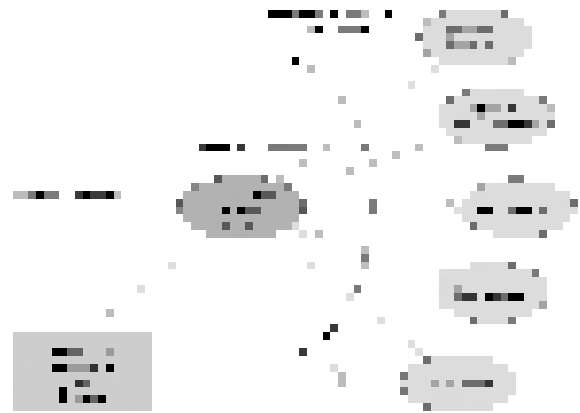
Fig. 5: CE Implementation

Benefits Concurrent Engineering

The following are the benefits of concurrent engineering:

- Reduces time from design concept to market launch by 25% or more.
- Reduces Capital investment by 20% or more.
- Supports total quality from the start of production with earlier opportunities for continuous improvement.
- Simplifies after-sales service.
- Increases product life-cycle profitability throughout the supply system.
- Reduces the fatigue of the workers in an industry.
  - It reduces the idle time of the persons and machines in different department of an industry thus increasing the overall profit of the company.
  - Since Concurrent Engineering is a team work so it leads to the collaboration of the different personalities on a common plate form. It leads to the development of the good working conditions in an industry.

Application of Concurrent Engineering

New tools such as Internet Virtual Reality are used along with the new techniques and it can be used effectively depending on the situation and requirement. With the advancement in Science & Technology different simulators or software's has been developed which provides the environment similar to the environment present in reality. So, Analysis of different works has become very easier as it can be re-conducted again and again without any difficulty. Virtual reality systems can support the training of performance in judging distance traveled on a treadmill, and with the aid of auditory cues, performance in such tasks has been improved [5]. Concurrent Engineering is now-a-days used in almost every field whether it is technical, manufacturing, sports or any other. Its basic application in Virtual Assembly Analysis is shown below:
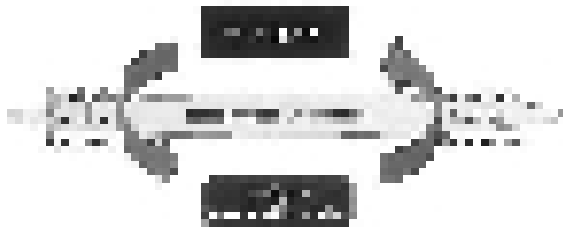
Fig.6. Virtual Assembly Analysis
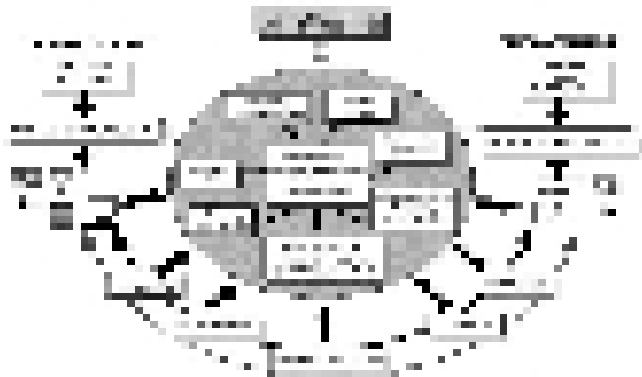
Fig.7. Concurrent Engineering Stages (Implementation)

Conclusion

Concurrent engineering is a business strategy which replaces the traditional product development process with one in which tasks are done in parallel and there is an early consideration for every aspect of a product's development. This strategy focuses on the optimization and distribution of a firm's resources in the design and development process to ensure effective and efficient product development process. Concurrent Engineering (CE) is a systematic approach to integrate product development that emphasizes the response to customer expectations. Concurrent Engineering not only helps to increase the pace of the market but also helps to increase the profit of the firm drastically. Implementation of Concurrent Engineering is also an important issue as everybody knows about it but didn't have any idea how to implement it, so its implementation process is shown in fig.5 & fig.7.

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"A Survey on The Problems of Students of Different Professional Courses in Context to Their Institutional Environment"

Shruti Tiwari
Department of Education
Suresh Gyan Vihar University, Jaipur

Abstract
The study aimed at examining the problems of students of different professional courses i.e. Engineering, Medical sciences, Business management and Education in context to their institutional environment. Random sampling method was used to select 18 professional institutions and 800 respondents. Self-made tool- a problem checklist (reliability and validity had been established) related to educational, personal and vocational problems and another one for checking the institutional environment including infrastructural facilities and human recourses. Both were prepared for data collection related to study. Relevant data obtained were analyzed using quantitative methods. Results from a t-test showed a significant difference between the personal and vocational problems of students of professional courses in context to their institutional environment. Results also reveal that there was an insignificant difference between the educational problems of students of professional courses in context to their institutional environment. It is also observed that on the basis of available environment in the institutes in their respective courses students have a considerable amount of educational problems but overall, they do not differ significantly. Aspects constituting the institutional environment like facilities of building infrastructure as well as human resource provided in campus are better nowadays and educational problems are more concern with the quality of teaching which was present in the institutes. It was recommended on the basis of study that problems of students of professional courses should be handled at institutional level its-self for their problems. Institutional environment should be improved at all respects so that specific skills, knowledge and guidance required in their field can be provided for their overall improvements.

Keywords: educational, personal and vocational problems, professional courses, students, institutional environment.

Introduction
Every individual male or female has different types of problems during his life span form infancy to his death. These problems vary with personality characters, age, sex, environment, family background, social status, community etc. Some problems may be inherited by the children from their parents and other members of family which are prolonged throughout the life.

Some problems can be generated from infancy stage and maintained throughout his life. Anyhow, impact of these problems also affects the each aspect of life like development of any individual, education, health and career etc. Some examples of common types of problems of students belong to any course or streams are mentioned below:-

- Educational problems
- Vocational problems
- Personal problems
- Problems related to Personality.
- Problems related to their sex/ gender difference.
- Problems related to institutional environment.

Educational Problems are difficulties faced by the students of professional courses in the field of their education like study, books and text books, course material, regular attendance in their theory and practical periods, teacher and their teaching styles, academic achievements, exams, medium of study and academic environment in institutions and at home etc.

Vocational Problems are difficulties faced by the students of professional courses in the field of their vocation like vocational choice, their attitude and aptitude towards the selected course of their choice, job opportunities in the courses, chances of campus selection, personality development according to their profession etc.

Personal Problems are difficulties faced by the students of professional courses like behavior emotions, intelligence, creativity, adjustment, health, self-esteem, self confidence, stress, anxiety etc.

Problems related to institutional environment
Problems regarding infrastructure, facilities, management, administration, academic staff, office staff, peons etc.
The present study has focused the educational, vocational and personal problems of students of various professional courses in relation to their institutional environment. Each student faces some specific type of problem while perusing their course.

Justification of the study
The nature of the problems varies at every stage of life of students and differs accordingly age, sex, environment around the person, family, peer group, occupation, achievements etc. In the context of professional courses if one can talk about the inclination of students towards them, it may found that medical,

engineering, management and education courses are most demanding courses at present time. In spite of that various students who take the admissions in these fields are sometimes not interested to continue the course or even make their career in this field. They are not able to continue further with the same line of their own choice at the end of the course. Various students are not able to get the jobs, not vocationally successful, secure very less marks even rejected in interviews by their industry people. Nowadays, many seats have been left vacant from last 2-3 years. Recently from the last few years various news papers are reporting the news headlines which are related to their admissions, results, dropouts, stealing, robbery, depression, anxiety, stress and suicidal cases and other educational, vocational and psychological problems of different disciplines of professional courses. So, it is very important and beneficial to know the educational, personal and vocational problems of students which can include vast range of different type of problems on the basis of their gender difference.

During the search for the studies related to topic, many studies reported till now related to the problems of the students at school level as well as college and university level.

- RAO, T.V. studied Perception of College Environment, Work- values and Professional Aspirations of Students of a Medical College, IIM. Ahmadabad. ICSSR financed.The main objective was to compare the perceptions of college environment, work-values and professional aspirations of students of a medical college. The findings of the study were: The relationship of father's education and occupation with sex role attitude of females was not significant. Females belonging to a joint family structure were more traditional or 'other oriented' in their sex role attitude.

- Tripathi studied adjustment Problems of Undergraduates of Varanasi Division. The following conclusions were drawn: In all 40 percent of the boys faced college environmental problems, 50 per cent faced economic problems, and 40 per cent could not develop amicable relation with their classmates. About 53 per cent of the urban and 42 per cent of the rural students faced difficulties in their adjustment with the educational environment.

- Arora reported his work on problems of students of professional courses of medicines, law, engineering and education in relation to their personality factors and found that, personality characteristics play a significant role in predicting professional success and problems are different according to different traits of students of different professional courses. (4)

- GREY, M. (2002) drawing with difference: challenges faced by international students in an undergraduate business degree. Teaching in higher education, 7 (2), 153-166. Examined the social, cultural and study experiences of 3 international undergraduate business students. Results show that the ss not only exhibited a pragmatic view of their education, but also specific expectations and goals which in many cases were not being met. Findings suggest that, often, international students are overlooked and not given a chance for their voices to be heard.

- INGMAN, K.A. (2003) an examination of social anxiety, social skills, social adjustment, and self-construal in Chinese and American students at an American university. Dissertation abstracts international, 63 (9-b), 4374. Results indicated that Chinese students experience lower social adjustment, higher levels of social anxiety, and report higher interdependent self-construal than American students. Independent self-construal was inversely related to social anxiety for both groups. Analyses of these data revealed that American students experienced higher anxiety than Chinese students both before and after the interactions. In addition, American students were rated as having better overall social skills (as defined by American norms) than Chinese students.

Though, lots of work has been done related to the problem of students of school going children, college students, universities students as well as students of professional courses. But little work has been reported yet regarding this proposed study. So, a direction has been found to select this problem as a research problem.

Objective of the study
1. To study the problems of students studying in Engineering, Medical sciences, Business management and Education courses in context to their Institutional Environment.
2. To identify the different types of problems of students studying in different professional courses in context to their Institutional Environment.

Hypothesis
Conceptual hypothesis
I. There is no significant difference between the problems of students studying in different professional courses of Engineering, Medical sciences, Business management and Education in context to their Institutional Environment.

Operational hypothesis
I.1 There is no significant difference between the educational problems of students studying in education, engineering, medical science and business management courses in context to have average and above average level of institutional environment.

I.2 There is no significant difference between the personal problems of students studying in education, engineering, medical science and business management courses in context to their average and above average level of institutional environment.

I.3 There is no significant difference between the vocational problems of students studying in education, engineering, medical science and business management courses in context to their average and above average level of institutional environment.

Variables of the Present Study
Independent variables:
- Institutional environment
Dependent variable:
- Problems of the students of professional courses
Terms Defined
- **Problems of students-**

In this study problem of students means difficulties related to their educational, vocational & personal field during the course.

▪ **Students-**
In this study, girls and boys admitted in various professional courses in different universities and colleges.

▪ **Professional courses –**
A first professional degree is an academic degree that prepares the holder for a particular profession by emphasizing competency skills along with theory and analysis. These professions are typically licensed or otherwise regulated by a governmental or government-approved body. Areas such as nursing, architecture, forestry, law, medicine, osteopathic medicine, chiropractic, engineering, dentistry, psychology, accounting, podiatry, audiology, physical therapy, optometry, pharmacy, social work, religious ministry, or education, among others, often require such degrees for licensing. Here, means studies related to the field of Engineering, Medical sciences, Business management and Education.

▪ **Institutional Environment—** In this study institutional environment means:
         (Of universities and colleges)
a) **Physical environment:** The environment of any institution can be described with its location infrastructure of the building, facilities provided in the institution (hostels, visiting room, sick room, tutorial room, classroom, common-room, seminar hall, auditorium, visiting room, guest house, labs, library, conveyance, mess/canteen, medical facilities, and stationary shops including fax, photocopy, STD, gym, playground and other entertainment
b) **Human Resources:** Management staff, administrative staff, academic staff, office staff and fourth class employees etc.

Material and method
Research Design:
Survey method had been used for proposed study.
Population: Students of professional courses of Engineering, Medical, Management and Education of Rajasthan.
Sampling Procedure:
It is a process of selecting a sample from the population. In the present study Random sampling had been used for selection of sample. In random sampling every member of the population has probability of coming into the sample. In this study institutions and students were selected randomly.
Sample:
On the basis of above sampling procedures total 800 students of professional courses of Engineering (200), Medical (200), Management (200) and Education (200), of Jaipur district had been taken as a sample. **Table- i (annexure-1)** is showing the actual sample found after the rejection of irrelevant and incomplete tool filled by the respondents selected for proposed sample.
Tools and Techniques for Collection of Data:
1. Self made check list for institutional environment was constructed by the researcher. In the checklist total 26 items were framed related to the infrastructure facilities and their human resources.

2. Self made Problem check list was constructed by the researcher. In the checklist total 150 items were framed related to the problems of their educational, personal and vocational field. For this self-made constructed tool its content validity on the basis of experts opinion and reliability by split-half method has been established which is 0.86.

Statistical Analysis
Statistical Analysis had been done on the basis of 't'-test. For this two groups having average and above average level of institutional environment were obtained on the basis of relevant scores obtained from the respondents on checklist (institutional environment). The result had been tabulated and presented on the basis of actual sample (480) found after the rejection of irrelevant and incomplete tool filled by the respondents selected (800) for sample. So the further following tables is showing the results of 60 male and 60 female students of education (ED), engineering (EN), medical science (MD) and business management studies (MN).

Results and Discussion
Hypothesis-I.1
There is no significant difference between the educational problems of students studying in education, engineering, medical science and business management courses in context to have average and above average level of institutional environment.

Table -ii **(in attached anexxure-1)** and fig-1**(in attached anexxure-2)** are showing the statistics on educational problems of students in context to institutional environment. Calculated 't'- value is **1.79**, which is lower than the table value on both the level of significance. This means there is no significant difference between the educational problems of students studying in education, engineering, medical science and business management courses in context to their average and above average level of institutional environment. Students of professional courses of both the selected groups may have same level of educational problems in their respective fields and perhaps not get affected by the available institutional environment produced by the infrastructure facilities (physical environment) and human resources.
Hence above H-I.1 is accepted.

Hypothesis-I.2
 There is no significant difference between the personal problems of students studying in education, engineering, medical science and business management courses in context to their average and above average level of institutional environment.

The table-iii **(in attached anexxure-1)** and Fig-2**(in attached anexxure-2)** are showing the statistics on personal problems of students studying in different professional courses gives an idea that the students of average level of institutional environment has statistical mean value as 22.41 where as other group of above average level is at 20.07. It indicates that the students of average level of institutional environment are facing more personal problems than the students of having above average

level of institutional environment. The calculated t-value (2.75) is higher than table value which implies that there is a significant difference between the personal problems of students studying in education, engineering, medical science and business management courses in context to their average and above average level of institutional environment. The probable reason for the difference may recline in lack of favorable environment in institution, problem related to boarding /lodging by day scholars. They may not have any close friends in college and not able to share problems in class or college campus. They might get troubled by sexual attitudes of classmate's /friends /teachers in institution and have feeling of unsaved at home /market/college/class/ hostels or in hired rooms. In institutions due to deficiency of facilities like visiting rooms, sick rooms, tutorial rooms, medical facilities, stationary shops/fax/photocopy/ STD, Wi-Fi and internet (cyber café), gym, clean water and toilets, there might be dissatisfaction among the students. In absence of sufficient, helpful and supportive teaching and non-teaching staff in various institutions may be a genuine cause of more personal problems of the students.

Hence, formulated hypothesis I.2 is rejected at both the level of significance.

Hypothesis- I.3

There is no significant difference between the vocational problems of students studying in education, engineering, medical science and business management courses in context to their average and above average level of institutional environment.

The table-iv **(in attached anexxure-1)** as well as fig-3**(in attached anexxure-2)** shows the statistical mean, SD and t-value on vocational problems of students in context to institutional environment. Mean score on vocational problems of the students of average level of institutional environment is 27.22 where as other group of above average level is at 22.27. It indicates that the students of average level of institutional environment are facing more vocational problems than the students of having above average level of institutional environment. The calculated t-value (5.02) is also higher than table value which implies that there is a significant difference between the vocational problems of students studying in education, engineering, medical science and business management courses in context to their average and above average level of institutional environment. The probable reason for the difference may recline in lack of favorable environment in institution for vocational guidance as well as less vocational support for the students of professional course. They require more vocational information or career information in institutions. The students might be facing problems due lack of proper training to get the job during the course, lack of student's training and placement cells or no job opportunities /better opportunities through campus recruitments/placement agencies in the institutions if they are present. It may also happen if there is unavailability to select a suitable course for a bright career in related institutions, unawareness of good vocational plans after taking the admission, lack of financial assistance in institution like scholarship or fellow ships, unaware about the services of employment agencies/job centers, worry due to increasing number of seats.

Hence, formulated hypothesis I.3 is rejected at both the level of significance.

Discussion:

The institutional environment includes infrastructure, provided facilities, students, management, administration, academic staff, office staff, peon as well as natural atmosphere around the institution. The institutional environment is one of the major factors for the problems of the students. Institutions want to be recognized as providers of good quality higher education. They understand that competing on the basis of any single aspect only is not sufficient to ensure the reputation of the university. Compelling empirical research shows that a positive and sustained school/college climate promotes students' academic achievement and healthy development. Not surprisingly, a positive institutional climate also promotes teacher retention, which itself enhances student success. The institutions having good physical environment and human recourses have less educational, personal and vocational problems. After analyzing the tables 4.67, 4.68 and 4.69 it has been come out that personal and vocational problem of the students of education, engineering, business management, and medical science courses have a significant relation with institutional environment of professional courses as compare to educational problems. It is also observed that on the basis of available environment in respective courses students have a considerable amount of educational problems but do not differ significantly. Aspects constituting the institutional environment included facilities of building infrastructure as well as human resource provided in campus are better nowadays and educational problems are more concern with the quality of teaching staff. So it may be possible that quality of appointed teachers in respective courses is almost similar everywhere. Personal problems are also related to personality, IQ and their personal attitude. Positive and sustained school/college climate promotes students' academic achievement and healthy development. A vocational problem also arises due to wrong selection or choice of institution in which they took admission. Unsuitable selection of institution/college due to counseling criteria leads to all types of problems because in such cases students show less interest in their institutions. They may also not satisfy with management staff, administrative staff, academic staff, office staff and fourth class employees, so it leads to a bad environment of institutions and initiate more causes of problems of students of professional courses. Pie diagrams in **Fig-1, 2, 3** which are attached in annexure-2, also justifies the institutions having above average level of environment are facing less E, P and V problems.

Educational Implications:

The study will be fruitful to the -

Administrators and Management: Administrators and management of the institution will be able to recognize with the problems of their students and on the basis of that, they may try

to provide the facilities according to their needs. They can think to establish a center for students' welfare in their institutions.

Teaching Faculty: They will be able to understand the causes of the problems of the students and may try to provide the desired help to their students.

Parents: Study will be also helpful for the parents for deciding the course and institution for their wards. They will be also come to know about the different types of problems in professional courses.

Students: The study will be highly helpful to students to understand the different type of problems and difficulties they are going to face during the course and they can very easily try to solve them with the appropriate sources during their course.

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ANNEXURE -1 (TABLES)

Table-i (actual sample)

S.No.	Professional institutions of Jaipur district running the courses	Number of institutes	No. of Students (proposed sample)		No. of Students (actual sample)		Total
			male	female	Male	Female	
1.	Education (ED)	5	100	100	60	60	120
2.	Engineering (EN)	5	100	100	60	60	120
3.	Medical science (MD)	3	100	100	60	60	120
4.	Business management (MN)	5	100	100	60	60	120
	Total	18	400	400	240	240	480

Table - ii

Educational problems of students in context to institutional environment

Level of institutional environment	N	mean	SD	t-value		level of significance
				tab	cal	
Average (good)	237	26.86	8.05	2.69	1.79	Insignificant at 0.01 level
Above average (best)	243	25.56	7.87			

Table value at .05(136) =1.98

Table value at .01(136) =2.69

Table- iii

Personal problems of students in context to institutional environment

Level of institutional environment	N	mean	SD	t-value		level of significance
				tab	cal	
average	237	22.41	9.62	2.69	2.75	Significant at 0.01 level
Above average	243	20.07	9.04			

Table value at .05(136) =1.98

Table value at .01(136) =2.69

Table - iv

Vocational problems of students in context to institutional environment

Level of institutional environment	N	mean	SD	t-value		Level of significance
				tab	cal	
average	237	27.22	10.70	2.69	5.02	Significant at 0.01 level
Above average	243	22.27	10.91			

Table value at .05(136) =1.98, Table value at .01(136) =2.69

ANNEXURE-2 (FIGURES)

Figure-1

E- problems in context to institutional environment

Above average level of institutional environment 25.56

Average level of institutional environment 26.86

Figure-2

P-problems in context to institutional environment

Above average level of institutinal environment, 20.07

Average level of institutional environment, 22.41

Figure-3

V-problems in context to institutional environment

Above average level of institutional environment, 22.27

Average level of institutional environment, 27.22
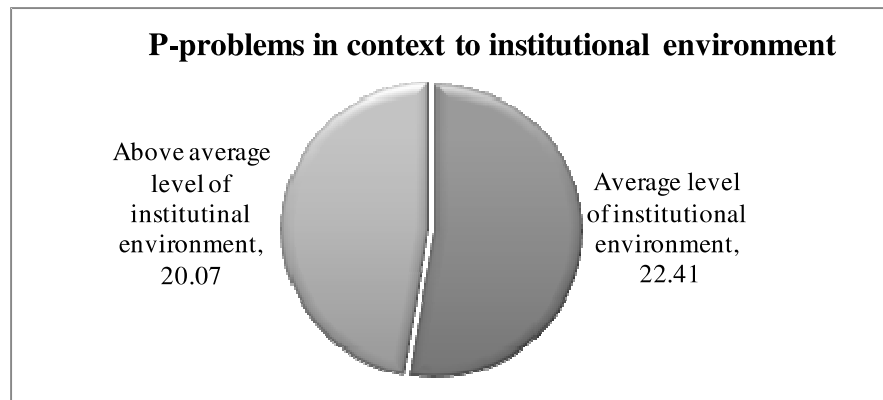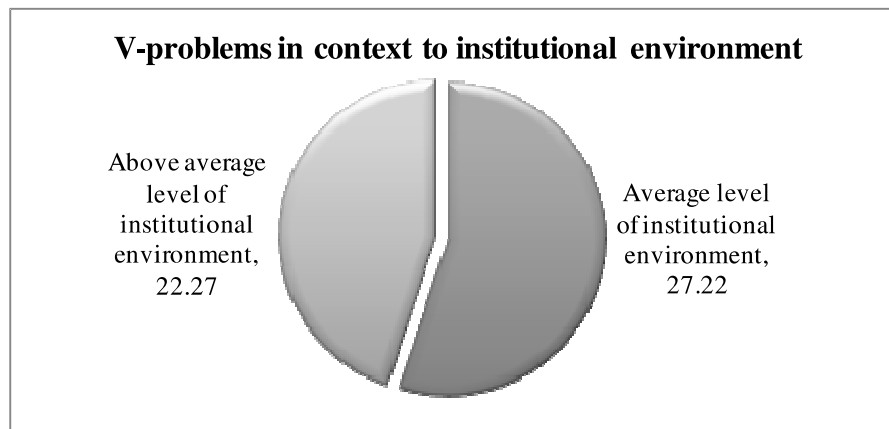
Technology V/S Print Media Advertising: A Case Study

Abhishek Mishra, Swati Mishra
Suresh Gyan Vihar University, Jagatpura, Jaipur

Introduction

In the advanced world of technology when an advertiser has varied contemporary choices of media vehicles to choose from the greatest question that arises is the choice between the traditional media and the technologically advanced media vehicles / electronic media.

Print media has fallen into doubts many times when the advertisers struggle between the aforementioned choices. In the world of instantaneous transfer of information when you know that any kind of message is just a click away from your customer how can any advertiser choose between print media and any other form of advanced electronic media which has both the advantages of being cheaper & faster. This case study tries to find out the answers to such questions which are faced by an advertisers every day.

Even if an advertiser has various avenues like Internet, Mobile Messaging, Billboards, T.V., Radio etc. it is not to be forgotten that print still has its own importance and a set of advantages over other media. For example, Unlimited Exposure is allowed by newspaper and magazines unlike T.V. or radio where advertising time is scheduled. T.V. & radio ads can sometimes lead to annoyance as they intrude between the programming time but print ads are less intrusive. Another advantage of Print ads are less intrusive. Another advantage of Print media is that it tends to be highly specialized to target some specific group of audience. Print media also holds a benefit of loyal readerships, surveys have proved that there has been phenomenal increase in the readership of the newspapers and has been retaining its leadership[1]. Secondly newspapers are always considered more credible than any other source of information. In today's world when contemporary information systems have created a centralized communication system newspapers are still considered more credible and command more trust amongst the readers compared to any other media source and hence the advertising through print media will always carry more credibility.[2]

The most sprawling question amongst the advertising fraternity is whether to go for the latest media of advertising or to go for the traditional media. This case study tries to discuss and find out a solution for this advertiser's dilemma.

When we put the media mix together undoubtedly information defines the world today. Wherein advertising is also one of the major components of information. So an advertiser has to put different media mix together while creating an ad campaign for e.g. television, radio, print, online, mobile, social media etc.. With such a vast range of media vehicle at your disposal you have to find the right mix with maximum exposure , ROI and connections which will give you the maximum benefit out of your Ad Spend. There are surely some major benefits attached to it and the first one being the feeling of substance attached to the good publications which actually stimulate the senses of the reader as compared to any other media. The newspapers are always a part of a readers daily routine and hence a daily door drop can be more effective than any direct access mail lying unread in your mail box or any other irritant pop up on the websites that you open which an internet user always blocks through firewalls or Ad block software. Similarly another major benefit that print carries along with it is that it engages the readers more than any other medium. Some news reports published in The New York Times and The Telegraph have put forward the fact that internet users lose concentration very easily and are distracted very easily or else lose capacity of focusing on a particular subject for a long time and similarly do not retain it[3] [4]. This adds to the plus points of the Print media advertising.

There could be different measures of judging the effectiveness of an ad campaign but this case study talks about the three most important measures namely "Return On Investment", "Engagement" and "Number of Queries Generated".

ROI (Return On Investment)

It is obvious that at the time of Economic Crisis mostly media budgets are cut down by the advertisers to cut down the advertising costs and hence print advertising seems to be declining whereas online advertising seems to be flourishing. But the fact remains that "Reach" & "Cost" are not the only measures of judging the effectiveness of any media but the most important factor is testing the ROI, which basically signifies Various inter-media studies [5] have proved that the ROI of advertising through print media is more lucrative as compared to any other conventional or contemporary media. Besides, print media has the benefit of placing the ads at different positions in the newspaper or magazines. Secondly, the inserts which could be added in the newspapers/magazines give an added advantage to the print advertisers and especially becomes the reason of ROI generation. Hence when counted in terms of ROI none of the advertisers should act as "penny-wise and pound-foolish" and of course should give print a fair share.

We conducted a small survey amongst the advertisers to get an idea of the ROI generation across different media and the responses generated through their advertising experiences were somewhat in favor of print.

The gross media spend compared to the additional sales during any campaign through the responses can be presented as follows:
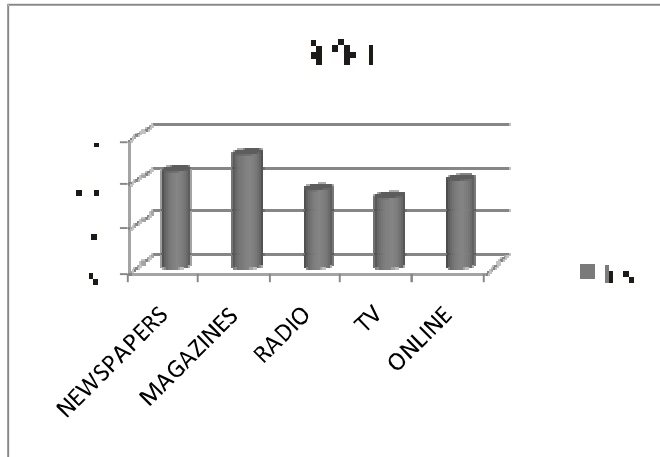
Hence, the above graph proves that print can form a very effective part of one's ad campaign.

Engagement

Engagement is the second measure of effectiveness of an ad campaign according to this case study of advertising through print v/s advertising through technology. This engagement in an advertisement is created through creativity and innovation used in creating any advert. Engagement basically refers not only to the amount of time a reader spends with an ad but also the "Brand recall" created through that ad and the "Buzz" generated through a particular ad.

Brand Recall basically signifies whether a reader can recall the brand whose ad he saw in the newspaper or online or on T.V/ Radio. The biggest problem of any kind of advertising is the power of rejection held by an audience. Most of the times it happens that any audience when goes through an ad either rejects it without even going through it by changing the channel/ closing the window or pop-up or turning the leaf of a magazine/newspaper. Hence an ad would always be called effective only when it can catch the attention of the reader/audience first and then down the line make them go through the complete ad.

Buzz on the other hand refers to the publicity generated for a particular brand through a creative / innovative ad when one person views the ad and talks about it to others. Now print carries this benefit of adding creativity/innovations through various means like ad placement (masthead, island, news wrap, watermark etc.), format of ad, catchy headlines, color schemes, insertion of technology like creation of talking ads, vibrators or LED screens in magazines, or else use of Q.R. codes or

Augmented Realities. So many innovations offered by print media are not possible in any other kind of media which adds to the benefits of using print media in any kind of ad campaign. For example Volkswagen which is a pioneer in using innovations in advertising and has always had huge ad spends has mostly spent huge amounts in innovations it used in print media advertising. There are case studies which talk about the use of print media innovations by Volkswagen.[6]

Similarly studies of different advertisers prove that print media advertising can be very effective in terms of engaging audience or creating buzz in the market. Some INMA reports also reinforce the fact that many advertisers have creatively encompassed the current events and to establish the relevance of their brands through creativity in print advertising. They also demonstrate how a funny newspaper ad stating "Mr. Kipling doesn't do rumours, but he does make exceedingly good cakes" or Lynx using the story of Prince Harry getting filmed on a trip to Vegas can become very catchy by stating in Print.[7]

Number of Queries Generated

Next in line is the "Number of Queries Generated" through any advert which can be the most effective measure of the effectiveness of any media vehicle. It basically refers to the number of inquiries generated on the website or the stores which could generate curiosity in audience and convert an audience buying decision in favor of the brand advertised. There are examples of various ads which have made the targeted audience hit the websites of the brand to enquire for the brand or else visit the stores for demo of the brands.

Print definitely commands the power to make the audience to stop at a particular ad, to go through it and also influence their ideas. An Print Ad run by a non – profit organization with a very shocking headline "I wish my son had Cancer" with a paragraph detailing about a father whose son is suffering from an incurable fatal disease ,

Duchenne Muscular Dystrophy and a picture of Alex Smith holing his son. Though it could be argued that this piece wouldn't have gained so much of publicity but the fact was that it increased the website hits by 17000%_ and the increase in donations was by 200%.[8]

Conclusion

This case study shows that any marketing campaign would work best when print media is utilized as one component of the marketing mix. Studies have proved that when magazine is added to the media mix it could increase the brand's favorability by 44% and the consumer's purchase intention by 15% [9]. Similarly if a combination of online advertising is used with newspapers it also increases the effectiveness along with brand engagement by almost 26% higher than by just using online [10]. Newspapers still form the number one media vehicle which is still shaping public opinion. They are still known for their credibility, the knowledge they impart and the values they possess hence still remain the most authentic and powerful medium for advertising.

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Isolation of new Grayane Diterpenoid Anthopogontoxin I, II and III from Rhododendron Anthopogon

Ashutosh Sharma[1], M.P.Dobhal[2]
[1]Yagyavalkaya Institute of Technology, Jaipur
[2] University of Rajasthan, Jaipur

Abstract
Phytochemical studies on the stems and leaves of *Rhododendron anthopogon D. Don.* (Ericaceae) yielded three new grayane diterpenoid Anthopogotoxin I, II and III. The structures of Anthopogotoxin I, II and III were established through spectral data and chemical evidence.

Introduction
Rhododendron anthopogon D. Don. (Ericaceae), an evergreen shrub growing at an altitude of 3,000–5,000 m, commonly known as Dhupi (Nepal), Palu (Bhutan) and Tallish (Tibet).This plant is widely used as incense for its aromatic properties and administered to produce sneezing.[1,2] Essential oil also known as Sunpati oil is obtained by steam distillation of the aerial parts of *R. Anthopogon.*This oil is a good natural source of sweet herbal, a faintly balsamic essence[3].
Various types of grayanoids have been isolated from *Ericaceae* family, some of which are known to be poisonous in nature. Grayanane diterpinoids possess an A-nor-B-homo ent-kaurane type skeleton, structure having 5,7,6,5 (trans or cis) membered ring system with polyhydroxyl group. Alteration in the basic skeleton A-homo-B-nor and B-homo-C-nor grayani ring system also known in leucothanes and kalmanes. About 128 grayanoids have been identified and reported to date from *Ericaceae* family[4]. Grayanotoxins obtained from the species *R. Ponticum,[5]R. arboreum, R. Campanulatum,[6] R. Aurigeranum,[7]R. japnicum,[8,9,10] R.molle, [11,12,13,16] R.decorum,*[14,15]earlier have been reported.
The present communication deals with the three new grayanotoxin namely Anthopogotoxin **I, II** and **III** (Fig-1) isolated and characterise from the species *R. anthopogon*

Fig.1. Anthopogontoxins I, II & III from Rhododendron anthopogon

Result and Discussion
Compound **I, II** and **III** were isolated from petroleum ether extract after column chromatographic separation. Compound **I** , was obtained as a white powder (M.P,168-169°C), with molecular formula $C_{26}H_{38}O_8$, as derived from its HR-ESI-MS (m/z 478.1 M$^+$) and confirmed by the NMR data. The IR spectrum (KBr) indicated the presence of OH (3445 cm^{-1}) and ester CO (1720 cm^{-1}) and a C=C bond (1628cm^{-1}). PMR spectrum of compound **I** (CDCl$_3$, TMS, ■ ppm) showed the presence of two tertiary methyl group bearing oxygen (acetoxyl group) at 1.60. Singlets (three protons each) for nine protons of three acetyl groups appeared at 1.92, 2.05, and 2.2. A broad signals of five protons at 5.3~5.5 was assigned for protons of OH groups. The signals in the region 2.35~2.8 as a complicated pattern established the presence of remaining fifteen protons.
On deacetylation of **I** gave a product (M.P 196-197°C) which was identical to Grayanotoxin-II (M.P 198°C). Compound **I** was identified as triacetyl derivative of Grayanotoxin-II and diacetyl derivative of Grayanotoxin-IV and named as Anthopogotoxin **I**
Compound **II**, was obtained as a colorless crystalline solid after crystallization in Ethanol (M.P, 180-182°C), with molecular formula $C_{26}H_{38}O_9$, as derived from its HR-ESI-MS (m/z 494.1 M$^+$) and confirmed by the NMR data. The IR spectrum (KBr) indicated the presence of OH 3452 cm^{-1}) and ester CO (1725 cm^{-1}) and a C=C bond (1628cm^{-1}). PMR spectrum of **II** (CDCl$_3$, TMS, ■ ppm) showed the singlets at 0.95-1.60(12h of 4-CH$_3$). Singlets at 1.92-2.2 (9H of 3-OCOCH$_3$). The quartet at 4.90 was assigned to protons of OH group at C10 and a broad singlet at 5.45 to the proton of OH at C5 position. It appears that a signal for a methine proton at C14 merged with signal of the OH proton at 5.45. The signals in the region 2.3-2.8 established the presence of remaining fourteen protons. Fragments in mass spectra were observed at m/z 479 (loss of -CH$_3$ group), m/z 466 (loss of CO or two -CH$_2$ groups), m/z 452 (loss of COCH$_2$ or by the loss of isopropyl group) and m/z 438 (loss of methylene group in ring C).
On deacetylation of **II** gave a product (M.P 225-228°C) which was identical to Grayanotoxin-V (M.P 226°C).Compound **II** was identified as triacetyl derivative of Grayanotoxin-V and named as Anthopogotoxin -**II**
Compound **III**, was obtained as a crystalline solid (M.P, 212-213°C), with molecular formula $C_{27}H_{42}O_8$, as derived from its HR-ESI-MS (m/z 511.1 M$^+$) and confirmed by the NMR data.
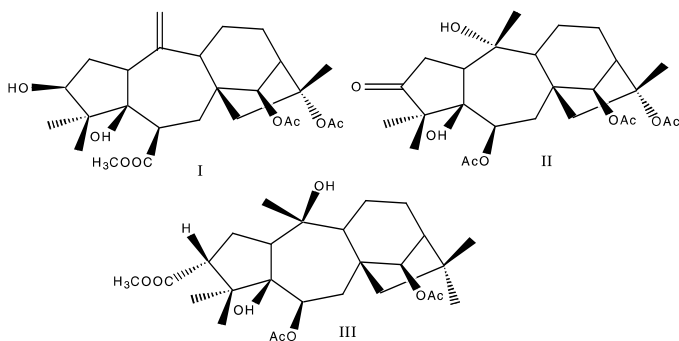
The IR spectrum (KBr) indicated the presence of OH (3472 cm^{-1}) and ester CO (1730 cm^{-1}) COCH$_3$ (1750 cm^{-1}) and a C=C bond (1628cm^{-1}). PMR spectrum of XIV (3) (CDCl$_3$, TMS, ▪ ppm), characterstic signals for the protons of three acetyl groups were observed at 1.92, 2.05, 2.2 and singlets at 0.95-1.60 (15h of 5-CH$_3$). At 5.42, 5.35 (broad singles for 3H) of OH group disappearing on deutaration and a signal for a proton at 5.51 (C-14 methine protons bearing O acetyl groups) which is characteristic position of grayanotoxin. A complicated pattern at 2.41-2.8 indicated the presence of 14 protons. On the basis of these observations, the tentative structure of Anthopogotoxin **III** was suggested.

Experimental Part
Column chromatography (CC) silica gel (SiO$_2$) 100-200 mesh, fractions were monitored by TLC (silica-gel GF $_{254,}$ Merck), I.R Spectra were recorded on Perkin Elmer-model 137 spectrophotometer. PMR spectra were recorded in CDCl3 containing TMS as an internal reference standard. Chemical shift were expressed in ▪ ppm.
The aerial parts of *R. Anthopogon* were collected from Tungnath, Garhwal hills of Uttrakhand in the month of May. The shade dried and finely ground stems (1 kg) of the plant were exhustiousely extracted with petroleum ether (60-80°C. The pet-ether extract thus obtained was concentrated under reduced pressure to give semi solid dark brown residue (40.0 gm).The Ethanolic extract was dissolved in the minimum amount of pet-ether and adsorbed on silica gel to form slurry. The dried slurry was subjected to column chromatography over silica gel (430 gm). The elution was carried out with solvents of increasing order of polarity. Elution with Benzene and pet-ether afforded some known compounds. Further elution with Benzene gave 80 mg of Anthopogotoxin **I**, which was crystallized in Ethanol, gave colorless crystalline compound (M.P 168-169°C). The column was than eluted with Benzene/Chloroform (1:1) gives Anthopogotoxin **II**, which was crystallized in Ethanol and recrystallized in Ethyl acetate, afforded white needles (M.P 180-182°C). The further elution of the column with Chloroform/Methanol (3:1) afforded 135 mg of grayanoto Anthopogotoxin **III,** which was crystallized by Ethanol and obtained as white micro needles (M.P 212-213°C)

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Human Resource Planning

Vivek Mishra
Department of Management and Business Administration
Shankara Institute of Technology, Jaipur

Introduction

Human resources planning are a process that identifies current and future human resources needs for an organization to achieve its goals. Human resources planning should serve as a link between human resources management and the overall strategic plan of an organization. Aging worker populations in most western countries and growing demands for qualified workers in developing economies have underscored the importance of effective Human Resources Planning.

Many business owners prepare a business plan before starting their business. However, small business owners often do not include human resource planning as part of their over-all business plan. They may start out with only a few employees or none at all. Over time, it is important to properly forecast employment needs. Just as failing to address potential threats in the marketplace can jeopardize the viability of your business, failing to anticipate personnel needs can impact on overall business success. The success of a business is directly linked to the performance of those who work for that business. Underachievement can be a result of workplace failures. Because hiring the wrong people or failing to anticipate fluctuations in hiring needs can be costly, it is important that you put effort into human resource planning. Planning for HR needs will help to ensure your employees have the skills and competencies your business needs to succeed. An HR plan works hand in hand with your business plan to determine the resources you need to achieve the business's goals. It will better prepare you for staff turnover, recruitment, and strategic hiring – and alleviate stress when you have emergency/last-minute hiring needs.

Basic Practices

The planning processes of most best practice organizations not only define what will be accomplished within a given time-frame, but also the numbers and types of human resources that will be needed to achieve the defined business goals. Competency-based management supports the integration of human resources planning with business planning by allowing organizations to assess the current human resource capacity based on their competencies against the capacity needed to achieve the vision, mission and business goals of the organization. Targeted human resource strategies, plans and programs to address gaps (e.g., hiring / staffing; learning; career development; succession management; etc.) are then designed, developed and implemented to close the gaps. These strategies and programs are monitored and evaluated on a regular basis to ensure that they are moving the organizations in the desired direction, including closing employee competency gaps, and corrections are made as needed. This Strategic HR Planning and evaluation cycle is depicted in the diagram below. Human resource planning is the ongoing process of systematic planning to achieve the best use of an organization's most valuable asset - its human resources. The objective of human resource (HR) planning is to ensure the best fit between employees and jobs, while avoiding workforce shortages or spares. The three key elements of the HR planning process are forecasting labor demand, analyzing present labor supply, and balancing projected labor demand and supply.

Developing an HR Plan

The daily demands and hectic lifestyle of business owners and managers often has an unfortunate by-product: human resource planning gets placed on the bottom of the list of things to get done. Failure to anticipate potential changes in your workforce often leads to last minute or "crisis mode" decision-making. Needless to say, quick fixes are no solution to long-term issues. Taking the time to forecast future hiring needs today will save you time and money in the long-run. HR planning must be tied to the overall business plan. You can start the process by assessing the current conditions and future goals of your company.

The following three-step method is designed to help you determine whether or not you are ready to hire:
1. Identify Business Strategy and Needs
2. Conduct a Job Analysis and Write a Job Description
3. Determine the Feasibility of Hiring

Step 1: Identify Business Strategy and Needs
Consider the following internal and external opportunities and record how they may impact your business:
1. **Competition:** Often businesses will feel pressure to expand and hire more workers in order to remain competitive in a particular market.
2. **Technology:** Technological advancements may increase the demand for employees in certain industries or professions.
3. **Increased customer demand:** An increased demand for products or services may require more resources to help produce or deliver services.
4. **Economics:** Growth of the economy or lower interest rates cause increased spending, and often increased business opportunities. Changes in the labor market impact your ability to find and keep employees.
5. **Workforce changes:** These include resignations, terminations, leave of absences, death, change in employment status, and retirement.

Step 2: Conduct a Job Analysis
If you decide that you need additional employees to fulfill your business strategy, it is recommended that you conduct a four-step job analysis:

1. Review your current workforce-Describe the employees you now have in terms of their knowledge, skills, and experience and describe how they function together to get work done. Map these onto your strategic plan and describe the skills and knowledge that you will need for the anticipated new work or function. At the same time, consider how the current work could be reorganized to make the best use of current and future employees.

2. Identify any skills and knowledge gaps- Note any gaps between the skills and abilities your current employees have and the skills and abilities that your workforce needs to meet your business objectives in the future. To ensure that you have considered the full scope of the new position from all different perspectives, ask your current employees what they think this position would involve.

3. Write a Job Description- After completing steps one and two, you can begin to draft a job description. Although many small businesses do not take the time to draft job descriptions, it is a worthwhile exercise.

4. Set an Appropriate Salary- Start by adopting a general salary range to help you determine what you will need to budget – and whether potential candidates are within your budget. You may want to complete a job evaluation, whereby you rank jobs and their corresponding salaries. Weigh the importance of critical skills and knowledge for each position, compare positions, and rank the new position on the pay scale accordingly. If you already employ an administrative assistant and plan to hire another, you will probably pay him/her approximately the same rate, depending on experience. If, on the

other hand, you decide to create a new position and recruit an employee with a unique skill set, you will need to do a comparison between the new and existing positions.

Step 3: Determine the Feasibility of Hiring
Before you hire, you must understand (1) the costs of hiring, (2) the benefits of hiring, and (3) the risks of not hiring.
(1) **When calculating the full cost of hiring a new employee you must consider:**
* Labor costs, such as salary and benefits
* Recruiting costs, which may include advertising in addition to time spent on recruiting activities, orientation and training.
(2) Weigh the costs of hiring against the value of having an employee contributing to the business.
(3) Some of the potential risks associated with choosing not to hire despite the need for additional staff include:
* Loss of revenues because of an inability to keep up with demand
* Loss of employees because they are unwilling to continue being overworked or to do the work of a departed employee
* No new ideas or knowledge brought in through new employees

Succession Planning-

1. **Non-Family Succession-** Succession planning is a process that is often neglected by small business owners. This is understandable when day-to-day operations are more than enough to keep you busy. The thought of losing control of your business – whether due to illness, death, or other factors – is unpleasant. However, the reality is that people age and accidents happen. By planning for succession or by considering your business exit strategy, you will also give yourself the freedom to voluntarily step away from your business to pursue other interests – if you so choose. If you want your business to survive beyond you, planning for changes in management is crucial. By keeping all business responsibilities in your own hands, you put the sustainability of your business in jeopardy. Succession must be managed for all significant positions in a company – not just owner(s) or senior manager(s). Business processes and institutional memory should be passed along not only at the ownership and executive levels, but also on the supervisory, professional, and skilled levels. The founder/owner has the power to suit his or her beliefs and values when choosing a method of succession. Some may decide to sell the business, while others may maintain an arm's length relationship with the business as the board chair. You have the option of grooming talent within your organization or looking outside of the business to find managers with the necessary qualifications. It is wise to start the planning process by identifying your business's existing competencies. You should then evaluate an assess current employees to determine how they match up to organizational needs. Coaching, mentoring, training, and recruiting methods can be used to fill gaps – and prepare your staff for future responsibilities.

2. **Family Succession-** Family succession is a critical issue facing our country's economy. Canada's more than one-million family-owned businesses generate more than 45 percent of the Gross Domestic Product (GDP) and provide a pay cheque for about half of all working Canadians. Succession planning will become increasingly important as Canada's baby boomers reach retirement. The majority of family-run businesses don't make it to the third generation as a result of "family-related issues."

Creating a Personal Manual
The best way to ensure that your employees understand your workplace policies is to communicate them both verbally and through a written document. This document need not be lengthy or elaborate. Simply outline your business's rules and expectations in a clear and concise way. Although drafting a personnel policy handbook may involve a time commitment initially, it will save you time and stress in the long-run. It will reduce your need to clarify questions and concerns with employees on an individual basis. Clear communication of policies and expectations is vital to successful human resource management not only during an employee's first weeks and months, but throughout the duration of his or her time with your business.

Conclusion
Because your employees play such a critical role in your business's successes, it is important that you put thought and careful planning into your human resource practices. Remember that your human resource plan should correspond with your business plan. For example, if you anticipate 25% growth in sales in two years, you must consider how that will affect your workplace and human resource needs. Human resource planning is an ongoing process. You must continually monitor and forecast personnel needs and concerns. Likewise, if you would like your business to continue after your retirement, you should make a commitment to forecasting future management needs. Human resource planning is something that you can learn and improve on through experience and effort.

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Watershed Management Approach for Sustainable Water Resource Development

Himani Pathak[1], Menka Bhasin[2], Ratnesh Trivedi[3]
[1] Department of Chemistry, Vivekananda Institute of Technology-East, Jaipur,
[2] Department of Chemistry, Vivekananda Institute of Technology-East, Jaipur,
[3] CSIR-Dhanbad

Abstract
Sustainable development is now the much talked about term in the modern society owing to the increasing concern for the degrading environment. In the present paper an attempt has been made to explain the concept of watershed management and show how effective such watershed project can be in achieving the sustainable development and broadly the overall socio-economic benefit in the society.

Keywords: Water resources, watershed, watershed management, socio-economic benefit, people

Introduction

Effective use of land and water is fundamental to growth and sustainable development. The concept of watershed management has evolved to ensure effective use of both natural and social capitals. Thus, the watershed development programmes include land, water and human resources as essential components. The watershed programme is primarily a land based programme, which is increasingly being focused on water, with its main objective being to enhance agricultural productivity through increased in situ moisture conservation and protective irrigation for socio-economic development of rural people [5].

It has been lately realized that there are certain economic activities that have negative effects on the environment. Such realization may be accounted due to three reasons namely, (i) increasing awareness; (ii) availability of new technology which may leave more negative impacts on the environment and (iii) increasing population that has resulted in an increase in the number of such economic activities which is acting as barrier to sustainable development. The need to manage water resources at a watershed level is based on the argument that management of water resources on administrative and political boundaries could not effectively address water resources that spanned beyond them, such as Trans-boundary river basins.

The term 'watershed', is defined as land area from which water drains to a given point i.e., stream, river, or lake. In this regard watershed is considered to be synonymous with catchment and drainage basin [7]. [4] explains watershed as not simply the hydrological unit but also socio-political-ecological entity which plays crucial role in determining food, social, and economical security and provides life support services to rural people. In the same way, watershed management refers to the process of guiding and organizing land and other resource use on a watershed to provide needed goods

and without adversely affecting soil, water and other natural resources. It broadly focuses on using resources in a productive and sustainable manner. Watershed management concepts recognize explicitly the interrelationships among land use, soil areas. In simple words, watershed management is all about the greening of the watershed through proper management of land water and energy resource.

Sustainability is a problem which faces all development, in industrialized countries as well as in the developing world. In the global discussion sustainability is looked primarily in terms of continuing to improve human well-being, whilst not undermining the natural resource base on which future generations will have to depend. For sustainability of water, this would mean that water continues to be available in the same or more quantity and at the same or better quality. Sustainability of water resources includes various other factors such as: Social factors, financial elements, the natural environment, Durable gender equity and empowerment, Technical issues, and Institutional arrangements.

The Concept

A watershed management concept basically strives for objectives, like conserving soil and water, improving the ability of land to hold water, rainwater harvesting and recharging and growing greenery – trees, crops and grasses. Thus, a watershed management approach incorporates "soil and water conservation" and "land use planning" into a broader, logical framework by focusing on the following concepts:
1) In a watershed the interaction of water with other resources impact people either positively and negatively. In the same way people affect the nature and severity of such interactions by the ways in which they use resources and the quantities they use.
2) Irrespective of political boundaries impacts of water and other resources interactions occur.
3) Since such interactions cut across political boundaries, what may be sound resource use from the point of view of one political unit (country, community, or landowner) may not be sound resource use from a broader, societal point of view, because of undesirable downstream effects, i.e., what economists call "externalities."
4) Given the existence of externalities, ecologically sound management becomes good economics for all concerned only if costs and benefits are appropriately distributed among the political units, communities and individuals that carry out the watershed management activities and those who benefit from them.

Watershed programme is one of the means to address the regional resource management program for addressing the shortage of water. The natural watershed is responsible for providing water to the environment. Managing this watershed sustainably can enhance the natural habitat, conserve water, and provide long term water storage and flood protection. Thereby it ensures the natural replenishing of water resources. Protecting the watershed therefore, becomes the highest priority in sustainable water management.

It starts from the premise that the problem can be solved at its source if rural indigenous communities are mobilized to produce water — that is, to increase the supply of water available for their own needs and, by extension, for society as a whole. Increasing society's ability to produce water, as well as use it more efficiently, can bring about an interrelated series of benefits that will dramatically improve environmental, sanitary, and productive conditions among some of the poorest social groups.

The Socio-economic Activities of Watershed Management Approach

A watershed management approach basically involves use of various structural and nonstructural elements that are primarily undertaken to (i) protect a watershed or prevent damage to it; (ii) mitigate the effects of land use to an acceptable level; and (iii) restore degraded environments. In order to achieve this activities or practices such as vegetation management, controlled grazing, erosion control structures, terracing, and selected agro-forestry practices are carried out. These practices help in (i) stabilizing soil and steep slopes; (ii) stabilizing/modifying water yield and stream flow; and (iii) maintaining or improving water quality.

The effects of these various actions translate into direct and indirect economic benefits to society. These are the benefits that link the on-the-ground practice of watershed management to economic development and justify the integration of a watershed management framework into economic development programs. Furthermore, indirect benefits of environmental quality also are realized in biological diversity, wildlife habitat, fishery habitat and in water quality.

Some of the advantages that strongly support such watershed management programmes are
(i)   Reduction in soil erosion;
(ii)   Increase in surface and ground water;
(iii)   Change in land use pattern;
(iv)   Cropping Intensification;
(v)   People Participation;
(vi)   Social Audit;
(vii)   Reduced migration;
(viii)   Women Empowerment; etc.

Components of Watershed Management
The components of watershed development programme include; (i) soil and land management (ii) water management (iii) crop management (iv) afforestation (v) pasture or fodder development (vi) livestock management (vii) rural energy management (viii) other farm and non-farm activities (ix) and development of community skills and resources. All these components are interdependent and interactive.

Barriers to Watershed Management Approach
Ironically, the basic concepts underlying a watershed management framework also explain part of the reason why more widespread adoption of this approach has not taken place. Since local political and tenure rights boundaries rarely coincide with natural watershed boundaries, the local political institutions that drive development seldom recognize the watershed as a workable unit for planning and action purposes.

Since the main effects of the water and land use practices of one political unit often are felt by people outside that unit, or by future generations who can't vote now, there has been little incentive to consider the concepts of watershed management that account for these interactions. A common question from upstream land users is: "why should we carry out watershed management activities when the main benefits occur downstream?" Indeed, why should we expect them to, if they are not compensated for the costs of such activities? Lack of awareness or understanding of watershed management concepts and practices by development professionals and the public also has limited the application of watershed management concepts. There has been a lack of interaction of technical experts in this field with development practitioners and administrators. Only recently have technical experts made a concerted effort to explain, in language understood by the pragmatic development professional, how watershed management concepts and practices can aid in development programs aimed at increasing food security, employment opportunities, economic growth and poverty alleviation, all within a sustainable development framework.

Overcoming the Barriers
The barriers to wider adoption of a watershed management framework are being broken down slowly but surely. Many decision makers now recognize the imperative of environmentally sound and sustainable development. Ignoring the boundaries and interrelations set by the forces of nature will inevitably lead to serious, if not disastrous problems. Two ways by which barriers can be overcome are increasing public awareness and concern and increasing use of watershed management approaches in developmental projects.

Increasing Public Awareness and Concern
The public is becoming increasingly aware of environmental matters and rightfully concerned about the condition of the world for future generations. This concern is translated into increased political awareness and action. It also has led to the creation of more effective and politically acceptable resource transfer mechanisms to distribute the costs and benefits associated with watershed management activities. Incentives are being created to encourage more environmentally sound land use on watersheds. In fact, such mechanisms have been used successfully in countries such as Japan for more than a century?

Developing countries, such as Colombia, also are beginning to establish such transfer mechanisms. A percentage of revenues from hydropower production are allocated for upland watershed management.

Increasing Use of Watershed Management Approaches in Development Projects

Watershed management must be integrated into the mainstream of development activity. It may be that watershed management practices only need to account for a small part of the budget to be effective. The watershed management expert may play only a small role in the total project; however, it can be an important one if sustainable economic growth and poverty alleviation are goals.

What all of this implies is that, while general development professionals and project personnel should understand watershed management and what it can do, they do not all need to become experts in the field. General project personnel--planners, managers and technicians-can choose and implement the most appropriate alternative, given the project situation and a broad general understanding of watershed management. The components of watershed have to be implemented and sustained by people other than "watershed managers, by general project administrators, foresters, agriculturists, sociologists, hydrologists, and, most importantly, by farmers and other land users. The implication is that these types of people need to understand why and how watershed management should be incorporated into everyday activities.

Watershed Management and its Importance to India

In a country like India, where a lot of running water goes waste, it becomes very important to apply the technology of watershed management to solve its annual problems of droughts and floods. Majority of the India's population depends on agriculture and about 60 percent of total arable land (142 million ha) in the country is rain-fed watershed programme has importance of its own. A large portion of the rain-fed areas (65% of arable land) in India is characterized by low productivity, high risk and uncertainty, low level of technological change and vulnerability to degradation of natural resources (Joshi, et al, 2004). Over the years, the sustainable use of land and water has received wider attention among policy makers, administrators, scientists and researchers. Almost all major international developmental agencies like World Commission on Environment and Development (WCED), Food and Agricultural Organization (FAO), and Consultative Group on International Agricultural Research (CGIAR) and its allied agencies amongst others have emphasized sustainable use of water and other natural resources. Such watershed management approach is definitely going to help states like Rajasthan where water problems exist owing to the scarcity of water in the region.

Conclusion

Sustainable development can occur only when the needs of people and the capacity of the natural resource base to meet those needs are balanced over time. Watershed management provides a convenient framework to use in moving toward this balance.

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Physicochemical and Microbial Study on Amanishah Nala waste Water and Ground Water Sources of Surrounding Areas

D.P. Sharma[1], Y.P. Mathur[2], Menka Bhasin[3]

[1]Department of Chemistry, Vivekananda Institute of Technology-East, Jaipur
[2]Department of Civil Engineering, MNIT, Jaipur
[3] Department of Chemistry, Vivekananda Institute of Technology-East, Jaipur

Abstract
Increasing industrialization and urbanization has led to the vast problem of disposal of municipal solid waste and industrial untreated effluents. Water is polluted with metabolites of aquatic plants, animals and human extract products. The effluent of industrial along with domestic waste is being used for irrigating crops and vegetables such vegetables are sold in market. Thus causing a lot of health hazardous to the public. The excess amount of fluoride and nitrate parameters causing for dental and skeletal fluorosis and blue baby disease respectively. The industrial and bio-medical waste has their own problems to which these have to be separate treatments. Water pollution not only effects human health but the total eco-system including the flora and funa. Physico-Chemical monitoring of Amanishah nalla and surrounding tube wells and hand pumps was carried out in pre monsoon in the month of June 2014. Parameters namely turbidity, pH, Cl, NO_3, SO_4 , total alkalinity, total solids, total dissolved solids, total suspended solids, total hardness , calcium hardness, magnesium hardness, fluorides, DO, COD, BOD, Phosphates, oils and greases ,and coliform count etc. The quality parameters were compared with standards laid by WHO and BIS. It is significant to note that the level of, BOD, COD, Phosphates, TDS was found higher in the tube wells near the nalla or within the nalla bed similarly coliform MPN count is also observed in these sources . Therefore, serious attentions are required for the safety of these drinking water sources.

Key Word : - BOD , COD , Phosphate , Coliform , MPN , Pollution , TDS .

Introduction

Water is vitality for mankind because it is directly linked with human life. The major sources of water pollution are domestic wastes from urban and rural areas and industrial wastes discharged in water bodies. Ground water and surface water are now contaminated with them. Discharge of untreated waste through bores and leachate from unscientific disposal of solid Wastes, nutrients, synthetic organic compounds, heavy metals like Arsenic, Lead, and Mercury etc. also contaminate ground water. Most water–borne diseases are infectious diseases spread primarily through intestinal and are transmitted through fecal waste. Pathogens which include virus, bacteria, protozoa, and parasitic worms are disease producing agents found in the feces of infected persons. Hepatitis, cholera, dysentery, and typhoid are the more common water-borne diseases that affect large populations in the tropical regions.

Jaipur is the capital of Rajasthan and has earned universal renown as the "Pink city". City and its flanking Jaipur (longitude: 950 24' E; latitude: 270 18' N), a city located at the central part of Rajasthan, is undergoing rapid urbanization and industrialization. The wastewaters generated from diverse industries are proposed to be subjected to primary and secondary treatment at the individual industry itself. Almost all parts of Jaipur city and adjacent areas, a large number of industries have came up during last two decades like Vishwakarma, Sudershanpura, Bais Godown, Jhotwara, Malviya Nagar, Sanganer, Sitapura industrial areas, etc. which play a major role in polluting different water resources and soils. All the wastes from domestic, municipal and industries are discharged in 'AMANISHAH NALA', which is the largest element of drainage system of this city and covers the whole city. The farmers for growing vegetables and other crops use water from some parts of 'Amanishah Nala', from where vegetables containing hazardous chemicals are sent to the market in the urban center for consumption, which cause many disorder and diseases. In Sanganer the industries release a large amount of waste water during printing and dying process, mostly untreated discharged into adjoining Nala. These effluents contain highly toxic dyes, bleaching agents, salts, alkali and heavy metals like Cd, Zn, Cu, Cr and Fe. Polluted water of Amanishah Nalla is directly used in irrigation practices in nearby agricultural fields.

Materials and Methods

Collection of water samples: Pre-monsoon sampling was done in the month of June 2014. Grab samples were collected randomly from selected points along the length of amanishah nala about 35 km. The distance between two sampling point was 2.5 – 3.0 KM. Total 13 points were identified along the whole length of the nala. Similarly 13 ground water samples of tube well/hand pumps were collected in the vicinity of the identified sampling points along the nala. The samples for chemical analysis were collected in well labeled and clean plastic bottles

of 2 liter capacity and for bacteriological analysis water samples were collected in sterilized tarson bottles of 150 ml capacity. The depth of bore well is 300-350ft and hand pump 200-250 ft.

All samples were stored in refrigerator at 4 hours analysis was over The water samples were analyzed as per: BIS specification for analysis of water and sewage and industrial effluents, Standard method for the examination of water and waste water published jointly by American Water Works Association, American Public Health Engineering Association, And Water Pollution Control Federation of America and WHO Guidelines for the analysis of water and waste water

Samples for microbiological examination of amanishah nala and ground water sources were collected and analyzed for the presence of Faecal Coliform organisms. The samples were tested by multiple tube technique, presumptive test method and the results reported as most probable number per 100ml (MPN/100 ml).

Results and Discussion:-

The physico-chemical characteristic of various sample stations is shown in table 1 and 2. From the analytical data it is revealed that;-

· **pH:** The pH was mild alkaline for all sample and falls within the permissible limit prescribed by WHO and ISI . In present case pH of nala water was found in the range of 7.10 to7. 81. The results show that the water samples are slightly alkaline due to presence of dissolved salts.

ı **Turbidity:** Turbidity is commonly due to suspended colloidal particles present in the water. The turbidity of nalla water was in the range of 23.7 NTU to 62.5 NTU where as that of ground water sources from 0.0 to1.1 NTU. Tube wells in the nala or near the nala were found more turbid.

· **Total alkalinity** – Alkalinity is a measure of capacity of water to neutralise an acid and expressed in term of $CaCO_3$ equivalent. The ground water sample show alkalinity value varying between 100 mg/L to 750 mg/L whereas nalla water samples between 220 mg/L to 600 mg/L. The desirable limit of 200 mg/L and permissible limit of 600 mg/L has been recommended by BIS. Many of the ground water sources have values higher than the permissible limit.

· **Total Hardness (TH)** – Hardness is a measure of the ability of water to precipitate soap in general , hard waters are originate in areas where top soil is thick and limestone formation are present . In present study hardness in ground water sources samples vary from 120 mg/L to 510mg/L. But In nallah water samples between 170 mg/L to410 mg/L. the desirable limit of 300 mg/L and the permissible limit 600 mg/L are prescribed by the BIS for drinking water.

· **Total Soild** - The Nallah water contains high values of total solids that ranged from 780 mg/L to 2000 mg/L and ground water sources have in the range of 700mg/L to 1960 mg/L.

· **Total Dissolved Solid (TDS)** - TDS constitutes mainly carbonates , bicarbonates , chlorides , sulphates , calcium ,magnesium, sodium and potassium . TDS of nallah water samples varied from 560 mg/L to 1610 mg/L. But the TDS of tube well and hand pump sample varied between 420 mg/L to 1960 mg/L.

· **Total suspended Solid (TSS)** – The TSS nala water varied from 180 mg/l to 480 mg/L where as in ground water samples it was nil.

· **Sulphates** – The sulphate content of nala water varies between 32 mg/L to 103 mg/L and ground water sample have 36 mg/L to 162 gm/L. The sulphate content may be contributed by biochemical and anthropogenic sources and industrial processes.

· **Chloride** – The chloride concentration in nala water varies from 60 mg/L to 250 mg/L whereas in the ground water varies from 50 mg/L to 330 mg/L. the desirable limit for water is 250 mg/L whereas maximum permissible limit is 1000 mg/L in absence of alternate source.

· **Nitrates** – Nitrates in the nala water samples was found 20 mg/L to 48 mg/L whereas, nitrate concentration in ground water it varied from 8 to 200 mg/L. The permissible limit for nitrate is 45 mg/L If drinking water contain more than permissible limit of nitrate it causes blue baby(methameglobenimia) diseases in infants.

ı **Fluoride** – Fluorides in the nala water sample was found 0.17 mg/L to 0.35 mg/L whereas fluoride concentration in ground water was found 0.12 to 145 mg/L The desirable limit of fluoride 1.0 mg/L in drinking water whereas maximum permissible limit is 1.5 mg/L for drinking water as per BIS standards. Excessive concentration of fluoride causes dental and skeletal fluorosis.

· **D.O.:** The presence of oxygen is essential for the survival of aquatic life in water. The DO values range from 3.5 to 5.1 mg/L in ground water samples but in nala water it was almost nil. These D.O value is about 7.6 mg/L at 30^0 C in fresh waters. Oxygen saturated water have pleasant taste. The solubility of oxygen decrease with increase of temperature, increase of salt concentration and increase of biological activity in fresh waters.

· **B.O.D.:** BOD is the measure of oxygen requirement for aerobic oxidation of decomposable organic matter in water, polluted waters and waste water under controlled conditions of temperature i.e. 20^0 C and incubation period 5 days This is an important parameter to assess the pollution strength of sewage and industrial effluents. The BOD of ground water sources vary from is zero 8mg/L and that of nala water samples varies from 60 mg/L to 166 mg/L. Tube wells in nala and near to nala have high BOD.

· **C.O.D.:** It determines the oxygen requirement equivalent of organic matter that is susceptible to oxidation with the help of

strong chemical oxidant. It is an important, rapidly measured parameter as a mean of measuring organic strength of streams and polluted water bodies. The COD values show wide variations ranging from 160 to 480 mg/L for nala water whereas in ground water samples it varies from 4 to 12 mg/L

· **Phosphates:** Presence of phosphate in water and waste water has a great significance. Phosphates in small quantities is used in water supplies to reduce scale formation, to increase carrying capacity of mains, to avoid corrosion in water mains etc. the presence of phosphate in large quantities in fresh water indicates pollution through sewage and industrial wastes. It promotes growth of nuisance causing microorganisms. The phosphate concentration in nala water varies from 0.6 mg/L to 2.0 mg/L but that of ground water samples it varied from 0.0 to 0.6 mg/L.

· **Oils and greases**: Oils and greases is any material recovered as a substance soluble in petroleum ether, hexane or n-hexane. The oils and greases of domestic and certain industrial wastes and of sludge, is an important consideration in the handling and treatment of these materials for ultimate disposal. hexane. Hydrocarbons, esters, oils, fats and high molecular weight fatty acids are the major materials dissolved by petroleum ether/hexane. The oils and greases in nala water varies from 0.0 mg/L to 3.9 mg/L, whereas in ground wter samples it is nil.

· **Coliform:** The coliform group of bacteria includes all aerobic and facultative anaerobic gram negative non-spore forming rod shaped bacteria which ferment lactose with gas formation within 48 hours at 37^{0}C. coliform bacteria are the indicator of recent faecal contamination in water. In nala water colifom MPN /100 ml count was more than 2100 in all the samples where as in ground water samples coliform MPN /100 ml varies from nil to 16 MPN/100 ml.

· **Conclusion:** The amanishah nala water is highly polluted . ground wter sources in immediate vicinity of nala are also getting polluted. Therefore industrial & sewage discharge in the nala should be strictly restricted or should be properly treated before discharging in the nala to check the further pollution.

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Table No: 1
REPORT of THE CHEMICAL EXAMINATION of NAALA WASTE WATER

SN	Characteristics	Nr Swaran Jayanti Park (1)	Nr. Chomu Bridge (2)	Nr. Ajmer Road Bridge (3)	Nr. Janpath Bridge (4)	Nr. Shamshan Mansarovar (5)	Nr. Riddhi Siddhi Bridge (6)	Nr. Maharani Farm Bridge (7)	Nr. Sanga Setu, Sanganer (8)	Nr. R G Narayan Textile (9)	Nr. Gate of Gular Dam (10)	Nr. Bambala Bridge, Tonk Road (11)	Nr. Metro Hospital, Sitapura (12)	Nr. Bridge Goner Road, Vidhani (13)
1	pH	7.52	7.25	7.5	7.10	7.33	7.5	7.52	7.15	7.52	7.28	7.46	7.68	7.53
2	Turbidity (NTU)	23.7	34.1	30.2	37.5	38.3	40.6	42.4	58.2	60.4	59.1	53.7	62.5	60.3
3	Total Alkalinity	220	240	580	520	`530	510	430	500	560	550	600	540	450
4	Total Hardness	180	170	410	220	280	290	260	280	340	270	290	280	170
5	Calcium Hardness	80	70	180	90	130	130	110	120	150	120	130	110	70
6	Magnesium Hardness	100	100	230	130	150	160	150	160	190	150	160	150	100
7	Chloride	210	60	240	150	170	180	170	200	240	170	250	220	130

SN	Characteristic												
	(as Cl) mg/												
8	Sulphate (as SO$_4$) mg/	64	36	36	32	48	103	30	32	32	62	44	42	36
9	Nitrate (as NO$_3$) mg/l	2	2	2	2	28	3	2	2	2	5	2.5	48	2
10	Total Solids mg/l	1160	780	1730	1380	1650	1560	1430	1720	2000	1670	1970	1540	1480
11	Total Dissolved Solids mg/l	980	560	1470	1120	1198	1260	1120	1260	1540	1190	1610	1524	1120
12	Total Suspended Soilds mg/l	180	220	260	260	310	300	310	460	460	480	360	380	360
13	Fluoride mg/l	0.28	0.28	0.17	0.26	0.25	0.26	0.26	0.26	0.28	0.25	0.35	0.30	0.33
14	DO mg/l	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
15	BOD mg/l	60	92	102	110	110	130	118	140	152	166	136	140	134
16	COD mg/l	160	240	260	280	290	360	310	440	480	510	406	430	380
17	Phosphates mg/l	0.6	1.0	1.0	1.1	1.2	1.2	2.5	2.5	2.5	2.7	2.0	1.6	1.4
18	Oil & Greases mg/l	Nil	Nil	0.5	Nil	0.6	1.2	3.8	3.4	3.9	1.8	2.0	2.0	2.1
19	MPN/100 ml	>2100	>2100	>2100	>2100	>2100	>2100	>2100	>2100	>2100	>2100	>2100	>2100	>2100

Note : - all results except pH are mg/L.

<u>Table No. -2</u>
<u>THE CHEMICAL EXAMINATION OF GROUND WATER SOURCES</u>

SN	Characteristics	TW Nr Swaran Jayanti Park (1)	TW Nr. Ambabari Crossing (2)	TW Nr. Ajmer Bridge (3)	TW Inside Temple, Laxman Nagar, . Janpath Bridge (4)	TW in Shamshan Mansar ovar, Nr. Metro (5)	TW in Mayur paradise , . Riddhi Siddhi Bridge (6)	TW in Gufa Wale Hanuman Ashram, . Maharani Farm Bridge (7)	TW in Jaipur paper Board, Sanga setu,r (8)	TW R G Textile Factory (9)	TW Nr. Godown & Majaar (10)	TW Krishna Paradi, Bambala Brid(11)	TW in Metro Hospital, Sitapura (12)	H.P. Goner Road, Vidhani (13)
1	Ph	7.10	7.80	7.37	7.59	7.46	7.58	7.60	7.19	7.56	7.32	7.81	7.68	7.13
2	Turbidity (NTU)	Nil	Nil	0.8	Nil	Nil	0.6	Nil	0.8	1.1	Nil	Nil	0.2	Nil

3	Total Alkalinity	290	200	450	200	430	350	100	420	450	460	410	320	750
4	Total Hardness	250	340	510	360	280	360	120	290	300	310	160	380	310
5	Calcium Hardness	110	150	230	160	130	160	40	130	160	140	70	220	180
6	Magnesium Hardness/	140	190	280	200	150	200	80	160	140	170	90	160	130
7	Chloride	100	70	190	90	160	70	50	130	230	140	150	130	330
8	Sulphate	36	45	60	72	110	57	40	12	162	82	58	132	42
9	Nitratel	25	120	25	80	90	75	8	70	150	65	200	105	45
10	Total Solids mg/l	840	700	1260	840	1340	920	420	1260	1400	1120	1400	1160	1960
11	Total Dissolved Solids mg/l	840	1160	1260	920	1340	910	420	1260	1400	1120	1400	1160	1960
12	TSS mg/l	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
13	Fluoride mg/l	0.20	0.32	025	0.27	0,36	0.38	0.23	1.02	1.17	0.93	1.17	126	1..45
14	DO mg/l	5.1	4.6	4.2	5.0	4.9	3.8	4.7	3.5	3.5	4.0	4.1	3.7	4.8
15	BOD mg/l	Nil	Nil	2.0	Nil	Nil	4.0	Nil	6.0	8.0	6.0	2.0	Nil	Nil
16	COD mg/l	Nil	Nil	4.0	Nil	Nil	10.0	Nil	10.0	12	10	5	Nil	Nil
17	Phosphates mg/l	Nil	Nil	0.3	Nil	Nil	0.2	Nil	0.5	0.6	0.5	0.2	0.2	Nil
18	Oil & Greases mg/l	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
19	COLIFORM MMPN/100ml	3	Nil	6	Nil	3	9	Nil	16	12	6	3	9	Nil

Note: - All results except pH are mg/L.

Digital Watermark Forensic on Video frames: A Review of Digital Watermarking Techniques using DCT, Threshold and Correlation based Schemes applied on Video Frames

Deepak Kumar[1], Tanushri Mukherjee[2], Kausar Ali[3]
[1,2,3]Department of Electronics and Communication
Vivekananda Institute of Technology, Jaipur

Abstract
Research in information hiding has grown explosively. However, many questions still exist concerning the potential of the technology and its role in establishing and upholding intellectual property rights in the digital age. This work, provides an overview of information hiding, outlining its main disciplines (covert channels, steganography[1], digital watermarking, and anonymity), and some applications current driving interest. The focus is on the current status of and prospects for digital watermarking [2], devoting special attention to a taxonomy based on insertion domain, applicability, and types of existing algorithms.
In this paper, a method is presented, toapply existing watermarking embedding and recovering techniques applied on extracted video frames, to cater the digital watermarking needs of the world by concentrating on embedding the watermarks in the R-G-B planes of color images. For intellectual property right protection of multimedia images, the color image is watermarked three times by embedding the same watermark in each plane of multimedia image. Multimedia images are divided into R-G-B color planes and watermarks are inserted into the individual color planes. One or more watermarks can be inserted into one or more of the color planes. The authentication process consists of retrieving the watermarks from all the three color planes and a final watermark is constructed from the intersection of all the retrieved watermarks.The proposed work has been implemented in both spatial domain and transform domain. For spatial domain, threshold-based correlation watermarking scheme is used whereas, for transform domain DCT based watermarking is done.

Keywords—Video Watermarking, Frames, Digital Watermark, DCT, Threshold, Correlation, Copyright.

Introduction

Issues of intellectual property right and protection abound in this era of persuasive digital information. Digital watermarking addresses the growing concerns of theft and tampering through the use of advanced signal processing strategies[4] to embed copyright and authentication information within multimedia content[5]. Well–established organizations are actively pursuing research into digital watermarking and are calling for proposals to incorporate research these methods in current multimedia standards[6],[7],[8]. Because this research is in its infancy many questions still exist concerning the potential of the technology and its role in establishing and upholding intellectual property rights[9] in the digital age. This paper examines digital watermarking from theoretical and applications-oriented perspectives. Our aim is to advance the technology, assess its appropriateness for certain problems, and broaden its usefulness to multimedia intellectual property management.

Related Work

In this paper, a method is presented to cater the digital watermarking needs of the world by concentrating on embedding the watermarks in the R-G-B planes of color images. For intellectual property right protection of multimedia images, the color image is watermarked three times by embedding the same watermark in each plane of multimedia image. Multimedia images are divided into R-G-B planes and watermarks are

inserted into the individual color planes. One or more watermarks can be inserted into one or more of the colorplanes.The authentication process consists of retrieving the watermarks from all the three color planes and a final watermark is constructed from the intersection of all the retrieved watermarks.
The work [7] has been implemented in both spatial domain and transform domain. For spatial domain, threshold-based correlation watermarking scheme is used whereas, for transform domain DCT based water marking [3] is done. The algorithms used to implement this scheme have been described below.

1. Threshold-based correlation watermarking [10],[11],[12]

This technique for watermark embedding exploits the correlation properties of additive pseudo-random noise patterns as applied to an image. A pseudo-random noise (PN) pattern $W(x,y)$ is added to the cover image $I(x,y)$, according to the equation shown below :

$$I_w(x,y) = I(x,y) + k.W(x,y) \qquad (1.1)$$

Here, k denotes a gain factor, and I_W the resulting watermarked image. Increasing k increases the robustness[4] of the watermark at the expense of the quality of the watermarked image.
Since in this method we work in spatial domain hence, it is less robust than the following two methods described in this thesis.

This method employs a selective encoding of the image block with the PN sequence. For embedding the watermark we develop a watermark mask that is then later added to the image to obtain the watermarked image. For developing the watermark sequence we first check whether the message bit is 1 or zero. If the bit is 0 we append the PN sequence to the watermark mask[5] else a zero sequence is appended. This process is repeated for all the bits of the message (a single pixel of message is referred to as a bit here). After this the watermark mask thus obtained is directly added to the cover image to get the watermarked image.

To retrieve the watermark, the same pseudo-random noise generator algorithm is seeded with the same key, and the correlation between the noise pattern and possibly watermarked image computed. If the correlation exceeds a certain threshold T, the watermark is detected, and a single bit is set. This method can easily be extended to a multiple-bit watermark by dividing the image up into blocks, and performing the above procedure independently on each block.

In the method here, the mean value of the correlation values of all the blocks with the PN sequence is used as the threshold for watermark detection. To start the recovery process, first obtain a PN sequence and then for each image block calculate the correlation between the image block and the PN sequence. A correlation vector is defined in which the correlation values of all the blocks are stored. A 1 is stored in the vector if the image block is exactly the same as the PN sequence. Now the elements of this correlation vector are checked against the mean value of same correlation vector. Only those elements that have value greater than 1 are identified as carrying the message bit '0'. The entire algorithm in step-wise order is provided below.

To Embed:
i   Generate a PN sequence equal to the size of the block.
ii   Process the image into blocks.
iii   Define a watermarking mask of size equal to the cover image.
iv   For each message bit:
     If the bit is '0'
           Add the PN sequence to the watermark mask in the position of the corresponding block.
     Else
           Fill the watermark mask with zero-matrix of size equal to the block.
v   Process next bit.
vi   Add the watermark mask directly to the cover image after applying a gain factor of 'k'.
     (i.e. watermarked image = cover image + k * watermark mask)

To Recover:
i   Generate a PN sequence equal to the size of the block.
ii   Process the image into blocks.
iii   Define a correlation vector in which to store the correlation values of each block with the PN sequence.
iv   Now for each block
     If block is identical to the PN sequence

           Make corresponding element of correlation vector as 1;
     Else
           Calculate the correlation of the block with the PN sequence and store the same in correlation vector.
v   Process next block;
vi   For each element in correlation (iterate I)
         If correlation (I) > mean (correlation)
             Corresponding message bit is 0;
     Else
         Set the bit to 1;

2. DCT based watermarking[13]-[17]:
The DCT allows an image to be broken up into different frequency bands, making it much easier to embed watermarking information into the middle frequency of the image.

The DCT is similar to DFT (discrete Fourier transform)[6]: it transform a signal or image from the spatial domain to the frequency domain.

DCT encoding:
The general equation for DCT transform is given by:

$$C(u,v) = \alpha(u)\alpha(v) \sum_{x=0}^{N-1} \sum_{y=0}^{N-1} f(x,y) \cos\frac{\pi u(2x+1)}{2N} \cos\frac{\pi v(2y+1)}{2N} \quad (2.1)$$

where u, v = 0,1,2....N-1 and the corresponding inverse 2D transform is given by:

$$C(x,y) = \sum_{x=0}^{N-1} \sum_{y=0}^{N-1} C(u,v)\alpha(u)\alpha(v)\cos\frac{\pi u(2x+1)}{2N} \cos\frac{\pi v(2y+1)}{2N} \quad (2.2)$$

where u, v = 0.1.2..., N-1
The basic operation of DCT is given by:
i   The input image is N by M.
ii   F (x, y) is the intensity of the pixel in row x and column y.
iii   C (u, v) is the DCT coefficient in row u1 and column u2 of the DCT matrix.
iv   For most images, much of the signal energy lies at lower frequencies; these appear in the upper left corner of the DCT.
v   Compression is achieved since the lower right values represent higher frequencies and are often small enough to be neglected with little visible distortion.
vi   The input is an N x M matrix (image) and the output is the DCT matrix of same dimension.

2.1 Computing the 2D DCT
The 2D DCT is computed by using the direct matlab function "dct2".
A pseudo code is as follows:
dct_image = dct2 (input_image);

Comparison of mid-band DCT coefficients:
The most basic of the watermarking techniques is based on simple comparison of mid-band coefficients[7] of the DCT image. In this method we transform the watermark into a straight vector having elements 1 or 0. Now the image is broken into blocks and then each one is processed to include one element of the watermark in it. For embedding we take two pixel locations in the

mid-band of the DCT. These positions remain constant during the entire embedding process. (like (5, 2) and (4, 3) etc.). Now every time the message bit is 0 we make one of them (say (5, 2)) to be greater than the other (4, 3) and vice versa. To improve robustness, we increase the difference between these pixel values to 'k'. The higher the value of 'k', better the robustness of the watermark. Since all these changes happen in the mid band DCT, hence they are difficult to find visually. But increasing the value of k might cause some sort of patterns to appear in the images. The algorithm of the above method is given below:

To embed the watermark:

i   Process the image in blocks.
ii   For each block
         Transform block using DCT.
         if message bit is 0.
                 ifdct_block (5,2) < (4,3) .
                         Swap them.
         Else
                 If (5,2) > (4,3)
                         Swap them.
         If (5,2) - (4,3) < k
                 (5,2) = (5,2) + k/2;
                 (4,3) = (4,3) – k/2;
         Else
                 (5,2) = (5,2) - k/2;
                 (4,3) = (4,3) + k/2;
iii Move to next block.
For recovering the watermark , we again break the watermark image into blocks and then process each block to find out whether the corresponding message bit is '0' or '1'. To determine this we check whether (5, 2) is greater than (4, 3), if it is then we assign the corresponding element of message as 1 and vice versa.

To recover the watermark:
i   Process the image in blocks.
ii   For each block
         Transform block using DCT.
         If (5,2) > (4,3)
                         Message = 1
         Else
                         Message=0;
iii Process next block.

3 Correlation based DCT watermarking[18]-[22]:
Another possible technique for transform domain watermarking is to embed a PN sequence W into middle frequencies of the DCT block. In this method, two different PN sequences that are highly uncorrelated are produced and embedded into the image. For this, first break the image into different blocks and then process each block. The block size is chosen such that the entire message/watermark can be written into it. Since, each block of the image can only store one bit of the watermark. After obtaining the blocks their DCT is computed. Now if the message bit is zero then embed the PN sequence (pn_sequence_0) to indicate the presence of bit '0' else insert the other PN sequence

(pn_sequence_1). To improve the detection process it must be made sure that the PN sequences that are generated must be highly uncorrelated. Each image block is processed in exactly the same manner as mentioned above. The algorithm for the above method is given below:

To embed:
i   Generate two "PN" sequences for 1 and 0.
ii   Find two highly uncorrelated sequences by generating two random PN sequences until the correlation between them is above a certain threshold.
iii For each image block
         Transform the block using DCT.
         If message_bit is 0
                 Embed pn_sequence_0 to the image block.
         Else
                 Embed pn_sequence_1 to the image block.
         Take the inverse DCT
iv   Move to next block.

For watermark retrieval, the correlation property of PN sequences is used. First break the image into blocks and then take the DCT of each block. After that, for each block a vector is generated that contains the entire mid band frequencies of the concerned block. Now take the correlation of this vector with both the PN sequences and assign the message bit a '1' if the correlation of the vector with the pn_sequence_1 is higher than that with pn_sequence_0.

To recover:
i   Generate two "PN" sequences for 1 and 0.
ii   Find two highly uncorrelated sequences
iii Process the image in blocks.
iv   For each block
         Transform block using DCT.
         Extract the mid-band coefficients.
         Calculate the correlation of mid-band frequencies with both the sequences.
             If correlation (mid-band, pn_sequence_0)>
             correlation (mid-band, pn_sequence_1)
                     Message=0;
             Else
                     Message =1;
v   Process next block.

Work
Proposed Work:

Fig1: Watermark Embedding Process to Video frames
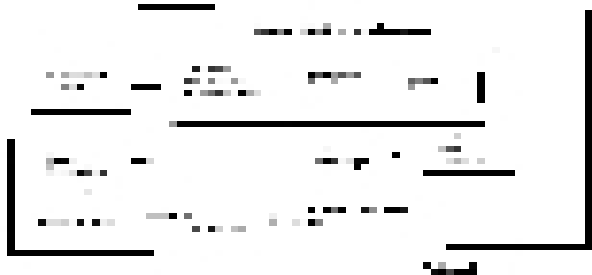
Fig 2: Watermark Extraction Process to Video Frames
Used Key Frames:
Used Video:Tylor:taylor_swift_you_belongs.avi

Selected Key frames:

3494.png   6524.png
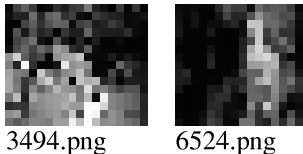
Used Watermarks
ı   and ⁻

2.

Recovered Watermarks

BER = 6.2% COR = 0.7650   BER = 0%   COR = 1 BER = 0%
COR = 1
(PSNR = 79.36)   (PSNR = 82.34)   (PSNR = 63.37)
Recovered Message   Recovered Message   Recovered Message

BER = 9.2% COR = 0.4520   BER = 0% COR = 1   BER = 0%
COR = 0.9921
(PSNR = 81.36)   (PSNR = 81.35)   (PSNR = 63.37)

I.   RESULTS

Chart for PSNR:
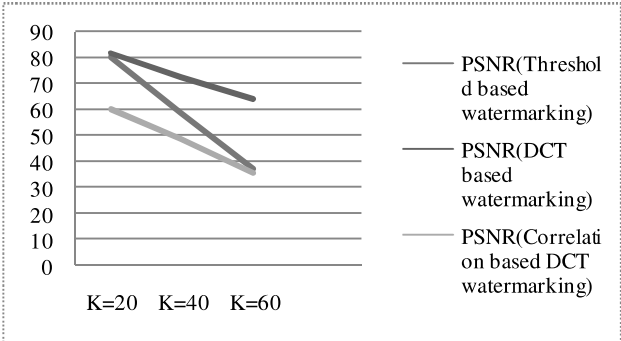
Graph 1.1(a): PSNR calculation in Performance analysis of watermarking techniques for normal watermark embedding and extraction

CHART for BER:
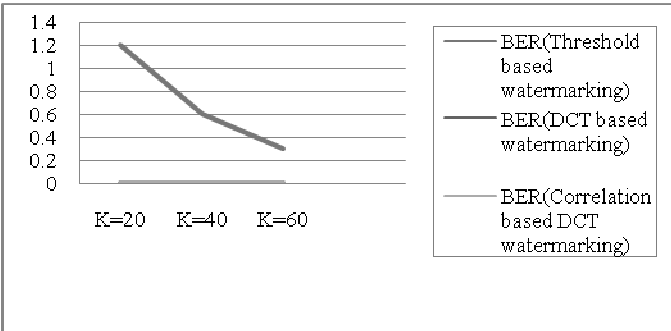
Graph 1.2: BER calculation in Performance analysis of watermarking techniques for normal watermark embedding and extraction

CHART for Coefficient of Correlation
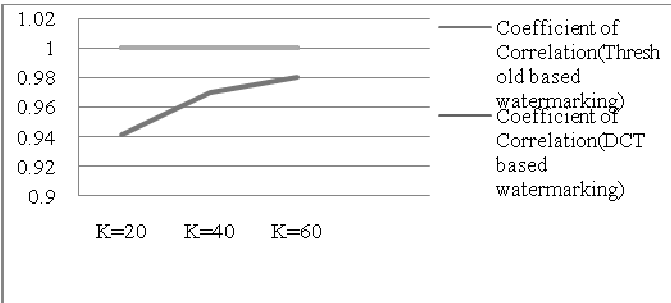
Graph 1.3: Coefficient of Correlation calculation in Performance analysis of watermarking techniques for normal watermark embedding and extraction

II.

Conclusions
The key conclusion of this study is that these methods can be easily applied to color images and these color watermarked images thus obtained have been shown to be much more robust to the normal watermark removal as well as special removal. (i.e.

watermark retrieval in case of attacks like noise addition, compression etc.). Moreover the proposed color image watermarking can be used to improve the quality of the retrieved watermark. The improved quality can be attributed to the fact, that the noise which usually crept in the final watermark during the retrieval process is mostly random and thus the retrieval of the same watermark from the three color planes (R, G, B) of the color image might contain some random noise but the noise won't be there at the same place in all the three of the planes. Hence when the intersection of all the three watermarks was taken, the final watermark retrieved appears to be less noisy.

The final watermarks thus obtained by proposed work are visually more similar to the original watermark than the ones obtained by these methods for grayscale images. Moreover the presence of noise also hinders the performance of detection software's that might be employed for retrieving as well as matching these watermarks with their original images and hence their performance is reduced significantly. This study will significantly improve the matching power of such detection software's.

Another observation of this work is that transform domains watermarking techniques are typically better candidates for digital watermarking of images than spatial domain techniques, for reasons of robustness as well as visual impact. Embedding the watermark in the transform domain proved to be highly resistant to JPEG compression as well as significant amounts of random noise, by anticipating which coefficients would be modified by the subsequent transform and quantization, DCT watermarking schemes were able to produce a watermarking technique with high robustness, good capacity, and low visual impact.

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Ethical Hacking and Security Issue in Communication System

Mukesh Kumar Vijay[1], Leena Goyal[2], Prateek Diwan[3], Pawan Patidar[4]
[1,2,3,4]**Department of Computer Science**
Vivekananda Institute of Technology, Jaipur

Abstract
Ethical hacking has become most popular discussion and one of the fastest growing areas in network security. Communication skills have connected the world and also brought into being anxiety for the system owners around world. The foremost basis after this uncertainty is Hacking-more expressly cracking the computer systems. Thus the need of defending the systems from the annoyance of hacking generated by the hackers is to encourage the persons who will punch back the prohibited attacks on our computer systems - The Ethical Hackers. The main purpose of this study is to disclose the brief idea of the ethical hacking and its affairs with the corporate security. This paper encloses the concise disclosure about the Hacking and as well the meticulous role of the ethical hacking as the contradict measure to cracking in accordance with the corporate security as well as the entity protection. It build ups the centralized idea of the ethical hacking and all its aspects as a whole.

Introduction
The explosive growth of the Internet has provided with: electronic commerce, accessible stores of reference material, collaborative computing, e-mail, and new avenues for advertising and information distribution, and much more. But with dark side: criminal hackers. Governments, companies, and private citizens around the world are anxious to be a part of this revolution, but they are afraid that some hacker will break into their Web server and replace their logo with pornography, read their e-mail, steal their credit card number from an on-line shopping site, or implant Computer software that will secretly transmit their organization's secrets to the open Internet. With these concerns and others, the ethical hacker can help. This paper describes ethical hackers: their skills, their attitudes, and how they go about helping their customers find and plug up security holes. With the growth of the Internet, computer security has become a major concern for businesses and governments. They want to be able to take advantage of the Internet for electronic commerce, advertising, information distribution and access, and other pursuits, but they are worried about the possibility of being "hacked". At the same time, the potential customers of these services are worried about maintaining control of personal information that varies from credit card numbers to social security numbers and home addresses. In their search for a way to approach the problem, organizations came to realize that one of the best ways to evaluate the intruder threat to their interests would be to have

independent computer security Governments, companies, and private citizens around the world are anxious to be a part of this revolution, but they are afraid that some hacker will break into their Web server and replace their logo with pornography, read their e-mail, steal their credit card number from an on-line shopping site, or implant Computer software that will secretly transmit their organization's secrets to the open Internet. With these concerns and others, the ethical hacker can help. This paper describes ethical hackers: their skills, their attitudes, and how they go about helping their customers find and plug up security holes. With the growth of the Internet, computer security has become a major concern for businesses and governments. They want to be able to take advantage of the Internet for electronic commerce, advertising, information distribution and access, and other pursuits, but they are worried about the possibility of being "hacked". At the same time, the potential customers of these services are worried about maintaining control of personal information that varies from credit card numbers to social security numbers and home addresses. In their search for a way to approach the problem, organizations came to realize that one of the best ways to evaluate the intruder threat to their interests would be to have independent computer security professionals attempt to break into their computer systems. This scheme is similar to having independent auditors come into an organization to verify its bookkeeping records the case of computer security, these "tiger teams" or "ethical hackers" would employ the same tools and techniques as the intruders, but they would neither damage the target systems nor steal the information. Instead, they would evaluate the target system's security and report back to the owners with the vulnerabilities they found and instructions for how to remedy them.

History of Hacking
2.1 PREHISTORY
1960s: The Dawn of Hacking
Original meaning of the word 'hack' started at MIT; meant elegant, witty or inspired way of doing almost anything; hacks were programming shortcuts

2.2 ELDER DAYS (1970-1979)
1970s: Phone Phreaks and Cap'n Crunch:
One phreak, John Draper (aka "Cap'n Crunch"), discovers a toy whistle inside Cap'n Crunch cereal gives 2600-hertz signal, and can access AT&T's long-distance switching system. Draper builds a 'blue box' used with whistle allows Phreaks to make

free calls. Steve Wozniak and Steve Jobs , future founders of Apple Computer, make and sell blue boxes.

2.3 THE GOLDEN AGE (1980-1991)
1980: Hacker Message Boards and Groups
Hacking groups form; such as Legion of Doom (US), and Chaos Computer Club (Germany).
1983: Kids' Games
Movie 'War Games' introduces public to hacking.

2.4 THE GREAT HACKER WAR
Legion of Doom vs. Masters of Deception; online warfare; jamming phone lines.
1984: Hacker 'Zines
Hacker magazine 2600 publication; online _zine Phrack.

2.5 CRACKDOWN (1986-1994)
1986: Congress passes Computer Fraud and Abuse Act; crime to break into computer systems.
1 988: The Morris Worm
Robert T. Morris, Jr., launches self-replicating worm on Arpanet.
1989: The Germans, the KGB and Kevin Mitnick.
German Hackers arrested for breaking into U.S. computers; sold information to Soviet KGB.Hacker "The   Mentor" arrested; publishes Hacker's Manifesto. Kevin Mitnick convicted; first person convicted under law against gaining access to interstate network for criminal purposes.
1993: Why Buy a Car When You Can Hack One?
Radio station call-in contest; hacker-fugitive Kevin Paulsen and friends crack phone; they allegedly get two Porsches, $20,000 cash, vacation trips; Paulsen now a freelance journalist covering computer crime.
First Def Con hacking conference in Las Vegas.

2.6 ZERO TOLERANCE (1994-1998)
1995: The Mitnick Takedown:
Arrested again; charged with stealing 20,000 credits card numbers.
1995: Russian Hackers
Siphon $10 million from Citibank; Vladimir Levin, leader.
Oct 1998 teenager hacks into Bell Atlantic phone system; disabled communication at airport disables runway lights.
1999 hackers attack Pentagon, MIT, FBI web sites.
1999: E-commerce Company attacked; blackmail threats followed by 8 million credit card numbers stolen.

Hacking
The explosive growth of the Internet has brought many good things…As with most technological advances; there is also a dark side: criminal hackers.
The term 'hacker' has a dual usage in the computer industry today. The term can be defined as:
HACKER, noun
Traditionally, a hacker is someone who likes to tinker with software or electronic systems. Hackers enjoy exploring and learning how computer systems operate. They love discovering new ways to work electronically.
Recently, hacker has taken on a new meaning — someone who maliciously breaks into systems for personal gain. Technically, these criminals are crackers (criminal hackers). Crackers break into (crack) systems with malicious intent. They are out for personal gain: fame, profit, and even revenge. They modify, delete, and steal critical information, often making other people miserable.
This complimentary description was often extended to the verb form 'hacking' which was used to describe the rapid crafting of a new program or the making of changes to existing, usually complicated software. As computers became increasingly available at universities, user communities began to extend beyond researchers in engineering or computer science to other individuals who viewed the computer as a curiously flexible tool. The increasing popularity of computers and their continued high cost, access to them was usually restricted. When refused access to the computers, some users would challenge the access controls that had been put in place. They would steal passwords or account numbers by looking over someone's shoulder, explore the system for bugs that might get them past the rules, or even take control of the whole system. They would do these things in order to be able to run the programs of their choice or just to change the limitations under which their programs were running. Initially these computer intrusions were fairly benign, with the most damage being the theft of computer time. Other times, these recreations would take the form of practical jokes. However, these intrusions did not stay benign for long. Occasionally the less talented, or less careful, intruders would accidentally bring down a system damage its files, and the system administrators would have to restart it or make repairs. Other times, when these intruders were again denied access once their activities were discovered, they would react with purposefully destructive actions. When the number of these destructive computer intrusions became noticeable, due to the visibility of the system or the extent of the damage inflicted, it became 'news' and the news media picked up on the story. Instead of using the more accurate term of 'computer criminal', the media began using the term 'hacker' to describe individuals who break into computers for fun, revenge, or profit. Since calling someone a 'hacker' was originally meant as a compliment, computer security professionals prefer to use the term 'cracker' or 'intruder' for those hackers who turn to the dark side of hacking. For clarity, we will use the explicit terms 'ethical hacker' and 'criminal hacker' for the rest of this paper.
Old School Hackers: 1960s style Stanford or MIT hackers. Do not have malicious intent, but do have lack of concern for privacy and proprietary information. They believe the Internet was designed to be an open system.
Script Kiddies or Cyber-Punks: Nearly 12 to 30; predominantly white and male; bored in school; get caught due to bragging online; intent is to vandalize or disrupt systems.
Professional Criminals or Crackers: Make a living by breaking into systems and selling the information.
Coders and Virus Writers: See themselves as an elite; programming background and write code but won't use it

themselves; have their own networks called 'zoos'; leave it to others to release their code into 'The Wild' or Internet.

3.1 CASE STUDY:

The Organisation:

CERN, the European Organization for Nuclear Research, is one of the world's largest and most respected centres for scientific research. Its business is fundamental physics, finding out what the Universe is made of and how it works. At CERN, the world's largest and most complex scientific instruments are used to study the basic constituents of matter — the fundamental particles.

What Happened:

A group of hackers identifying themselves as the 2600 succeeded in hacking into a computer network of the Large Hadron Collider at CERN. The hacker team 2600 also identified themselves as the 'Greek Security Team ￭'and was competing against a rival hacker group to successfully tap the computer system of history's largest physics experiment.

Impact:

The website - cmsmon.cern.ch - can no longer be accessed by the public as a result of the attack. Scientists working at CERN, the organisation that runs the vast smasher, were worried about what the hackers could do because they were 'one step away' from the computer control system of one of the huge detectors of the machine. If they had hacked into a second computer network, they could have turned off parts of the vast detector and, said the insider, "it is hard enough to make these things work if no one is messing with it."Fortunately, only one file was damaged but one of the scientists firing off emails as the CMS team fought off the hackers said it was a 'scary experience'.

Lessons

• Try to avoid using internet connection to the computer systems for such an important experiment. But this could not be the proper way in all sense. Hence, appointing the group of certain certified ethical hackers which can hit back such vulnerabilities will be a good choice.

•If you need to use the Internet for experimenting, keep it at secret level from public interference.

Ethical Hacking

With the growth of the Internet, computer security has become a major concern for businesses and governments. In their search for a way to approach the problem, organizations came to realize that one of the best ways to evaluate the intruder threat to their interests would be to have independent computer security professionals attempt to break into their computer systems. In the search for a way to approach the problem of hacking, organizations came to realize that one of the best ways to evaluate the intruder threat to their interests would be to have independent computer security professionals attempt to break into their computer systems. This scheme is similar to having independent auditors come into an organization to verify its bookkeeping records. In the case of computer security, these — tiger teams￭ or — ethical hackers￭ would employ the same

tools and techniques as the intruders, but they would neither damage the target systems nor steal information. Instead, they would evaluate the target systems'security and report back to the owners with the vulnerabilities they found and instructions for how to remedy them. This method of evaluating the security of a system has been in use from the early days of computers. In one early ethical hack, the United States Air Force conducted a 'security evaluation' of the Multics operating systems for 'potential use as a two-level (secret/top secret) system.' Their evaluation found that while Multics was 'significantly better than other conventional systems' it also had '. . . vulnerabilities in hardware security, software security, and procedural security' that could be uncovered with 'a relatively low level of effort.' The authors performed their tests under a guideline of realism, so that their results would accurately represent the kinds of access that an intruder could potentially achieve. They performed tests that were simple information-gathering exercises, as well as other tests that were outright attacks upon the system that might damage its integrity. Clearly, their audience wanted to know both results. There are several other now unclassified reports that describe ethical hacking activities within the U.S. military. With the growth of computer networking, and of the Internet in particular, computer and network vulnerability studies began to appear outside of the military establishment. Most notable of these was the work by Farmer and Venema, which was originally posted to Usenet in December of 1993. They discussed publicly, perhaps for the first time, this idea of using the techniques of the hacker to assess the security of a system. With the goal of raising the overall level of security on the Internet and intranets, they proceeded to describe how they were able to gather enough information about their targets to have been able to compromise security if they had chosen to do so. They provided several specific examples of how this information could be gathered and exploited to gain control of the target, and how such an attack could be prevented. Farmer and Venema elected to share their report freely However, they realized that the testing at which they had become so adept might be too complex, time-consuming, or just too boring for the typical system administrator to perform on a regular basis. For this reason, they gathered up all the tools that they had used during their work, packaged them in a single, easy-to-use application, and gave it away to anyone who chose to download it. Their program, called Security Analysis Tool for Auditing Networks, or SATAN, was met with a great amount of media attention around the world. Most of this early attention was negative, because the tool's capabilities were misunderstood. The tool was not an automated hacker program that would bore into systems and steal their secrets.

Rather, the tool performed an audit that both identified the vulnerabilities of a system and provided advice on how to eliminate them. Just as banks have regular audits of their accounts and procedures, computer systems also need regular checking. The SATAN tool provided that auditing capability, but it went one step further: it also advised the user on how to correct the problems it discovered. The tool did not tell the user how the vulnerability might be exploited, because there would be no useful point in doing so. An ethical hacker is a computer

and network expert who attacks a security system on behalf of its owners, seeking vulnerabilities that a malicious hacker could exploit. To test a security system, ethical hackers use the same methods as their less principled counterparts, but report problems instead of taking advantage of them. Ethical hacking is also known as penetration testing, intrusion, testing and red teaming.

'One of the best ways to evaluate the intruder threat is to have an independent computer security professionals attempt to break their computer systems' .Successful ethical hackers possess a variety of skills. First and foremost, they must be completely trustworthy. Ethical hackers typically have very strong programming and computer networking skills. They are also adept at installing and maintaining systems that use the more popular operating systems (e.g., Linux or Windows2000) used on target systems. These base skills are augmented with detailed knowledge of the hardware and software provided by the more popular computer and networking hardware vendors.

One of the first examples of ethical hackers at work was in the 1970s, when the United States government used groups of experts called red teams to hack its own computer systems. According to Ed Skoudis, Vice President of Security Strategy for Predictive System's Global Integrity consulting practice, ethical hacking has continued to grow in an otherwise lackluster IT industry, and is becoming increasingly common outside the government and technology sectors where it began. Many large companies, such as IBM, maintain employee teams of ethical hackers. We need protection from hacker shenanigans. An ethical hacker possesses the skills, mindset, and tools of a hacker but is also trustworthy. Ethical hackers perform the hacks as security tests for their systems. If you perform ethical hacking tests for customers or simply wants to add another certification to your credentials, you may want to consider the ethical hacker certification Certified Ethical Hacker, which is sponsored by EC Council. Ethical hacking — also known as penetration testing or white-hat hacking —involves the same tools, tricks, and techniques that hackers use, but with one major difference: Ethical hacking is legal. Ethical hacking is performed with the target's permission. The intent of ethical hacking is to discover vulnerabilities from a hacker's viewpoint so systems can be better secured. Its part of an overall information risk management program that allows for ongoing security improvements.

4.1 Understanding the Need to Hack the Systems:
To catch a thief, think like a thief. That's the basis for ethical hacking. The law of averages works against security. With the increased numbers and expanding knowledge of hackers combined with the growing number of system vulnerabilities and other unknowns, the time will come when all computer systems are hacked or compromised in some way. Protecting the systems from the bad guys — and not just the generic vulnerabilities that everyone knows about — is absolutely critical. When we know hacker tricks, we can see how vulnerable your systems are. Hacking preys on weak security practices and undisclosed vulnerabilities. Firewalls, encryption, and virtual private networks (VPN s) can create a false feeling of

safety. These security systems often focus on high-level vulnerabilities, such as viruses and traffic through a firewall, without affecting how hackers work. Attacking the own systems to discover vulnerabilities is a step to making them more secure. This is the only proven method of greatly hardening our systems from attack. If we don't identify weaknesses, it's a matter of time before the vulnerabilities are exploited. As hackers expand their knowledge, so should we. We must think like them to protect our systems from them. We, as the ethical hacker, must know activities hackers carry out and how to stop their efforts. We should know what to look for and how to use that information to thwart hacker's efforts. We don't have to protect your systems from everything. We can't. The only protection against everything is to unplug our computer systems and lock them away so no one can touch them — not even us. That's not the best approach to information security. What's important is to protect our systems from known vulnerabilities and common hacker attacks. It's impossible to buttress all possible vulnerabilities on all our systems. We can't plan for all possible attacks — especially the ones that are currently unknown. However, the more combinations we can try —the more we test whole systems instead of individual units — the better our chances of discovering vulnerabilities that affect everything as a whole. Ethical Hacking makes little sense to harden our systems from unlikely attacks. For instance, if you don't have a lot of foot traffic in your office and no internal Web server running, you may not have as much to worry about as an Internet hosting provider would have. However, don't forget about insider threats from malicious employees!

4.2 Understanding the Dangers that a Systems Face
It's one thing to know that our systems generally are under fire from hackers around the world. It's another to understand specific attacks against our systems that are possible. Many information-security vulnerabilities aren't critical by themselves. However, exploiting several vulnerabilities at the same time can take its toll. For example, a default Windows OS configuration, a weak SQL Server administrator password, and a server hosted on a wireless network may not be major security concerns separately. But exploiting all three of these vulnerabilities at the same time can be a serious issue.

4.2.1 Non-technical attacks:
Exploits that involve manipulating people are the greatest vulnerability within any computer or network infrastructure. Humans are trusting by nature, which can lead to social-engineering exploits. Social engineering is defined as the exploitation of the trusting nature of human beings to gain information for malicious purposes. Other common and effective attacks against information systems are physical. Hackers break into buildings, computer rooms, or other areas containing critical information or property. Physical attacks can include dumpster diving (rummaging through trash cans and dumpsters for intellectual property, passwords, network diagrams, and other information).

4.2.2 Network-infrastructure attacks:
Hacker attacks against network infrastructures can be easy, because many networks can be reached from anywhere in the world via the Internet. Here are some examples of network-infrastructure attacks:
^ Connecting into a network through a rogue modem attached to a computer behind a firewall.
^ Exploiting weaknesses in network transport mechanisms, such as TCP/IP and NetBIOS^ Flooding a network with too many requests, creating a denial of service (DoS) for legitimate requests
^ Installing a network analyzer on a network and capturing every packet that travels across it, revealing confidential information in clear text
^ Piggybacking onto a network through an insecure 802.11b wireless configuration .

4.2.3 Operating-system attacks:
Hacking operating systems (OSs) is a preferred method of the bad guys. OSs comprises a large portion of hacker attacks simply because every computer has one and so many well-known exploits can be used against them. Occasionally, some operating systems that are more secure out of the box —such as Novell NetWare and the flavours of BSD UNIX — are attacked, and vulnerabilities turn up. But hackers prefer attacking operating systems like Windows and Linux because they are widely used and better known for their vulnerabilities. Here are some examples of attacks on operating systems:
o   Exploiting specific protocol implementations.
o   Attacking built-in authentication systems .
o   Breaking file-system security.
o   Cracking passwords and encryption mechanisms.

4.2.4. Application and other specialized attacks:
Applications take a lot of hits by hackers. Programs such as e-mail server software and Web applications often are beaten down:
^ Hypertext Transfer Protocol (HTTP) and Simple Mail Transfer Protocol (SMTP) applications are frequently attacked because most firewalls and other security mechanisms are configured to allow full access to these programs from the Internet.
^ Malicious software (malware) includes viruses, worms, Trojan horses, and spyware. Malware clogs networks and takes down systems.
^ Spam (junk e-mail) is wreaking havoc on system availability and storage space. And it can carry malware. Ethical hacking helps reveal such attacks against your computer systems.

4.3 The Ethical Hacking Process
Like practically any IT or security project, ethical hacking needs to be planned in advance. Strategic and tactical issues in the ethical hacking process should be determined and agreed upon. Planning is important for any amount of testing — from a simple password-cracking test to an all-out penetration test on a Web application. Formulating the plan Approval for ethical hacking is essential. Obtaining sponsorship of the project is the first and important step. One needs someone to back up and sign off on

the plan. Otherwise, the testing may be called off unexpectedly if someone claims they never authorized for the tests. The authorization can be simple. One needs a detailed plan, but that doesn't mean we have to have volumes of testing procedures. One slip can crash your systems — not necessarily what anyone wants. A well-defined scope includes the following information:
 ^ Specific systems to be tested.
^ Risks that are involved.
^ When the tests are performed and your overall timeline?
^ How the tests are performed?
^ How much knowledge of the systems you have before you start testing?
^ What is done when a major vulnerability is discovered?
^ The specific deliverables — this includes security-assessment reports and a higher-level report outlining the general vulnerabilities to be addressed, along with countermeasures that should be implemented When selecting systems to test, start with the most critical or vulnerable systems. For instance, we can test computer passwords or attempt social engineering attacks before drilling down into more detailed systems. It pays to have a contingency plan for our ethical hacking process in case something goes awry. What if we're assessing our firewall or Web application? And we take it down? This can cause system unavailability, which can reduce system performance or employee productivity. Even worse, it could cause loss of data integrity, loss of data, and bad publicity. So it is important to handle social-engineering and denial-of-service attacks carefully. Determine:
how they can affect the systems we're testing and our entire organization. Determining when the tests are performed is something that we must think long and hard about. Do we test during normal business hours? How about late at night or early in the morning so that production systems aren't affected? Involve others to make sure they approve of our timing. The best approach is an unlimited attack, wherein any type of test is possible. The bad guys aren't hacking the systems within a limited scope, so why should we? Some exceptions to this approach are performing DoS, social engineering and physical-security tests. Don't stop with one security hole. This can lead to a false sense of security. Keep going to see what else you can discover. Simply pursue the path we're going down until we can't hack it any longer (pun intended). One of our goals may be to perform the tests without being detected. For example, we may be performing our tests on remote systems or on a remote office and we don't want the users to be aware of what we're doing. One don't need extensive knowledge of the systems we're testing — just a basic understanding.
This will help us protect the tested systems. Understanding the systems we're testing shouldn't be difficult if we're hacking our own in-house systems. If we're hacking a customer's systems, we may have to dig deeper. Most people are scared of these assessments.

4.4 Selecting tools
As with any project, if we don't have the right tools for ethical hacking, accomplishing the task effectively is difficult. Having said that, just because we use the right tools doesn't mean that

we will discover all vulnerabilities. It is important to know the personal and technical limitations. Many security-assessment tools generate false positives and negatives (incorrectly identifying vulnerabilities). Others may miss vulnerabilities. If we're performing tests such as social engineering or physical-security assessments, we may miss weaknesses. Many tools focus on specific tests, but no one tool can test for everything. For the same reason that we wouldn't drive in a nail with a screwdriver, we shouldn't use a word processor to scan our network for open ports. This is why we need a set of specific tools that we can call on for the task at hand. The more tools we have, the easier our ethical hacking efforts are. It is very much essential to make sure you that we're using the right tool for the task:
^ To crack passwords, we need a cracking tool such as LC4, Johnthe Ripper or pwdump.
(A general port scanner, such as Super Scan, may not crack passwords.)
^ For an in-depth analysis of a Web application A web-application assessment tool (such as Whisker or Web Inspect) is more appropriate than a network analyzer (such as Ethereal).
Hundreds, if not thousands, of tools can be used for ethical hacking— from our own words and actions to software-based vulnerability- assessment programs to hardware-based network analyzers. The following list runs down some of most favourite commercial, freeware, and open-source security tools.

4.5 Security Tools:
Foot printing and Reconnaissance : Whois, Sam Spade, Nslookup, Traceroute, Ping
Scanning and Enumeration : Nmap, NMapWin, SuperScan, IP Scanner, Hyena, Retina, LANguard
System Hacking : Telnet, Snadboy, Lophtcrack, Keylogger
Trojans and Backdoors : NetBus, SubSeven
Sniffers : Spoofing a MAC address, Spoofed Mac, Ethereal, Iris Snort
Web Based Password Cracking : Cain and Abel, Legion, Brutus
Covering Tracks : Image Hide, ClearLogs
Google Hacking and SQL Injection : Google Hacking, Google Cheat Sheet, SQL Injection
The capabilities of many security and hacking tools are often misunderstood. This misunderstanding has shed negative light on some excellent tools, such as SATAN (Security Administrator Tool for Analyzing Networks) and Nmap (Network Mapper).
Some of these tools are complex. Whichever tools we use, familiarize ourselves with them before we start using them. Thus it is quite fine to go through the following steps:
^ Read the readme and/or online help files for your tools. ^ Study the user's guide for your commercial tools. ^ Consider formal classroom training from the security-tool vendor or another third-party training provider, if available.

4.6 Characteristics in tools for ethical hacking
^ Adequate documentation.
^ Detailed reports on the discovered vulnerabilities, including how they may be exploited and fixed.

^ Updates and support when needed.
^ High-level reports that can be presented to managers or non techie types.
These features can save our time and effort when we're executing the plan. Ethical hacking can take persistence. Time and patience are important. We should be careful when we're performing our ethical hacking tests. A hacker in our network or a seemingly benign employee looking over our shoulder may watch what's going on. This person could use this information against us. It's not practical to make sure that no hackers are on our systems before we start. Just make sure to keep everything as quiet and private as possible. This is especially critical when transmitting and storing our test results. If possible, encrypt the e-mails and files using Pretty Good Privacy(PGP) or something similar. At a minimum, password-protect them. Harness as much information as possible about the organization and systems, which is what malicious hackers do. 1. Search the Internet for your organization's name, your computer and network system names, and your IP addresses. I think 'Google' is a great place to start for this. 2. Narrow the scope, targeting the specific systems which are being tested. Whether physical-security structures or Web applications, a casual assessment can turn up much information about our systems. 3. Further narrow the focus with a more critical eye. Perform actual scans and other detailed tests on the systems. 4. Perform the attacks, if that's what has been chosen to do.

4.7 Evaluating results
Assess the results to see what is uncovered, assuming that the vulnerabilities haven't been made obvious before now. I think, this is the most important step. Evaluating the results and correlating the specific vulnerabilities discovered is a skill that gets better with experience. At the end of the day we'll end up knowing our systems as well as anyone else. This makes the evaluation process much simpler moving forward. Moving on...... When we've finished with our ethical hacking tests, we still need to implement our analysis and recommendations to make sure that our systems are secure. New security vulnerabilities continually appear. Information systems constantly change and become more complex. New hacker exploits and security vulnerabilities are regularly uncovered. Security tests are a snapshot of the security posture of our systems. At any time, everything can change, especially after software upgrades, adding computer systems, or applying patches. Plan to test regularly (for example, once a week or once a month).

Ceh
5.1 Introduction
Attacks on the World Trade Centre ignited a very important question in the hearts of the founders of EC–Council – Jay Bavisiand Haja Mohideen. Shortly after the attacks, they researched the web for — Information Security ꟷ programs that would be able to provide Information Security professionals with the necessary tools and education that will help them avert a cyber war, should the need ever arise. The results returned from the research were disappointing and that motivated them to

form the International Council of Electronic Commerce Consultants, known as the EC-Council. They soon gained the support of subject matter experts from all over the world that eventually led to the creation of various standards and certifications both in the electronic commerce and information security space. The International Council of E-Commerce Consultants (EC-Council) is a member-based organization that certifies individuals in various e-business and security skills. It is the owner and developer of the world famous Certified Ethical Hacker course, Computer Hacking Forensics Investigator program, License Penetration Tester program and various other programs offered in over 60 countries around the globe. These certifications are recognized worldwide and have received endorsements from various government agencies including the US Federal Government via the Montgomery GI Bill, and the US Government National Security Agency (NSA) and the Committee on National Security Systems (CNSS) certifying EC-Council Network Security Administrator (ENSA) program for meeting the 4011 training standard for information security professionals. Individuals who have achieved EC-Council certifications include those from some of the finest organizations around the world such as the US Army, the FBI, Microsoft, IBM and the United Nations. EC-Council has also been featured in internationally acclaimed publications including The Herald Tribune, The Wall Street Journal, The Gazette and The Economic Times as well as in online publications such as the ABC News, USA Today, The Christian Science Monitor, Boston and Gulf News.

EC-Council is the creator of the Hacker Halted conference and workshop series. The world-class Hacker Halted events are held all over the world. It had been held in Singapore, Taiwan, Mexico, Malaysia, USA and Dubai, and will be heading to many other cities in the future. Hacker Halted features renowned international speakers who are experts in the field of information security. The objective of Hacker Halted series of conferences is to raise international awareness towards increased education and ethics in information security.

Another EC-Council event series is the Security Summit which is a road-show as a platform to expose individuals in the host cities of the need for information security and to help them understand the current trends and issues in information security.

5.2 Vision

EC-Council envisions itself to be a community of common interest, where individuals converge on one platform for communication, education and knowledge sharing regardless of their specific responsibilities or abilities. The organization welcomes any individual who believes in our philosophy in creating awareness and sincerely desires to enhance their skills and that of the E- commerce circle. Administration of the philosophy is done by its members in accordance to democratic principles.

5.3 Mission Statement

EC-Council aims to:
• Foster professional standards;

• Provide for communication among all E-commerce professionals, including corporate consultants in various government agencies, businesses, and education, independent consultants, and students aspiring to be E-commerce professionals;
• Provide for education through the development of curriculum, publishing of articles and books, participation in professional papers, and the sponsoring of seminars and conferences;
• Stimulate the continued growth of the E-commerce arena by providing a forum for the raising of new ideas and an effective mechanism for dialogues on these issues;

• Provide security, legal and marketing white papers in E-commerce as well as real-time updates on the current trends in the Information Security world; and
• Provide accreditation for E-commerce certifications and training programs.

5.4 Recertification:

EC-Council Continuing Education (ECE) points will serve to ensure that all EC-Council certified professionals maintain and further their knowledge. Professionals will need to meet the requirements of the ECE to avoid revocation of certification. Members holding the C|EH/CNDA designation (as well as other EC-Council certifications) will be required to re-certify under this program every three years for a minimum of 120 credits (20 credits per year).

Controversy

The term ethical hacker have been objected by certain computer security professionals: 'There's no such thing as an 'ethical hacker '- that's like saying 'ethical rapist'- it's a contradiction in terms.'
Part of the controversy may arise from the older, less stigmatized, definition of hacker, which has become synonymous with computer criminal. Some companies on the other hand do not seem to mind the association. According to EC-Council, there has been an increase of careers where CEH and other ethical hacking certifications are preferred or required.

Ethical Hacking: Future Impulse

It is always enticed to predict the future when it comes to computer security. Of course it's impossible to know for sure but it is possible to make an educated guess. They say we are in the — the golden age of hacking ‖ and we do not agree more. Tools for both Windows and Linux are available and now anyone can actually be a decent hacker using nothing but windows. The best of times for those curious about security and how it can be breached and the worst of times if you are sitting on the net with a vulnerable computer! If we were to split hacking into 3 levels, say low, middle and high. Low is requiring the least amount of technical skill and relies more on social engineering and a few simple things like hardware key loggers. Middle level comprises a good skill with tools available and precompiled buffer overflows, etc... High is someone who can think way outside the box and deepest aspects of TCP/IP and can code accordingly. Our strong feeling is that the middle level as defined it will be

the one that will disappear in the future. Buffer overflows will become a thing of the past. Technology is growing strongly towards that direction. Exploiting code will slowly become more and more difficult and tools that focus on that will lose more and more of their effectiveness. Hackers will either focus on things like social engineering or gaining physical access. Join a cleaning crew and place a hardware key logger. Come back the next night and retrieve it and while not very sophisticated it can be very devastating none the less. The high end will be those that understand the very core of IP6 and will understand how to manipulate packet flows in ways no one has ever thought about. Obviously if this scenario is correct, most hackers will focus on the low level and that perhaps is even scarier. Using a combination of hardware and social skills could prove the most difficult to defend against.

That's the future as I see it happening. Let's wait and see!

Conclusion

The idea of testing the security of a system by trying to break into it is not new. From a practical standpoint the security problem will remain as long as manufacturers remain committed to current system architectures, produced without a firm requirement for security. As long as there is support for ad hoc fixes and security packages for these inadequate designs and as long as the illusory results of penetration teams are accepted as demonstrations of a computer system security, proper security will not be a reality. Regular auditing, vigilant intrusion detection, good system administration practice, and computer security awareness are all essential parts of an organization's security efforts. A single failure in any of these areas could very well expose an organization to cyber-vandalism, embarrassment, loss of revenue or mind share, or worse. Any new technology has its benefits and its risks. While ethical hackers can help clients better understand their security needs, it is up to the clients to keep their guards in place.

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Implementation of area and energy efficient Full adder cell

Ruchi Sharma
Department of Electronics & Communication
Vivekanada Institute of Technology, Jaipur

Abstract
This paper presents a low power full adder cell designed with transmission gate and pass-transistor logic styles that lead to have a reduced area, power and delay. We compared 28T conventional CMOS full-adders to 14T and 16T full adder cell, in terms of speed, power consumption and area. All the full-adders were designed with a 0.25um CMOS technology, and were tested using a tannerv13.0 .After simulating CMOS and pass transistors based full adder ,compared the average power consumption.16T based Full adder consumed 98% less power compared to 28T conventional CMOS full adder.
Keywords: Pass transistor logic (PTL), Transmission Gate (TG), Complementary Metal Oxide Semiconductor (CMOS), Full Adder (FA)

Introduction

Energy-efficiency is one of the most required features for modern electronic systems designed for portable applications. Addition is a fundamental arithmetic operation that is broadly used in many VLSI systems, such as application-specific digital signal processing (DSP) architectures and microprocessors. 1 bit Full Adder (FA) cell is the building block for most implementations of subtraction, addition operations. Full adder circuit is functional building block and most critical component of complex arithmetic circuits like microprocessors, digital signal processors or any ALUs. Almost every complex computational circuit requires full adder circuitry. The entire computational block power consumption can be reduced by implementing low power techniques on full adder circuitry.

In this paper, we report the design and performance comparison of two full-adder cells implemented with pass transistor logic and transmission gate. The resultant full-adders show to be more efficient on regards of power consumption and delay when compared with 28T conventional CMOS full adder.
Several full adder circuits have been proposed targeting on design accents such as power, delay and area. Among those designs with less transistor count using pass transistor logic have been widely used to reduce power consumption [1, 3].These designs can be divided into two types, the CMOS logic and the pass-transistor logic [4]
This paper is organized as follows. Section II presents the CMOS conventional structure adopted as standard in previous papers for designing a full-adder cell. Section III introduces the pass-transistor powerless/groundless logic styles and transmission gate used to build the two proposed full-adders.

Section IV explains the features of the simulation environment used for the comparison carried out to obtain the power and speed performance of the full-adders. Section V reviews the results obtained from the simulations, and Section VI concludes this work.

CMOS based Full Adder cell:
The Full adder design in static CMOS with complementary PMOS and NMOS [1].This adder is based on regular CMOS structure (pull-up and pull-down network), which uses both NMOS and PMOS transistors. These transistors are arranged in a structure formed by two complementary networks
In static CMOS, the NMOS transistors only need to pass 0's and the PMOS only pass 1's, so the output is always strongly driven and the levels are never degraded. This is called a fully restored logic gate Pull-up network is complement of pull-down.
Below schematic is a Full adder cell of 28 transistors which is implemented by using CMOS technique (used sum and carryout equations).
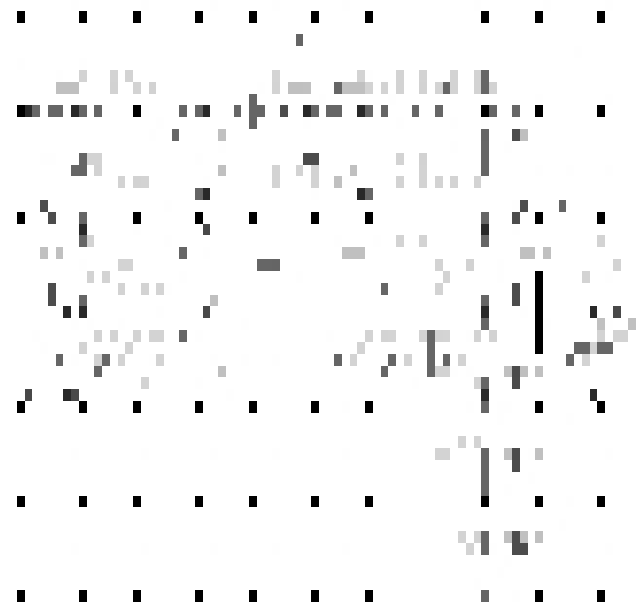

Fig1: 28T conventional CMOS Full adder cell

Advantages: One of the most significant advantages of this full adder was its high noise margins and thus reliable operation at low voltages. The layout of CMOS gates was also simplified due to the complementary transistor pairs.
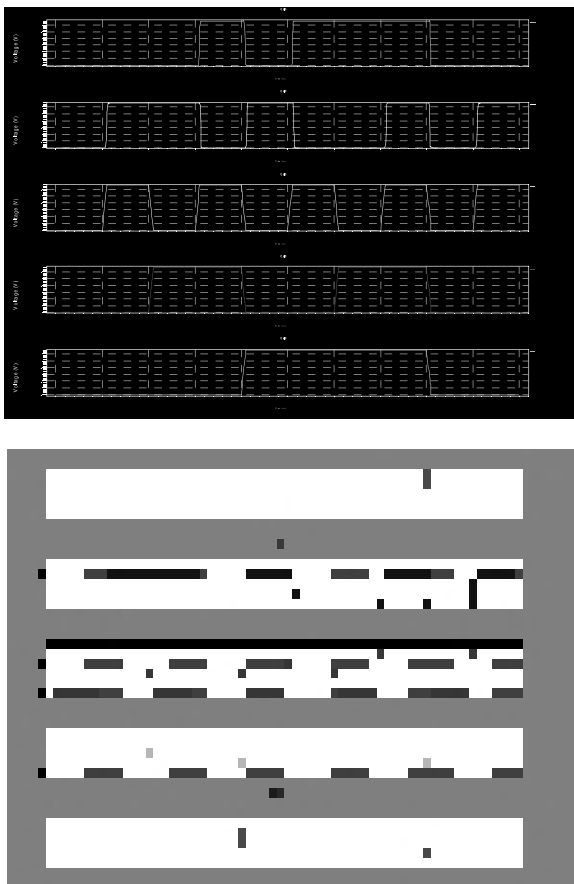
Disadvantages: But the use of substantial number of transistors results in high input loads, more power consumption and larger silicon area. [5]

Rise time and fall time depends on load capacitance, we have simulated on different load capacitances.

Load capacitance=1pf
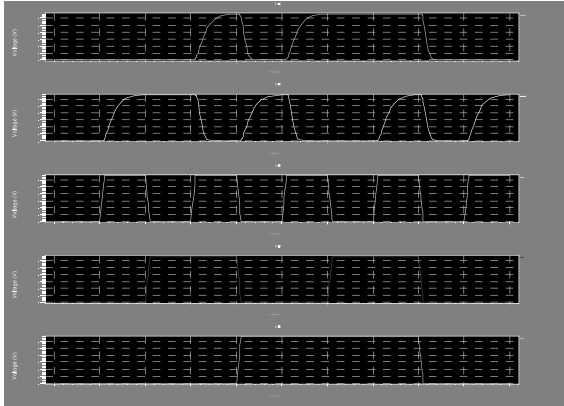
Load capacitance =0.01pf

Fig.2: Transient response on   Variations of power supply

**Full Adder cell using pass transistor and transmission gate:**

Pass Transistor logic: pass transistors are single FETs that pass the signal between drain and source terminals instead of a fixed power supply value. [6]

The basic difference of pass-transistor logic compared to the CMOS logic style is that the source side of the logic transistor networks is connected to some input signals instead of the power lines. The advantage is that one pass-transistor network (either NMOS or PMOS) is sufficient to perform the logic operation, which results in a smaller number of transistors and smaller input loads. [7]

Pass transistors require lower switching energy to charge up a node, due to reduces voltage swing [6]. They require less area and wiring, but cannot pass the entire voltage range

The basic nFET pass circuit is shown in fig

Fig.3: Schematic symbol of NMOS pass transistor
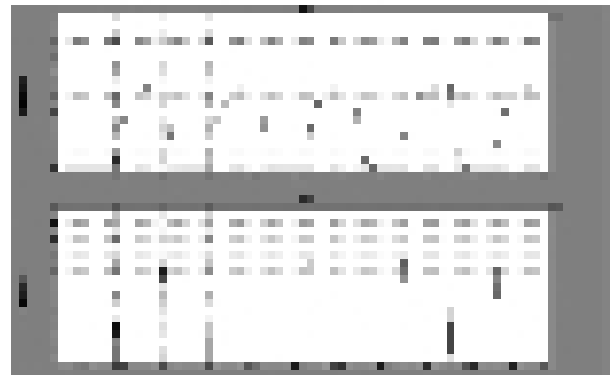
Fig.4: simulation result of NMOS pass transistor

Transmission gate:

An electrical feature of the transmission gate and pass transistor is that there are no direct signal connection to the power supply Vdd or ground [6].

    No isolation between the input and output.

    Output progressively deteriorates as it passes through various stages.

Both 14T and 16T simulated by using 0.01pF load capacitance to avoid rise and fall time delay.

14 T Full Adder cell:

Implementated Full Adder cell using pass transistor logic and transmission gate .

In this schematic 14 transistors are used .Two pass transistors PMOS performs XOR functions of two inputs A and B, Another input cin XORed by using transmission gate. Similarly carry will be extracted by using pass transistor and transmission gate.
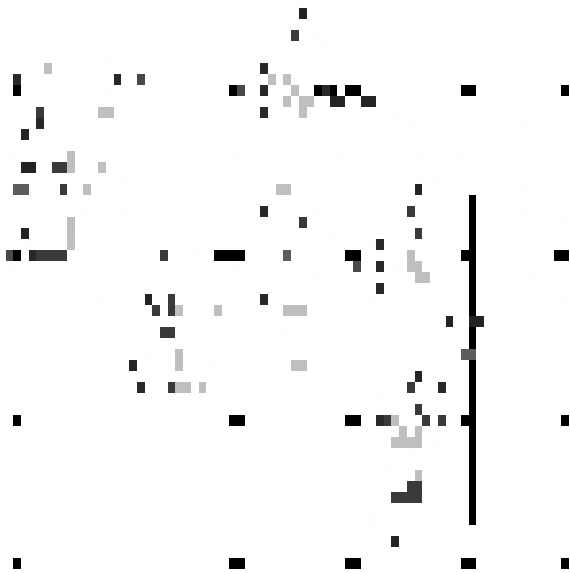

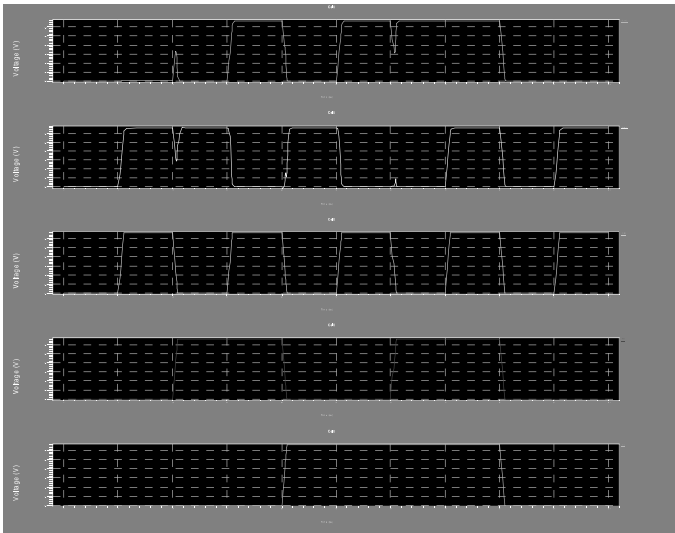**Fig.5: Schematic of 14T Full Adder cell**

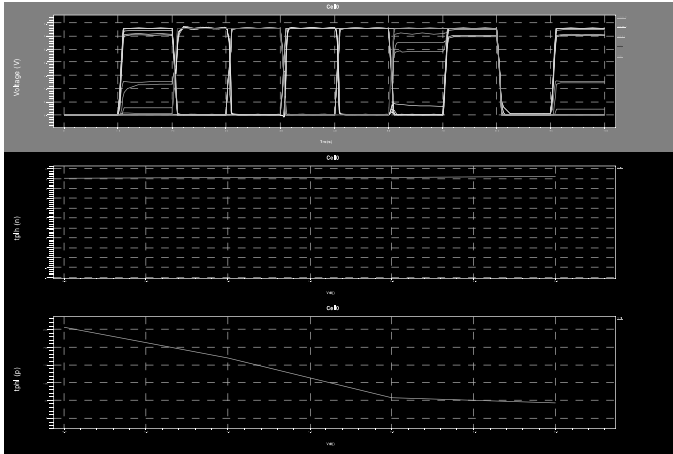Simulation results :

Fig.6: Transient response

Fig.7: Transient response on different power supply 16T Full Adder cell:

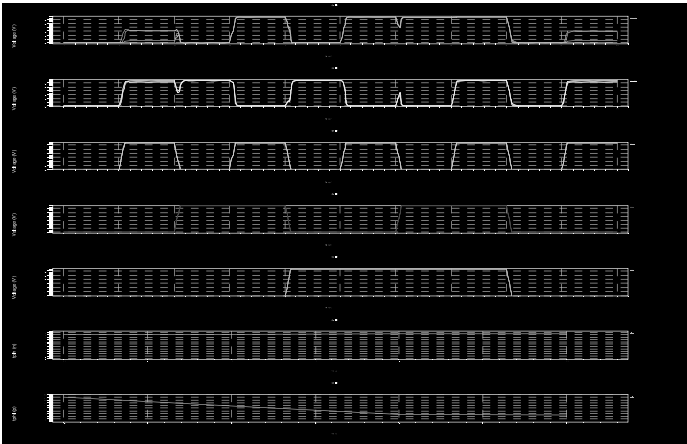**Fig.8: Schematic of 16T Full adder**

Simulation Results:

Fig.9: Transient response

Power Results:
Power Supply=3.3v

Time 0 to 1e-007
Table .I: Compared power of 14T and 16T with conventional 28T CMOS

	Min Power	Max Power	Avg Power
28T	6.020824e-010	3.656563e-003	550µ
16T	7.252275e-010	2.860838e-004	6.9µ
14T	6.755391e-010	7.328616e-004	16.7µ

Simulation result of rise and fall time delay on different power supply:

Table .II: Rise & fall time delay on power supply = 0

	Power Supply (Vdd)= 0	
	tphl	Tplh
14T	2.5614e-010	9.1055e-009
16T	4.0240e-010	9.1355e-009

Table .III: Rise & fall time delay on power supply = 1

	Power Supply (Vdd) = 1	
	tphl	Tplh
14T	1.6985e-010	9.1301e-009
16T	2.3260e-010	9.1500e-009

Table .IV: Rise &fall time delay on power supply = 2

	Power Supply (Vdd)= 2	
	tphl	Tplh
14T	5.6927e-011	9.1777e-009
16T	8.6574e-011	9.1989e-009

Table .V: Rise& fall time delay on power supply = 3

	Power Supply (Vdd) = 3	
	tphl	Tplh
14T	4.3515e-011	9.2012e-009

16T	7.6561e-011	9.2149e-009

Conclusion:

The current work simulated the design of 14 and 16 transistor full adder cell using transmission and pass transistor logic, which is used low transistor count. XOR gate which is implemented by PMOS pass transistors has a less delay .The main aim of this paper is to design a high performance and low power full adder cell with less power dissipation and acquires least area.

The circuits were designed with a TSMC 0.25µm technology, and were simulated and compared against other conventional full adder cell. T-Spice Simulation results shows that average power consumption is less than in 16T. By using 3 steps of power supply from 0 to 3 volts Tphl is higher in 16T compared to 14T and Tplh is almost same.The 16T full adder cell achieves better power reduction when compared with conventional CMOS full adder. Due to less power dissipation and less transistor count the 16T full adder cell can be useful in portable and low power applications.

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Effect of hydrogen on optical properties of multilayer ZnSe/Mn and ZnSe/Co thin films

Mahesh K. Jangid[1], M.Singh[2]
[1]Department of Physics, Vivekananda Institute of Technology, Jaipur
[1]Department of Physics, University of Rajasthan, Jaipur

Abstract
This article is reporting the effect of hydrogen on optical properties of multilayer ZnSe/Mn and ZnSe/Co thin films. The thin films were prepared using thermal evaporation method at pressure 10-5 torr and hydrogenated at different pressure (20 and 30 Psi) to see the effect of hydrogen on optical properties. The optical band gap was found to be decrease in case of ZnSe/Mn thin films but it was found to be increase in case of ZnSe/Co thin films. Hence it was suggested that optical band can be tailored using hydrogen gas in dilute magnetic semiconductor.

Introduction
In recent years, II-VI DMS thin film materials have attracted tremendous attention in their fundamental studies as well as in technical worldwide applications due to their unique size dependent properties that are distinct from their corresponding bulk characteristics. In addition, a drastic cut in the production cost of these DMS semiconductor thin films in place of single crystals has been observed. The wide band gap semiconductors are ubiquitous candidates of modern semiconductor technology. Many efforts are currently directed to a new generation of photodiodes based on wide band-gap semiconductors. ZnSe with a direct band gap (Eg = 2.7 eV) is of considerable interest in electronic and optical devices. The electronic passivation of host impurities inducedby atomic hydrogen in semiconductor has been widely studied in materials of technological relevance such as Si , Ge , GaAs , InP , GaP and GaH. Recently it has been observed that hydrogen can even tune the band gap of InxGa1-xAs1-yHy an innovative semiconducting alloys of high potential for telecommunications and solar cell applications [1-6]. The effect of atomic hydrogen on the magnetic properties of (Ga,Mn)N is of interest since potentially it could have a large influence if it were to passivative the deep Mn acceptors [7-8]. Today's microelectronics relies on electronic charges to process and store information . Recently the advantages of using electronic spins for such parposes have been realized and a new class of semiconductor magnetoelectronic a spintronic devices is emerging, such as spin light emitting diodes [9-10] or spin transitor [11]. Dilute magnetic semiconductor (DMS) which combine magnetic ordering with the versatile properties of semiconductors [11-12]. The diluted magnetic semiconductors (DMS / In Mn) as holds great promise for future spin-tronics applications. The combination of its magnetic and semiconducting properties opens up exciting possibilities for novel devices.(In-Mn)As is only DMS to exhibit light induced ferromagnetism [12-13] as well as electric –field control

magnetism[14]. The essential effort of the scientists is concentrated on studying of the spin polarized transport in nanosize multilayer structures, which are including alternating layer of ferromagnetic metals and ZnSe/Co and its optical properties and also effect of hydrogen in optical band gap.

Experimental:
The samples were prepared by thermal evaporation method using vacuum coating unit at a pressure of 10^{-5} torr. The thin film of ZnSe/Mn and ZnSe/Co were prepared by in situ evaporation one by one and stacked layered structures were prepared. The hydrogen introduce in hydrogen chamber at different pressure (20 and 30 Psi) to see the effect of hydrogen on optical properties of these films. The UV–vis transmission & absorption spectra of thin films were taken at room temperature in the wavelength region of 300–800 nm with the help of Hitachi-330 spectrophotometer.

Results and discussion:
(1) Multilayer ZnSe/Mn thin film:
Fig.1. shows transmission versus wavelength for as- grown and hydrogenated ZnSe/Mn multilayer thin films. Hydrogenated thin films shows higher transmission than as-grown thin film. These variations in the transmission spectra are due to the defect passivation by hydrogen adsorption at surface and interface. Fig. 2. shows the graph between energy (hv) and $(\alpha h v)^2$, to carried out the band gap. The band gap of hydrogenated thin films decreases with hydrogenation.
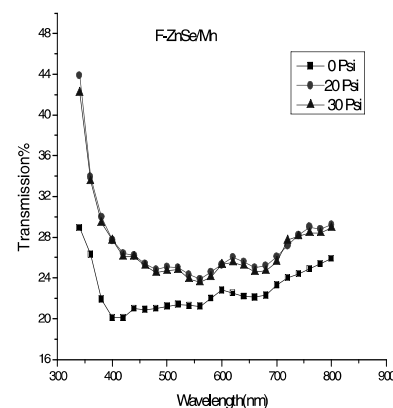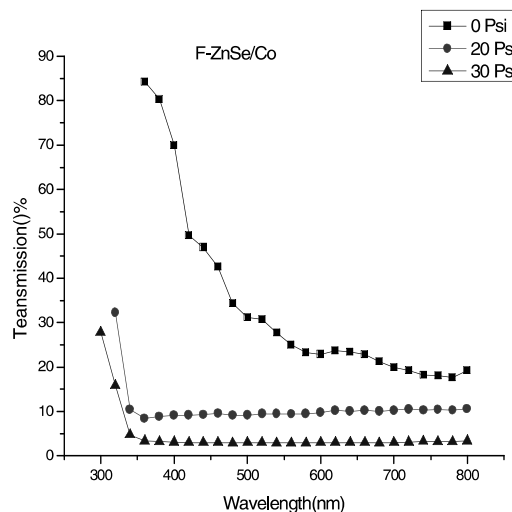

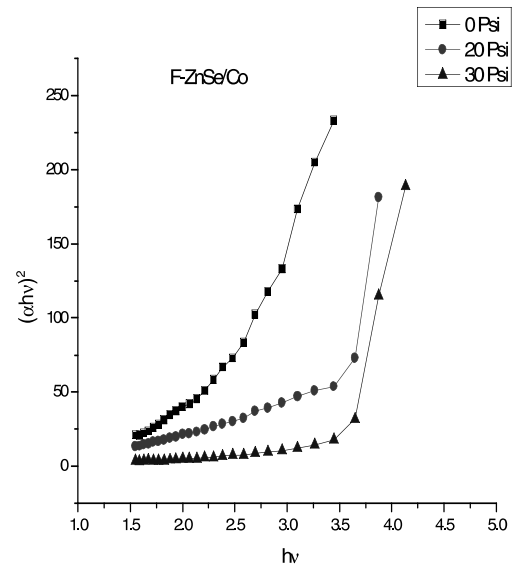**Fig 1. Optical transmission spectra of multilayer ZnSe/Mn thin film at different hydrogen pressure**.

Fig 2. Optical band gap spectra of multilayer ZnSe/Mn thin film at different hydrogen pressure.
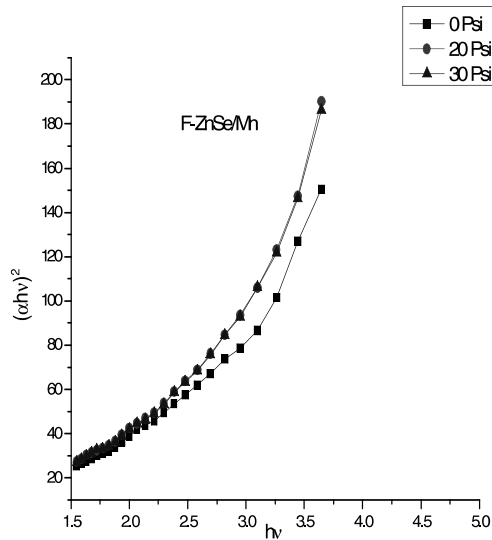
Fig 4. Optical band gap spectra of multilayer ZnSe/Co thin film at different hydrogen pressure.

(2) Multilayer ZnSe/Co thin film:

The variation in optical transmittance was recorded in the wavelength range from 300 nm to 800 nm for all the films. Fig.3 shows variation in %T with wavelength (■). The transmittance spectra showed maximum transmission at shorter wavelengths whereas minimum transmission in the higher wavelength range and the transmission edge is not sharp as expected for thin films. there is no change in transmission at higher region of wave length but at lower region of wavelength increase value as transmission observed. Fig. 4. Shows the variation of band gap with hydrogenation and it was found that band gap increase with hydrogenation in case of ZnSe / Co multilayers. It may due to hydrogen accumulation responsible for it.

Conclusion:

The diluted magnetic semiconductors is prepared using multilayer ZnSe/Mn and ZnSe/Co thin films and confirm the inter diffusion as well as the effect of hydrogenation on this structure The results clearly indicate that hydrogenation can be used to modify optical properties of films. The optical band gap of ZnSe/Mn thin films found to be decrease with hydrogen pressure, but band gap of ZnSe/Co found to be increase with hydrogen pressure. It means Mn and Co interlayer with ZnSe reverse the effect of hydrogenation and also tailored the band gap range of material from low to high region.

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Fig 3. Optical transmission spectra of multilayer ZnSe/Co thin film at different hydrogen pressure.

Water Fuel Cells and Water Powered Cars Alternative Fuel Saves the Environment and Cuts Energy Expenses

[1]Mala Mathur, [2]Pallavi Mishra
[1,2]Department of Chemistry
Vivekananda Institute of Technology, Jaipur

Abstract
There is a tremendous pressure on the conventional fuel available today, as it is limited in quantity. That's why alternative fuel is developed vigorously. In line of search for alternative fuel, water fuel cells and water powered cars are being developed. Clean energy is being derived from water. Water can be cheaply disassociated into Brown's Gas / HHO gas (monatomic and diatomic Hydrogen and Oxygen) using efficient electrolyzing techniques which require very little power to operate, or sophistication to build. There is no meaningful expense in creating HHO gas, and there is no need to store it under high pressure as it can be safely created on-site, at low pressure, on demand. Using self-generated HHO to power our vehicles is no more dangerous than using gasoline.

**Key Words: Fuel cell, Brown gas**

Introduction

A water-fuelled car is an automobile that hypothetically derives its energy directly from water. Water-fuelled cars have been the subject of numerous international patents, newspaper and popular science magazine articles, local television news coverage, and websites. The claims for these devices have been found to be pseudoscience and some were found to be tied to investment frauds.[1-2] These vehicles may be claimed to produce fuel from water on board with no other energy input, or may be a hybrid claiming to derive some of its energy from water in addition to a conventional source (such as gasoline). In fact when we run a vehicle on gasoline or diesel fuel, we are actually running it on hydrogen, in the similar manner we are using the hydrogen from water. According to National Bureau of standard figures when we use water, the energy released is roughly two and half times more powerful than that of gasoline. So water is a very powerful fuel. Water powered cars; using 100 % water as fuel is real. By splitting water by electrolysis and creating hydrogen/ oxygen gas, we can replace gasoline.[3-4] There is no doubt that it is possible to run internal combustion engines on nothing but Brown's Gas / HHO .For this purpose we have to convert all ICE (internal combustion engines) to burn hydrogen and oxygen in the water. And the amount of water used in an all-HHO system is less than a third of the volume of gasoline that would be used for the same mileage.

Water Fuel Cells Can Convert Water into Fuel

The principle of functioning of water fuel cells is simple. Water consists of hydrogen and oxygen and can be separated easily into its component which when recombined releases energy[1]. Brown's gas and HHO are fringe science terms for a 2:1 mixture of oxyhydrogen [9]. Water fuel cells take the hydrogen from the water and convert it into Brown's gas (or HHO), which in turn powers the car. Browns Gas is a new product and there is no literature describing its properties which are sufficiently different from a combined molecular hydrogen and oxygen gas mixture, in 2:1 proportion, to be significant in industrial and commercial applications. There is a battery, which converts the water into brown/s gas and it releases energy in this process which is being utilized.

A fuel water cell is a small sized container that is installed under the hood of the vehicle. This device is filled with water, as well as a little bit of baking soda. One end of the device is attached to the engine exhaust and it is responsible for pumping spent fuel into the water cell and the other end of the device is connected to the carburetor. A wire from the vehicle battery conducts an electric current into the water. This current helps baking soda to split the water into hydrogen. Then it produces Brown's gas[5].

Brown's Gas got the name from Yull Brown, a gifted Bulgarian professor and inventor living in Australia. He was one of the first to note the extraordinary properties of HHO, and to disassociate it cheaply from water. He was also one of the first to use it to power an automobile's internal combustion engine, and to also market it as a welding gas. Besides Professor Brown, the most famous name in HHO is that of Stanley Meyer[6-8]. Meyer created a very efficient, high-output electrolyze cell for creating large amounts of HHO on demand. He then mated it with a Volkswagen-powered dune buggy vehicle; and ran the engine on nothing but HHO. Meyer's methods and results were unique; he actually removed the spark plugs of the engine and devised a system to self-explode the gas under pressure using a laser and RF electricity to induce the H gas atoms to a much higher state of excitement. Although his HHO creation cell has been reproduced successfully many times, very few have been able to run cars entirely on HHO yet;

Stanley Meyer's water fuel cell
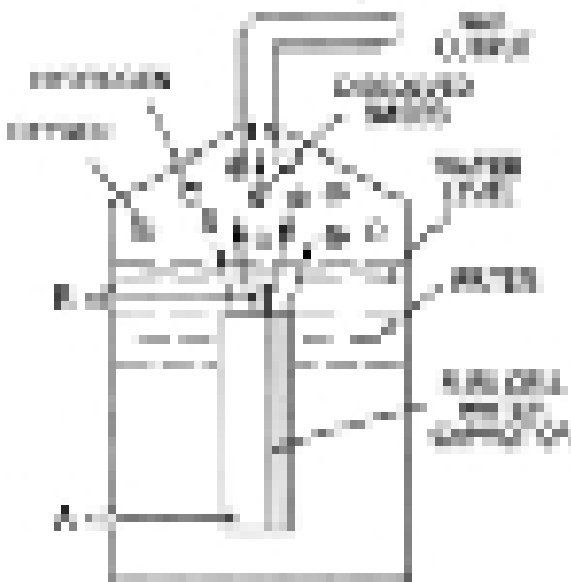
Advantages of Water Fuel Cell

The biggest problem with HHO gas is that it is too cheap and too easily created, and therefore too "dangerous" to the current social model. This model is one based on energy scarcity. If this were changed to energy abundance; the possibilities for improving our world are endless: With cheap energy, we could turn the deserts into green fields via desalinization of ocean water. With abundant and clean fuel; the cost of growing food would drastically drop and third-world nations could feed themselves. Without the need for fighting over energy resources or food, two major reasons for war are eliminated. HHO is not a panacea, and it is not "Free Energy" But it is an important and significant energy source that could revolutionize our world for the better.

Water fuel cell has many advantages. Some of them are as follows:

- Water is available everywhere. Unlike gas, which can't be obtained everywhere but only at gas station, water is practically everywhere.

- Water Fuel cells are inexpensive. They cost less than $200 to design and use.

- Water cells are easy to install. There installation and removal does not require any construction changes.

- Enriched mixture of hydrogen, oxygen, gasoline is bonded together molecularly and magnetically. The combined fuel results in better fuel economy and increases in mileage.

- It is also environment friendly. Running a car on water is a blessing for the environment because there are no harmful exhaust gases.

- It also increases fuel efficiency as brown gas breakdown carbon and removes it from engine. There is no storage tank and the gas is only being created at relatively low pressures while the car is running, leaks or problems with the storage tanks are not an issue.

Water fuel cells are a step ahead in the direction of cutting gas expenses and saving the environment. While 100% water powered cars are still not real, using a water fuel cells to power a car is as real as it can be.

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Khoj

Botanical Antioxidants – An Important Class of Phytochemicals for Human Health

[1]Pallavi Mishra, [2]Mala Mathur
[1,2]Department of Chemistry
Vivekananda Institute of Technology, Jaipur

Abstract
The present study deals with the antioxidant activity of methanolic extract of four medicinal plants, such as *Nerium oleander* (seeds), *Alstonia scholaris* (aerial parts), *Gynandropsis pentaphylla* (whole plant), and *Parkinsonia aculeata* (stem) using DPPH (1, 1-diphenyl-2-picrylhydrazyl) method. After the DPPH inhibition, it was evaluated that the methanolic extract of *Nerium oleander* and *Alstonia scholaris* exhibited better antioxidant activity than those of *Gynandropsis pentaphylla* and *Parkinsonia aculeata*. This might be due to the presence of more active antioxidant compounds.

Key-words: Antioxidants, DPPH (1, 1-diphenyl-2-picrylhydrazyl), *Nerium, Alstonia, Parkinsonia, Gynandropsis*

Ayurvedic medicines[1-11] are used to cure several diseases[12] as the herbs mentioned in the Ayurvedic texts are considered safe for human consumption. Antioxidant compounds in food play an important role as our health- protecting factor. Autoxidation of fats and oils not only lowers the nutritional value of foods, but it is also associated with aging, membrane damages, heart diseases, diabetes and cancer in living organisms. Addition of antioxidants to food is an effective way for retarding the oxidation of fats. There is an increasing interest in antioxidants, particularly in those intended to prevent the deleterious effects of free radicals in human body, and to prevent the deterioration of fats and other constituents of foodstuffs. In both cases, there is a preference for antioxidants from natural[13-16] rather than from synthetic sources.

The term antioxidant (also "antioxygen") originally referred to a specific chemical that prevented the consumption of molecular oxygen. An antioxidant is a chemical that reduces the rate of particular oxidation reactions in a specific context. One major action of antioxidants in cells is to prevent damage due to the action of reactive oxygen species. These include hydrogen peroxide (H_2O_2), the superoxide anion (O_2^-), and free radicals such as the hydroxyl radical ($OH^·$). These radicals are unstable and highly reactive and can damage cells by chemical chain reactions that can lead to cancer-promoting mutations or cell death. All cells therefore contain antioxidants that serve to reduce or prevent this damage. Consumption of antioxidant-rich foods reduces damage to cells. This may slow down, prevent, or even reverse certain diseases that result from cellular damage, and perhaps slow down the aging process[17].

The main characteristic of an antioxidant is its ability to trap free radicals. There are two basic categories of antioxidants, namely, synthetic and natural. The most common synthetic antioxidants used in foods, are the compounds with phenolic[18] structures of various degrees of substitution, whereas natural antioxidants are primarily plant phenolic and polyphenolic compounds that may occur in all parts of plants. The antioxidants in fruits, vegetables, tea and red wine are the main factors for the observed efficacy of these foods in reducing the incidence of chronic diseases like heart disease and cancers. Many researchers have now focused on natural antioxidants because they do not have any side effects and they are good as free radical scavengers[19].

Primary sources of naturally occurring antioxidants are whole grains, fruits and vegetables. Plant sourced food antioxidants like vitamin C[20], vitamin E, carotenes[21-22], phenolic acids, phytate and phytoestrogens. Several studies have shown the antioxidant potential of vegetables particularly of beans, potato[23], tomato[24], spinach[25], legumes[26], garlic, ginger[27], rosemary[28], dietary supplements[29] and drinks[30]. Recently, a comprehensive review about the antioxidant properties of fruits and the role of phenolic compounds in storage and processing of polyphenols[31], strawberry[32], plum[33], olive oil[34], onions, beans and pear[35] have been discussed. Green and black teas and red wines also possess antioxidant property, and contain a significant amount of naturally occurring polyphenolic compounds[31]. Various drinks[36], sake[37], jerez sherries[38] and cavas[39] have better antixodant activity.

Various plants and plant products have been evaluated for their antioxidant activities viz. Green barley[40], *Pelargonium* species[41] willow species[42], mulberry[43], avocado[44], seeds of tamarind[45], canola[46], sesame[47], evening primrose[48], flax[49], lupinus[50], buckwheat[51], sunflower[52] and *Rosa rubigionosa*[53] have better antioxidant activity.

Phenolics have been reported to have a capacity to scavenge free radicals. They are commonly found in both edible and non-edible plants and have multiple biological effects, including antioxidant activity. The antioxidant activity of phenolics is mainly due to their redox properties, which allows them to act as reducing agents, hydrogen donors, and singlet oxygen quenchers. In addition, they have a metal chelation potential. Phenolics, such as flavonoids, phenolic acids, stilbenes, lignin, and tannins, are especially common in leaves, flowering tissues, and woody parts, such as stems and barks. They have been suggested to play a preventive role in the development of cancer, heart disease, and ageing-related diseases.

Materials and Methods

Various methods for the evaluation of antioxidant activity have been reported in the literature, to monitor and compare the antioxidant activity of several herbal plants. Recently, oxygen radical absorbance capacity assays and enhanced chemiluminescence assays have been developed to evaluate antioxidant activity. These analytical methods measure the radical-scavenging activity of antioxidants against free radicals like the 1,1-diphenyl-2-picrylhydrazyl (DPPH) radical[54], the superoxide anion radical (O_2^-), the hydroxyl radical ($OH^\cdot$), or the peroxy radical ($ROO^\cdot$).

One of the most simple and inexpensive method to measure antioxidant activity of plant extracts or compounds involves the use of the free radical (DPPH). It is a stable free radical and is often used to evaluate the antioxidant activity of several natural compounds. Antioxidants on interaction with DPPH, either transfer electron or hydrogen atom to DPPH and thus neutralizing its free radical character. The odd electron in the DPPH free radical shows a strong absorption at 517nm, and the solution is purple in color.

Plant Material

Plants were collected from the locality of Jaipur (Rajasthan, India) during June and July to evaluate the antioxidant activity. The plant material was dried in shade and powdered.

1. *Nerium oleander* (Stem)
2. *Alstonia scholaris* (Stem bark)
3. *Gynandropsis pentaphylla* (Whole plant)
4. *Parkinsonia aculeata* (Stem)

Extraction of Plant Material

Shade dried plant material was powdered and extracted separately with methanol. The plant material was extracted with 400 ml (2x200) of solvent. Each extraction step was completed in 24 hrs. The extracts were filtered hot and solvent was removed completely under reduced pressure. The concentrated extracts were dried under vaccuo and then used for the evaluation of antioxidant activity.

Evaluation of Antioxidant Activity

Antioxidant activity of plant extracts against stable DPPH free radical (diphenylpicrylhydrazyl) was determined spectrophotometrically[55]. A solution of DPPH free radical **(A)** was prepared in methanol. When free radical **(A)** was treated with extract having antioxidant compounds, which donates hydrogen as a free radical and gets reduced in compound **(B)**. The change in color (from deep violet to light yellow) was measured at 517nm on UV/Visible Spectrophotometer.

A
Diphenylpicrylhydrazyl (DPPH)
Free radical

B
Diphenylpicrylhydrazine (DPPH)
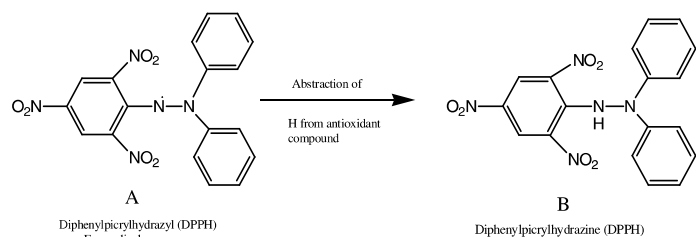
Method 1:-

The extract solution was prepared by dissolving 0.025gm of dry extract in 10ml of methanol. The solution of DPPH (0.0247gm in one litre, 6×10^{-5}M) in methanol was prepared. The samples were kept in dark for 15 minutes at room temperature after that decrease in absorption were measured. The absorption of blank sample containing the same amount of methanol and DPPH solution was also measured as blank.

The Percentage inhibition of the extracts was calculated by the following formula.

$$\text{Percentage Inhibition} = \frac{A_B - A_A}{A_B} \times 100 \%$$

AB = Absorption of blank sample at zero time (t=0)
AA = Absorption of tested extract solution after 15 minutes (t=15 minutes)

Method 2:-

DPPH is a stable free radical and antioxidants on interaction with DPPH, either transfer electron or hydrogen atom to DPPH or thus neutralize its free radical character. Another method involves the study of the changes in the absorbance at 517nm at various concentrations of these plant extracts. It can be noticed that E1 and E2 showed significant decrease in the absorbance of DPPH, while E3 and E4 do not reduce the absorbance at 517nm even at high concentration of the extract. These results confirm that the antioxidant activity of E1 and E2 can be attributed to efficient free radical scavenging ability. **(Fig.II)**

Results and Discussion

The result of DPPH inhibition of different plant extracts have been summarized in table-1.

Table-1: DPPH Absorption Inhibition (%) of Plant Extracts

S.No.	Plant	MeOH Extract
1.	*Nerium oleander* (E1)	80.26 ± 2.1
2.	*Alstonia scholaris* (E2)	77.3 ± 0.8
3.	*Gynandropsis pentaphylla* (E3)	42.67 ± 2.5
4.	*Parkinsonia aculeata* (E4)	31.22 ± 1.4

From the above table it is clear that methanolic extracts of *Nerium oleander* and *Alstonia scholaris* significantly exhibited the percentage of inhibition as 80.26 and 77.3 respectively. These percentages can be considered as significant absorption inhibition of DPPH. The methanolic extracts of *Gynandropsis pentaphylla* and *Parkinsonia aculeata* exhibited less effective antioxidant activity.

On the basis of these results it was concluded that methanolic extracts of *Nerium oleander* and *Alstonia scholaris* contains compounds having significant antioxidant activity. **(Fig.I)**
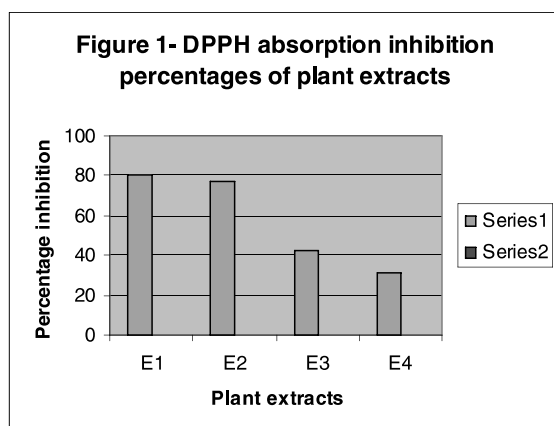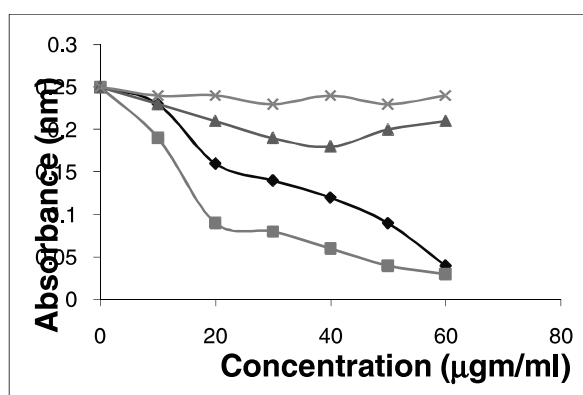
Figure-I

Figure-II

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Position figures and tables at the top and bottom of columns. Figure captions should be below the figure and centralized. Table captions should be above the tables and centralized.	
Title of Paper	24 Point (Regular)
Author's Name	11 Point (Bold)
Author's Affiliation	10 Point (Regular)
Section Heading Subheading	10 Point, (Capitalization each word) (Bold) 10 Point other letters 10 Point (Capitalization each word) (Bold) (Italic)
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