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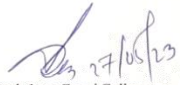
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BIOCHEM-I


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Quantification and Electrophoretic profiling of Haemolymph and Silk Gland Proteins of muga silkworm larvae, *Antheraea assamensis* Helfer reared on different host plants

Eva Rani Hazarika¹ and Dipsikha Bora²

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1. INTRODUCTION :

Antheraea assamensis Helfer is polyphagous and semi domesticated in nature. They feed on different host plants that are classified into primary and secondary types, depending upon the various qualitative and quantitative aspects of the plants and feeding behaviour of the insects in relation to the ultimate production of quality silk. The food plants play an important role in the growth, development and silk production (Nasreen *et al.*, 1999; Singh and Goswami, 2012). The primary hosts plants are mostly preferred by the silkworm and usually not preferred are the secondary host plant. *Persea bombycina* and *Litsea monopetala* both are primary host plant and some secondary host plants are *L. salicifolia*, *L. cirata* etc. (Tikader *et al.*, 2013). A varying level of closeness is observed between herbivorous insect and their host plants. Growth, development, cocoon characters, silk quality of muga silkworm are influenced by nutritional quality of host plant (Talukdar *et al.* 2015). Chawki rearing is one of the best methods to lowering the early instar larval mortality and increase the production. Interchange the host plants for rearing economically important insects helps in management. Haemolymph is the reservoir of nutrients and metabolites essential for growth, development of muga silkworm. Silk gland secretes silk which are composed of glue protein sericin and silk protein fibroin. Haemolymph protein acts as a storage house for synthesis of silk proteins. For increase the production of silk it is very essential to study the effect of host plants on growth, development and silk quality of silkworms.

Chapter-10

Basic Electrochemistry of Dopamine in Different Medium and Determination of its Diffusion Co-efficient

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ABSTRACT

Dopamine is one of the most important neurotransmitters present in our brain and plays an active role in several important physiological functions. Dopamine deficiency may cause neurological diseases such as Parkinson's disease, Alzheimer's disease and Schizophrenia. We have studied the basic electrochemistry of dopamine in different medium like phosphate buffer, surfactant micelles and liposomes using cyclic voltammetry and square wave voltametric technique. The redox potential and diffusion coefficient of dopamine in both oxidized and reduced state was determined.

Keywords: Dopamine; cyclic voltammetry; neurotransmitter.

1. INTRODUCTION:

Dopamine (DA) belongs to a group of neurotransmitters called catechol amines. Their distinctive structural features are the single amine group, a nucleus of catechol (a benzene ring with two adjacent hydroxyl group) and a side chain of ethylamine (Fig.1). The precursor for the synthesis of DA is the aromatic amino acid tyrosine. Two reactions transform tyrosine into DA: the first is catalyzed by enzyme tyrosine hydrolase (TH) that converts tyrosine into L-3,4-dihydroxyphenylalanine (L-DOPA). The second step is the decarboxylation of DOPA, catalyzed by the enzyme aromatic L-amino acid decarboxylase (AADC) which produces DA. DA constitutes about 80% of the catecholamine content in the brain [1].



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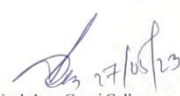
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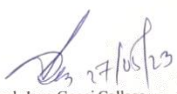
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Kirchhoff Index as a Robustness Measure: A Survey

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Abstract. Robustness is the ability of a network to withstand failures. In today's highly connected world, robustness plays a very important role in the effective functioning of many essential networks. The study of robustness is a flourishing area in complex network analysis. In this paper, an attempt has been made to study the robustness of complex networks with a graph measure called the Kirchhoff index. The recent works in this area and future scopes are also discussed here.

Keywords: Complex networks, Robustness, Kirchhoff index.

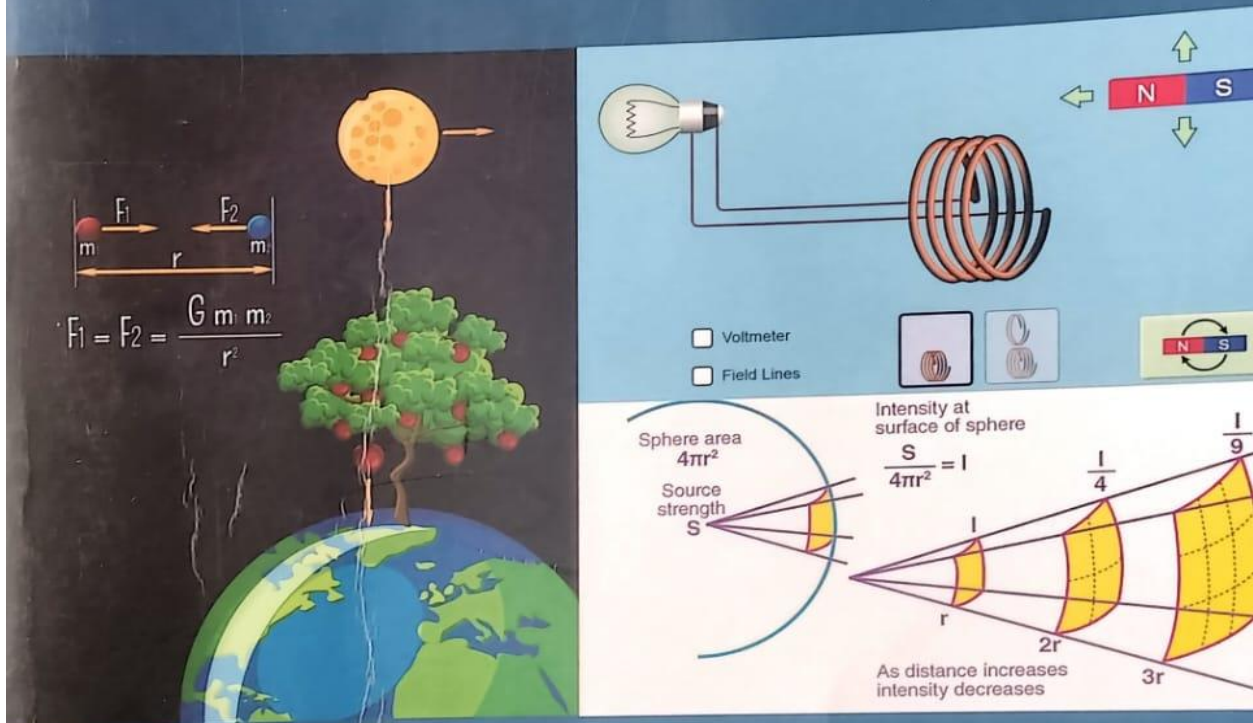
1. Introduction

Networks can be found everywhere around us. It is studied under a branch of discrete mathematics called graph theory. Any network can be modelled with the help of graphs where the nodes are entities and edges represent the connections between the nodes. Complex networks are a large collection of highly interconnected nodes dynamically evolving with time. The node can be anything such as a person, a biological cell, a computer, etc. For example, a social network consists of nodes that are individuals and their relationships or interactions. Some real-world networks are social networks, computer networks, brain networks, the internet, transportation networks, biological networks, and so on. Erdős-Rényi model of random graphs, Watts and Strogatz small-world model, and Barabasi and Albert scale-free model are considered pioneering network models in studying real-world networks.


Many systems in nature and numerous critical facilities in our society represent complex networks. In this regard, it becomes necessary to study the structure and functioning of such networks for their uninterrupted performance. Network analysis is useful in various fields like mathematics, computer science, biology, public health, social networks, statistics, circuit theory, and so forth. The analysis of these networks gives better insights into the networks and their connections. It is seen, the performance of some networks is affected by a node or link removal while some other networks remain resilient to such failures. The attack in a network may be targeted or a random failure. Robustness analysis of the networks is done for their reliable performance and it is the first issue of networks to be tackled. Networks must be robust so that vital facilities around us function steadily. According to Boccaletti et al. [3] the robustness

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AN OVERVIEW ON C-H ACTIVATION/ FUNCTIONALIZATION

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ABSTRACT

The use of transition metal catalyst for C-H bond activation has witnessed great development which has led to many pioneering discoveries. Inspired by the literature on transition-metal-catalyzed C-H activation reaction, which consists of a rich array of versatile approaches, this chapter particularly gives a basic overview on C-H activation and functionalization reactions. The chapter contains a brief discussion on transition-metal-catalyzed C-H activation, which highlights the properties and reactivity of C-H bonds, mechanistic studies and different types of additives and their roles in C-H activation reaction.


1.1. Introduction:

"C-H activation is at the center of organic chemistry"

- Albert Eschenmoser, 2011

A few decades ago, the use of non-activated C-H bonds in coupling reactions at reaction sites is nearly impossible. However, developing C-H activation methodology in organic chemistry makes this possible to break inert C-H bond and then make a new bond [1]. Nowadays, the field of C-H activation has emerged as one of the most rapidly rising fields of homogeneous catalysis and refurbishing the scenario of both organometallic catalysis and synthetic chemistry [2].

Majority of our chemical feedstock consists of hydrocarbons (molecules containing only carbon and hydrogen atom). However, most compounds require nitrogen, oxygen


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GRAPHENE@LAYERED DOUBLE HYDROXIDE NANOCOMPOSITES FOR THE REMOVAL OF HEAVY METALS FROM WATER

Dr. Pinky Saikia

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ABSTRACT

Both Graphene and Layered Double Hydroxides (LDH) are two dimensional layered materials having some unique and distinct properties some of which are complementary to each other. LDH have the general of $[M^{2+}_x M^{3+}_y (OH)_z] (A^{n-})_{x/n} \cdot mH_2O$, where M^{2+} may be bivalent cation like Mg^{2+} , Co^{2+} , Ni^{2+} , Cu^{2+} , Zn^{2+} and M^{3+} may be trivalent cation like Al^{3+} , Fe^{3+} , Cr^{3+} , etc. and A^{n-} represents an interlayer anion such as CO_3^{2-} , SO_4^{2-} , and NO_3^- etc. On the other hand, graphene is also two dimensional layered materials with sp^2 hybridized carbon nanostructure. Aggregation of layered nanosheets observed during the process of application is the common problem in both graphene and LDH which can be reduced by the combination of these two nanomaterials and this result in the formation of multifunctional materials with unique properties. The graphene/ LDH nanocomposites have different application in the field of energy storage, catalysis, environmental protection, drug delivery, and material science etc. This chapter summarizes the recent application of graphene/LDH nanocomposites as adsorbent for the removal of heavy metals from water.

Keywords: Nanocomposites; water treatment; multifunctional; adsorbent; heavy metals; synergic effect

A BIOCHEMICAL STUDY OF MIDGUT PROTEASE 'TRYPSIN' ACTIVITY IN TWO STRAINS OF ERI SILKWORM, *SAMIA RICINI* DONOVAN FED WITH CASTOR PLANT

Eva Rani Hazarika¹ and Dr. Janmoni Moran¹
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INTRODUCTION :

Silk is a unique gift of nature secreted by several arthropods, primarily the silkworms. It is a high molecular weight natural fiber with great importance in both textile and biomedical industries for its uniqueness, rarity and durability. Indian Eri silkworm, *Samia ricini* Donovan, is primarily distributed in the Brahmaputra valley of North- Eastern region of India has great demand in textile industries as it produces unique natural silk, the Eri or Ahimsa silk. Six morphologically different strains of *S. ricini* have been reported so far based on colour and marking on the larval stages. These are Greenish –Blue Plain (GBP), Greenish –Blue Spotted (GBS), Greenish –Blue Zebra (GBZ), Yellow Plain (YP), Yellow Spotted (YS) and Yellow Zebra (YZ). *S. ricini* is polyphagous in nature and fed on wide range of host plants. The host plants are categorized into primary and secondary type based on the quantitative and qualitative aspects. The primary host plants of Eri silkworms are Castor (*Ricinus communis*) and Kesseru (*Heteropanax fragrans*) and some secondary host plants are Tapioca (*Manihot utilisima*), Jatropha (*Jatropha curcas*), Papaya (*Carica papaya*), Borpat (*Ailanthus grandis*) etc. Host plants have profound effect on rate of growth, development, survival and ultimately silk production of the silkworm. The relationship between insects and plants is a dynamic one both being co-evolved in different ways. Feeding preferences of silkworm larvae are largely influenced by the presence and distribution of secondary metabolites in plant [1][8]. Herbivorous Lepidopteran larvae feed voraciously on plant parts to derive nutrients for optimum growth and development. The


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SOME FORMULAE FOR COMMUTING PROBABILITY

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ABSTRACT

The probability that any two randomly chosen elements of a finite ring R commute is the commuting probability of R and is denoted by $Pr(R)$. For any subring S of a finite ring R , the probability that a randomly chosen element of S commute with a randomly chosen element of R is denoted by $Pr(S, R)$. In this article, we have given a few introductory results of $Pr(S_1, S_2, R)$.

1. INTRODUCTION AND PRELIMINARIES

Commuting probability of finite rings was first studied by Irish Mathematician MacHale [13] in 1976. Many Mathematicians starting from Erdős and Turán have written several papers on the group's commuting probability over the last few decades which has proved to be very significant in analysing the commutativity of different groups [3, 4, 10, 11, 12, 13, 14]. But the study of the subject on the finite rings was not given due importance over that period of time. Then after many years MacHale restarted his study on commuting probability of finite rings along with Buckley and NiShé in the year 2013.

Thereafter in the year 2017, J.Dutta, D.K. Basnet, R.K. Nath worked on obtaining different bounds for $Pr(R)$ by generalizing $Pr(R)$ with the help of the smallest prime divisor p of $|R|$. Also, with the inclusion of ideals and commutators they have generated better bounds compared to the previous bounds obtained in previous works. Since then extensive research is being done on this topic. Throughout the paper, R denotes a finite ring and S, S_1 and S_2 denote subrings of a ring R . These terms will be used in the entire article.

Commuting Probability of Finite Ring:

Suppose R is a finite ring and S is its subring. The commuting probability of R denoted by $Pr(R)$, is the probability that a random chosen pair of elements of R commutes.

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DEVELOPMENT OF LIGHT EMITTING DIODE ON THIN FILM AND VACUUM TECHNOLOGY USING ORGANIC MATERIALS

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1. Introduction

Thin-film and vacuum technology is one of the most important technology which are widely used for the fabrication of optoelectronic devices in flat panel technology. In this regard organic semiconductor can play an active role in which there is no intrinsic charge carrier. This implies that during the device performance all charges must be supplied from external biasing through the electrode/organic interfaces. Therefore light emitting diode using organic materials (OLED) can be considered as a special class of electronic device which attract very much attention from few decades. Now a day, OLEDs have attracted increasing interest for their potential advantages, such as, low cost, lightweight and possible fabricating on flexible substrate, as well as large-area feasibility. So, the application of organic electronic (i.e. carbon based compound) in thin film technology is widely distributed in different commercial application and they are mainly found to use in transistors and diodes, in electroluminescent devices like Polymer Light Emitting Devices, Organic Light Emitting Devices etc. These organic based devices also have many advantages compared to the inorganic compound based devices which have many positive effects on the social life. For this reason, different approach/steps has been taken from the early time of tang and vanslyke in 1987 to improve the performance and stability of the OLED devices towards display technology.

The glorious chapter in organic light emitting diode back to the observation of electroluminescence (EL) from organic material in the 1960s. Electroluminescence (EL) is a phenomenon in which one can observe the light emission from certain materials due to the

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THE EFFECT OF DC PLANAR MAGNETRON TARGET ON THE PROPERTIES OF PLASMA DISCHARGE: AN EXPERIMENTAL STUDY

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Abstract

In this study, the effect of magnetron target on different plasma parameters of Argon/Hydrogen ($Ar - H_2$) direct current (DC) magnetron discharge is examined. Here, Copper (Cu) and Chromium (Cr) are used as magnetron targets. The value of plasma parameters such as electron density (N_e), ion density (N_i), degree of ionization of Ar, and degree of dissociation of H_2 for both the target are studied as a function of hydrogen content in the discharge. The plasma parameters are determined by using Langmuir probe and Optical emission spectroscopy. The obtained results show that electron and ion density decline with gradual addition of Hydrogen in the discharge. It brings significant changes on the degree of ionization of Ar and dissociation of H_2 . The enhanced value of electron density (N_e), ion density (N_i), degree of ionization of Ar, and degree of dissociation of H_2 for Cr compared to Cu target is explained based on its higher Ion Induced Secondary Electron Emission Coefficient (ISEE) value.

1 Introduction:

The term magnetron generally refers to the device which utilizes crossed electric and magnetic field for particle confinement. Magnetron sputtering is a plasma-based deposition method proven to be versatile technique for deposition of coatings used to modify the functional properties of material like hardness, optical reflectivity etc. In magnetron sputtering permanent magnets are placed beneath the target which is used as the cathode. The magnetic lines of force enter and leave through the cathode plate. The role of the magnetic field is to trap the secondary electrons generated by the bombarding ions when very high voltage (~

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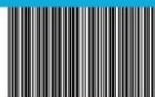
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Expanding Horizon of Cyanobacterial Biology

Developments in Microbiology

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Chapter 10 - Cyanolichens: An evolutionary perspective

Pampi Sarmah

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Abstract

Cyanolichens is a lichen species that contains cyanobacteria as photobiont and fungus as mycobiont.

Cyanobacteria help the li

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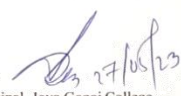
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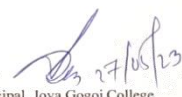
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Knowlege Management and LIS Professional Development : The need of the hour

Deepa Baruah

Abstract :

"Knowledge management may be defined as the set of the processes that create and share knowledge across an organization to optimize the use of judgment in the attainment of mission and goals." Knowledge management is an emerging discipline developing on the interstices of organizational psychology, library and information science, economics and computer science. It is emerging field which offer lots of opportunities to the Library and Information professional (LIS) to improve their effectiveness and at the same time to justify the need of LIS people in the present day context. It is the LIS people who can play an active role in managing knowledge and can give the profession a new dimension. But to be an active part in the knowledge management process, LIS people also have to develop their competencies according to the need of the hour. Library and Information science profession is a profession which has to face the challenges of constant changes in the profession due to the adoption of new Information and Communication technologies. The paper discusses on the issues like knowledge management and libraries, role of LIS professionals in the process and different issues of professional development among the Library and information science professionals.

Key Words : Knowledge , Knowledge management, LIS professionals, professional development etc.

1. Introduction

Knowledge is a buzz word in today's society. Very often the word Knowledge is synonymously used with information. But knowledge is more than that. Knowledge is the structured or


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Community Development
The way forward

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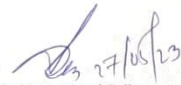
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IV


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COSTING AND PRICING OF LIBRARY PRODUCTS AND SERVICES: A THEORITICAL STUDY

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Abstract:

Marketing of library services and products is the need of the hour. Since the introduction of economic and financial deregulation and free market policies of Government since 1990, libraries cannot think to avoid marketing. They are bound to sell certain high tech services for the sake of the survival of their own as well as for the sake of their respective institutions. The paper has discussed the implementation of marketing in the library and information centres. The paper has discussed the costing and pricing of library products and services. It has covered the aspect of price which governs the very feasibility of any marketing programme. There is discussion on the cost accounting and its application in library marketing. The paper has also stated a process of cost estimation of library products and services.

Key words: Cost Accounting, Cost Estimation, Marketing, Price, Pricing Strategy, Price Estimation.

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