



# RAMMOHAN COLLEGE

(Formerly City College W. Dept.)

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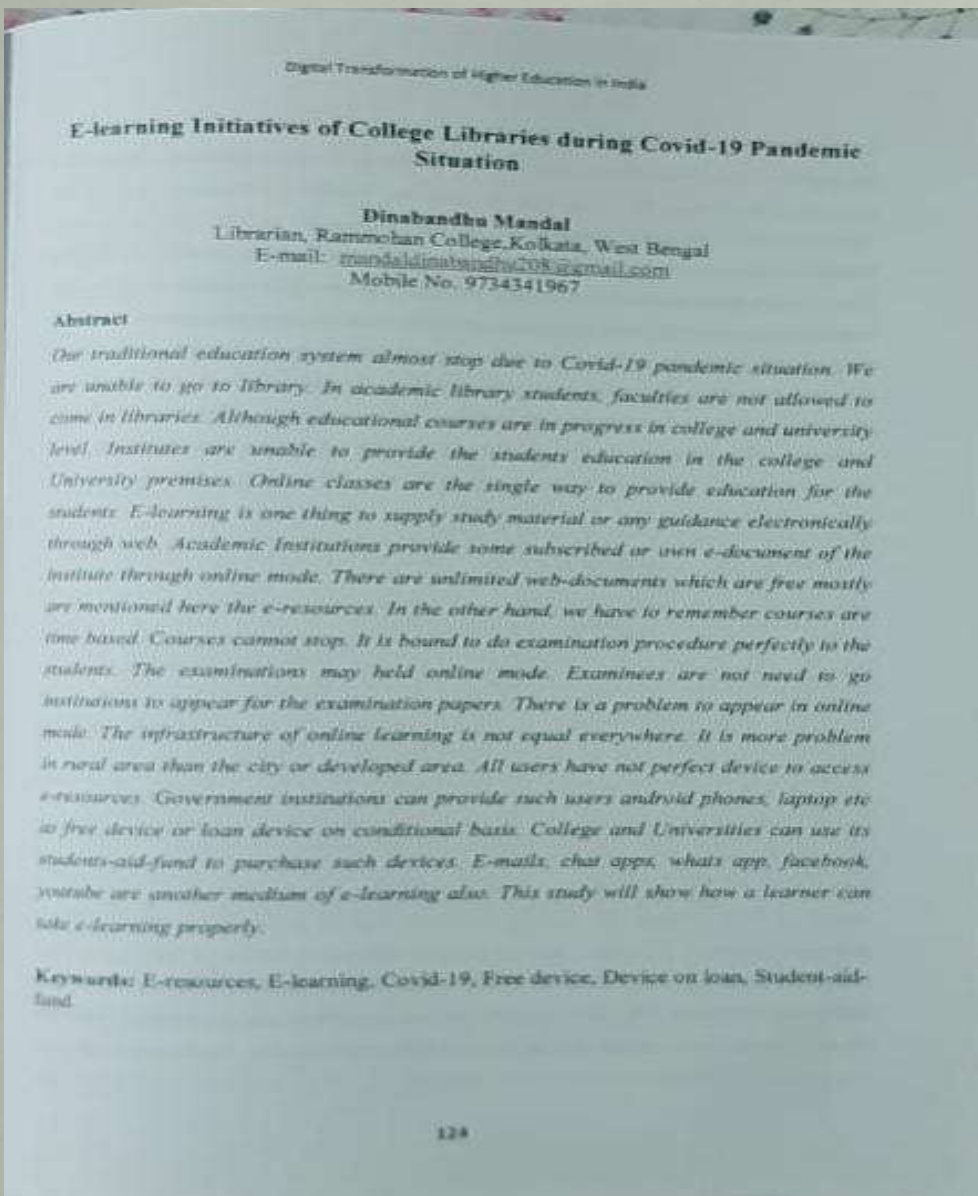
Ref. ....

Date ..... 20

Year: 2021

Name of the teacher: Mr. Dinabandhu Mandal

Title of book/chapter/paper: E-learning Initiatives of College Libraries during Covid-19 pandemic Situation



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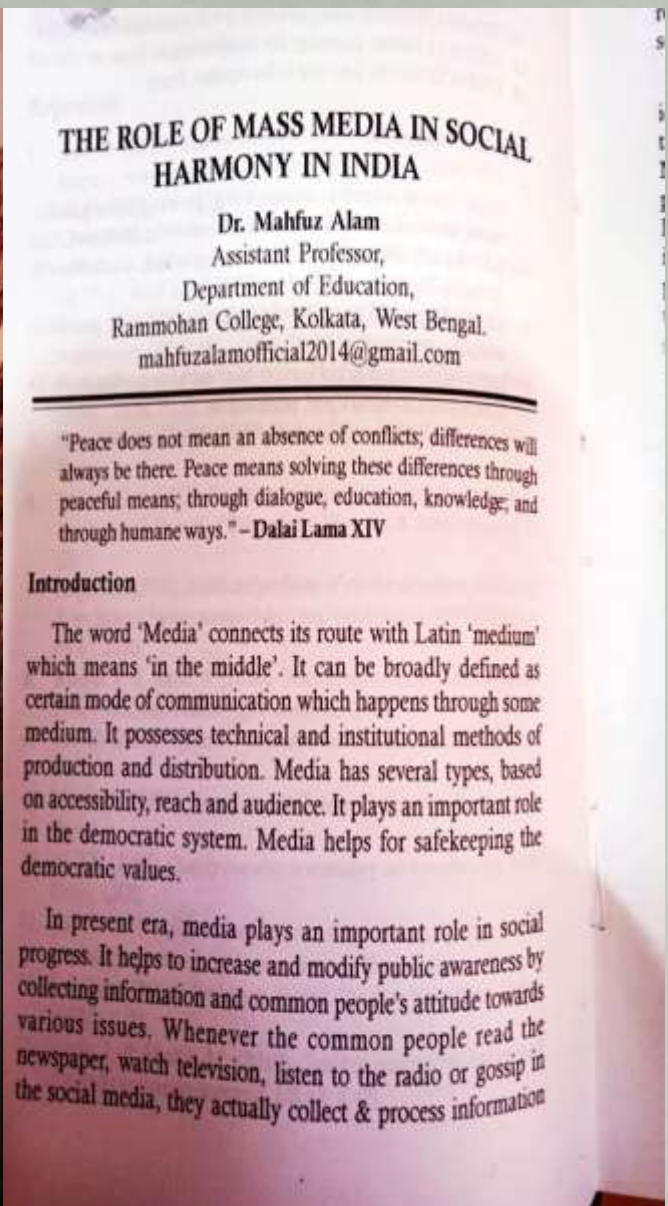
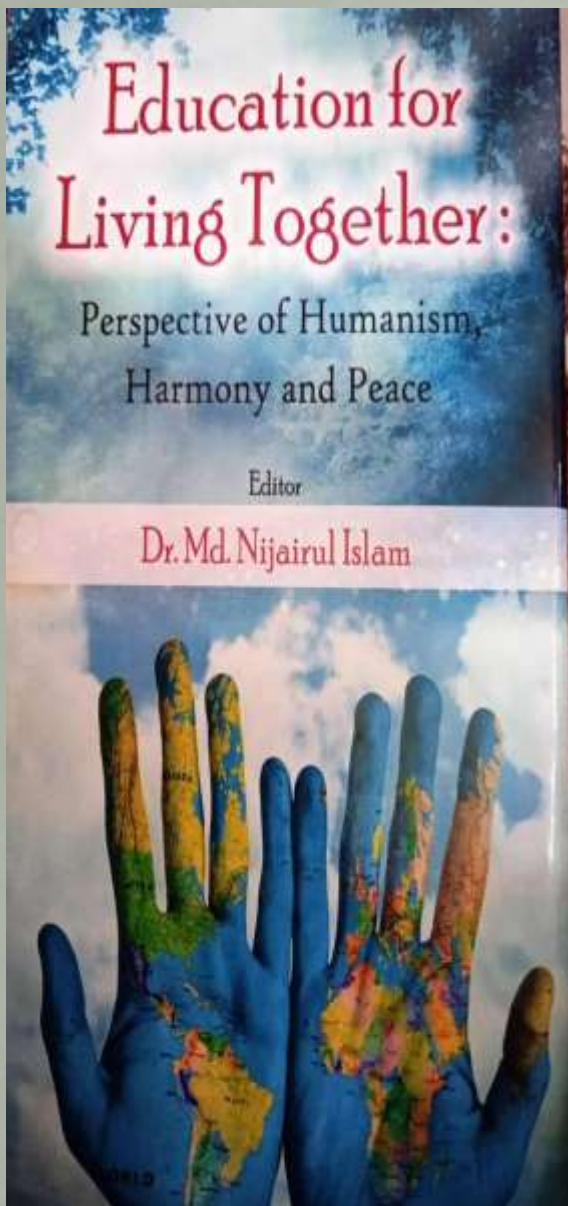
Ref. ....

Date ..... 20

Year: 2021

Name of the teacher: Dr. Mahfuz Alam

Title of book/chapter/paper: The Role of Mass Media in Social Harmony in India



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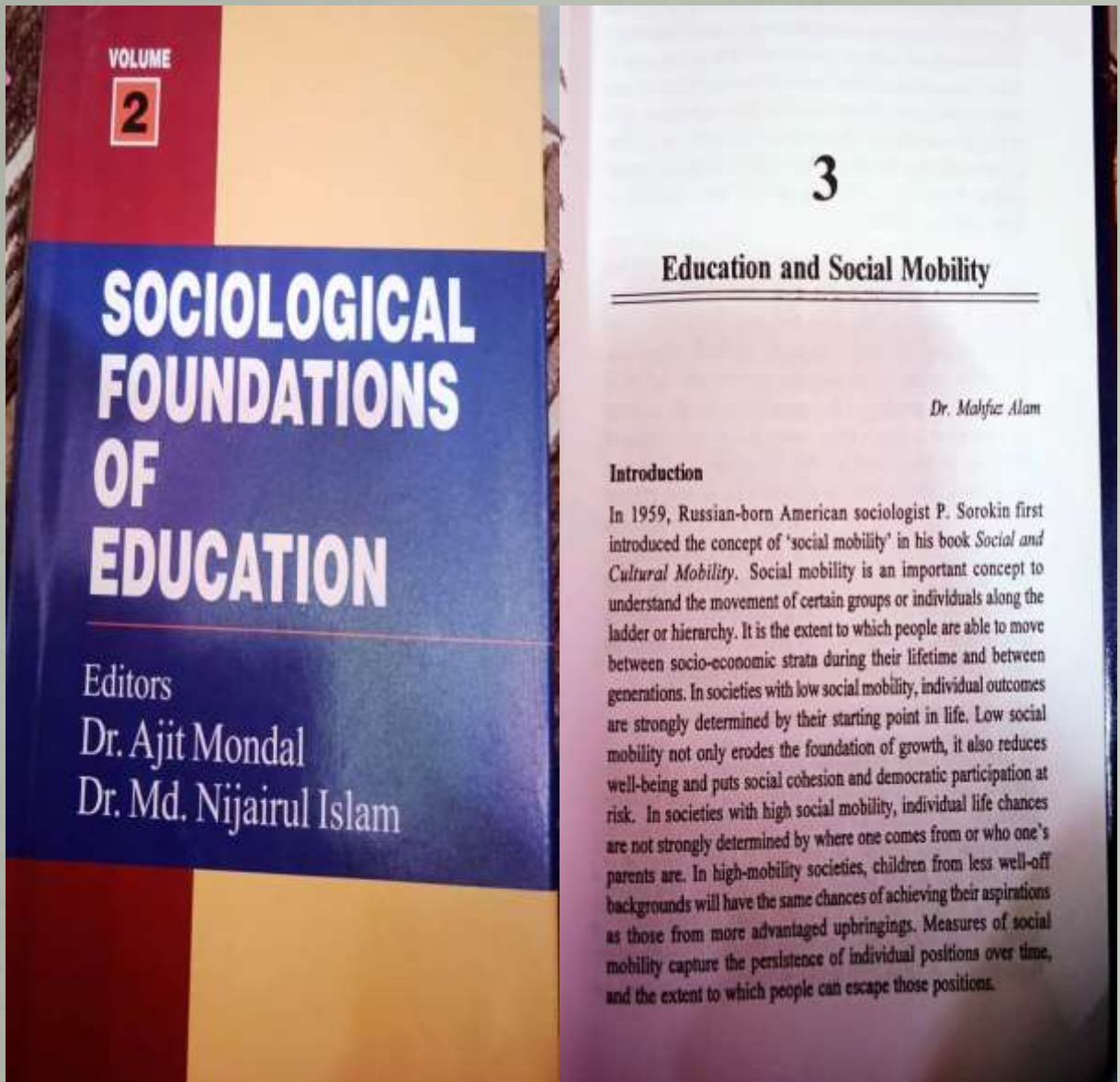
Ref. ....

Date ..... 20

Year: 2021

Name of the teacher: Dr. Mahfuz Alam

Title of book/chapter/paper: Education and Social Mobility



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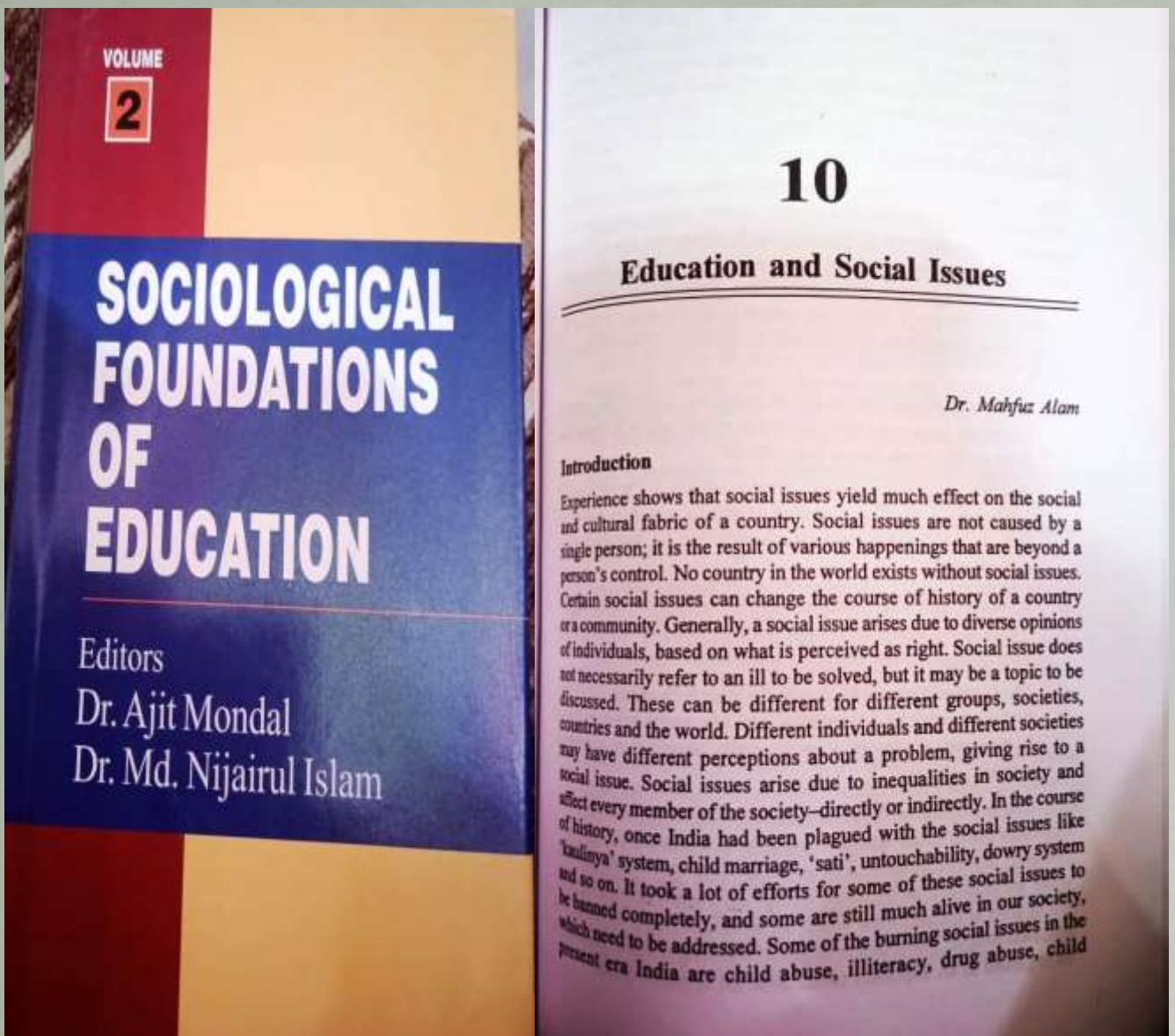
Ref. ....

Date ..... 20

Year: 2021

Name of the teacher: Dr. Mahfuz Alam

Title of book/chapter/paper: Sociological Foundations of Education



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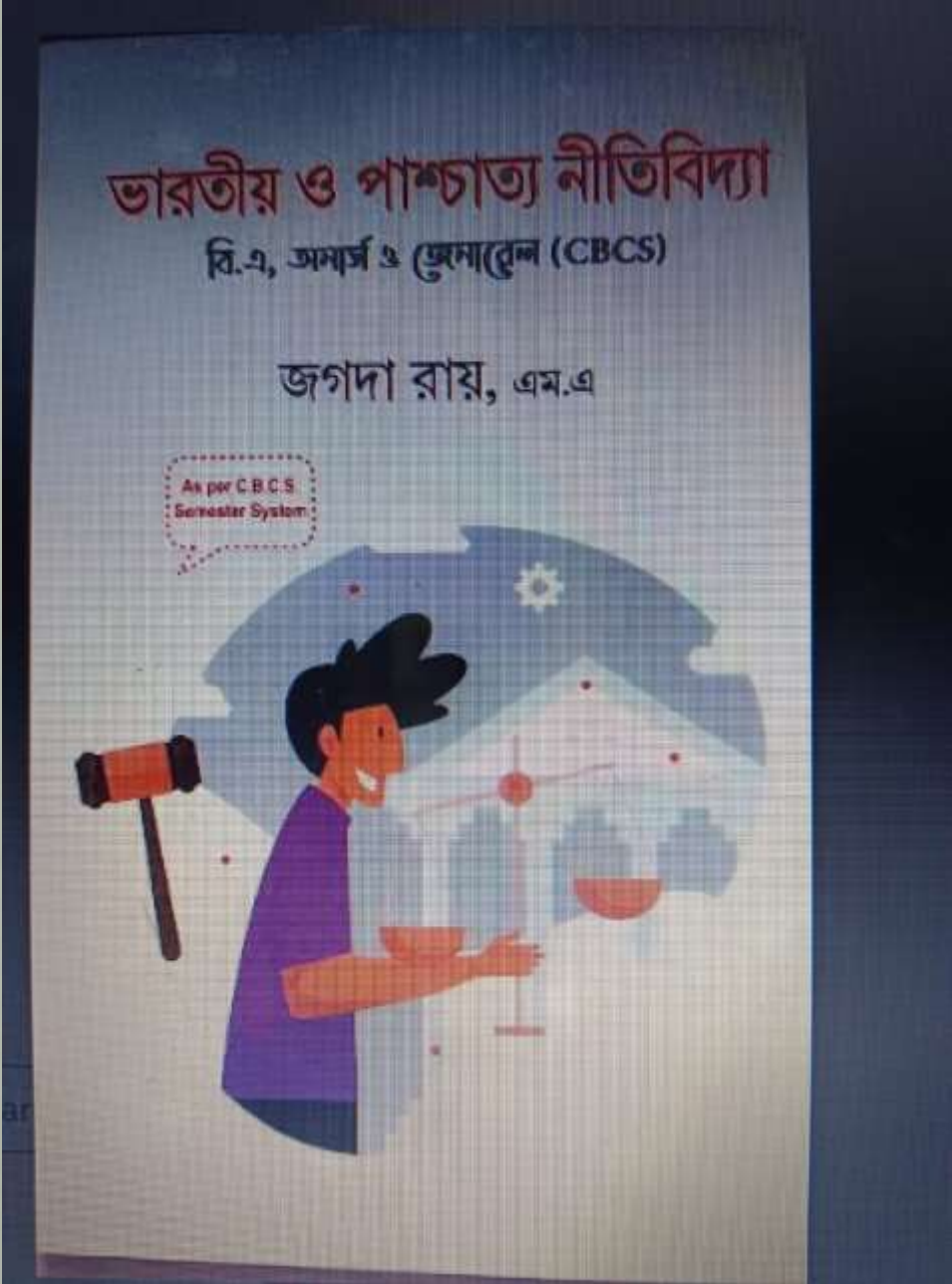
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Date ..... 20

Year: 2022

Name of the teacher: Mr. JAGODA ROY

Title of book/chapter/paper: ভারতীয় ও পাশ্চাত্য নীতিবিদ্যা



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Ref. ....

Date ..... 20

Year: 2022

Name of the teacher: DR. SAMIRAN MONDAL

Title of book/chapter/paper: Application of Quantum Dots in  
Biology and Medicine: Recent Advances

Puspendu Barik  
Samiran Mondal *Editors*

# Application of Quantum Dots in Biology and Medicine

Recent Advances

 Springer

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Ref. ....

Date ..... 20

Year: 2022

Name of the teacher: DR. SAMIRAN MONDAL

Title of book/chapter/paper: Introduction to Quantum Dots

## Introduction to Quantum Dots



Samiran Mondal

**Abstract** Quantum dots (QDs) or luminescent semiconductor nanocrystals possess size-tunable elegant electro-optical properties, broad absorption spectra, and narrow emission ranging from UV to NIR region, high fluorescent quantum yields, fluorescence intermittency, resistance to photobleaching, and significant Stoke shift, which are the prerequisites for the application in vitro and in vivo bioimaging, biomarker, molecular pathology, drug delivery, and many more. The suitable applicability of QDs in the biomedical field needs to understand the science behind the QDs and their fundamental properties, which are most relevant to biology and medicine. In recent years, QDs have shown a wide variety of possibilities in the biomedical field due to their recent development of synthetic procedures and biocompatibility. The chapters will focus on the fundamentals of QDs. The chapter also includes a brief description of chapters in the book, which may help readers understand the topics' overview.

**Keywords** Quantum dots (QDs) · Fundamentals and applications of QDs · Biomedical field

QDs are nanometer-scale (typically 2–10 nm in diameter) semiconductor nanocrystals composed of Groups II (e.g., Zn, Cd),-VI (e.g., Se, S) or III (e.g., Ga, In),-V (e.g., N, P) or IV (e.g., Pb)-VI (e.g., Se, S) elements of Mendeleev periodic table that exhibit size-dependent optical properties, including absorbance and photoluminescence [1, 2]. Unique optoelectronic, catalytic, and semiconductor properties of QDs are arising due to their three-dimensional quantum confinement regime, i.e., the size of the QDs in the range of exciton Bohr radius [3, 4]. Valence and conduction bands are separated by a band gap in the semiconductor material. On photon absorption, electrons from the lower electronic energy state (valence band) are promoted to the higher electronic energy state (conduction band), producing a hole in the valence band. Bandgap energy becomes higher for the smaller QDs, and

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Ref. ....

Date ..... 20

Year: 2022

Name of the teacher: DR. SAMIRAN MONDAL

Title of book/chapter/paper: The Underlying Mechanism of Quantum Dot-Induced Apoptosis: Potential Application in Cancer Therapy

## The Underlying Mechanism of Quantum Dot-Induced Apoptosis: Potential Application in Cancer Therapy



Jishu Mandal, Mriganka Mandal, Tamanna Mallick, and Samiran Mondal

**Abstract** Quantum dots (QDs) are a popular agent to use in a wide range of scientific and industrial applications because the molecules consist of an excellent biophysical and optical property, later varies with the compositions from a wide range of visible to infrared wavelength. Being an established fluorescent probe QDs are useful in the long-term, multiplexed and quantitative imaging and detection is governed wonderfully by QDs. Here we represent the present trends of the multidimensional use or applications of QDs in the field of biological science to achieve disease diagnostics, control over it and in particular cancer treatments and cellular mechanisms induced by QDs. The QDs are small in size with a high surface ratio, capable of potentially changing the therapeutic and pharmacological efficacy towards a good dimension of disease management. These are unique anti-cancer activities like apoptotic cell death and autophagy cell death, different types of molecular path-ways and mechanism of apoptosis has been focused hereafter application of quantum dots in various cell lines of malignant cells of mice and humans.

**Keywords** Quantum dots · Apoptosis · Cancer therapy

Jishu Mandal, Mriganka Mandal—Both the authors have equal contributions.

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Date ..... 20

Year: 2022

Name of the teacher: DR. SAMIRAN MONDAL

Title of book/chapter/paper: Present Status and Future Perspective

## Present Status and Future Perspective



Samiran Mondal

**Abstract** The present chapter illustrates an overview of the application of quantum dots (QDs) and enlightens the future perspective on their potentiality in biology and medicine. The chapter highlights the critical aspects of QDs and the present state-of-the-art applications, both in vitro and in vivo.

**Keywords** Quantum dots (QDs) · Present status · Future perspective

The concept of artificial atoms or quantum dots (QDs) comes from the reduced dimensionality of semiconducting crystals, i.e., the size of semiconductor particles controls optical and electronic properties called the quantum size effect. QD synthesis, characterization, and applications are still highly active fields of interest to researchers despite being part of mature technologies. During the last three decades, researchers have synthesized QDs by improving monodispersity and size tunability to ameliorate the overall optical properties by exploring different reaction conditions such as solvents, salts, pH, and temperature. The size-dependent tunable emission is attractive for biomedical research since luminescence is commonly used in cell, tissue, and animal experiments, supporting biomedical researchers with many precursors for building tools to address important questions and diagnose and treat diseases. Many researchers convincingly described many optical advantages of QDs over organic fluorophores or dye molecules for biomedical research, owing to their high quantum yield, broad absorption spectra, large Stoke shift, and highly stable. The widely increased interest in QDs has been established as a technological revolution by the tremendous efforts of scientists in chemistry, physics, biology, medical engineering, and pharmaceutical sciences.

QDs present a versatile tool to obtain a series of remarkable results in the fields of cell labeling, cell migration tracking, multiplexed imaging, flow cytometry, fluorescence in situ hybridization, targeted tracing in living cells and animals, real-time in vivo and cellular process imaging, genomic and proteomic detection, pathogen

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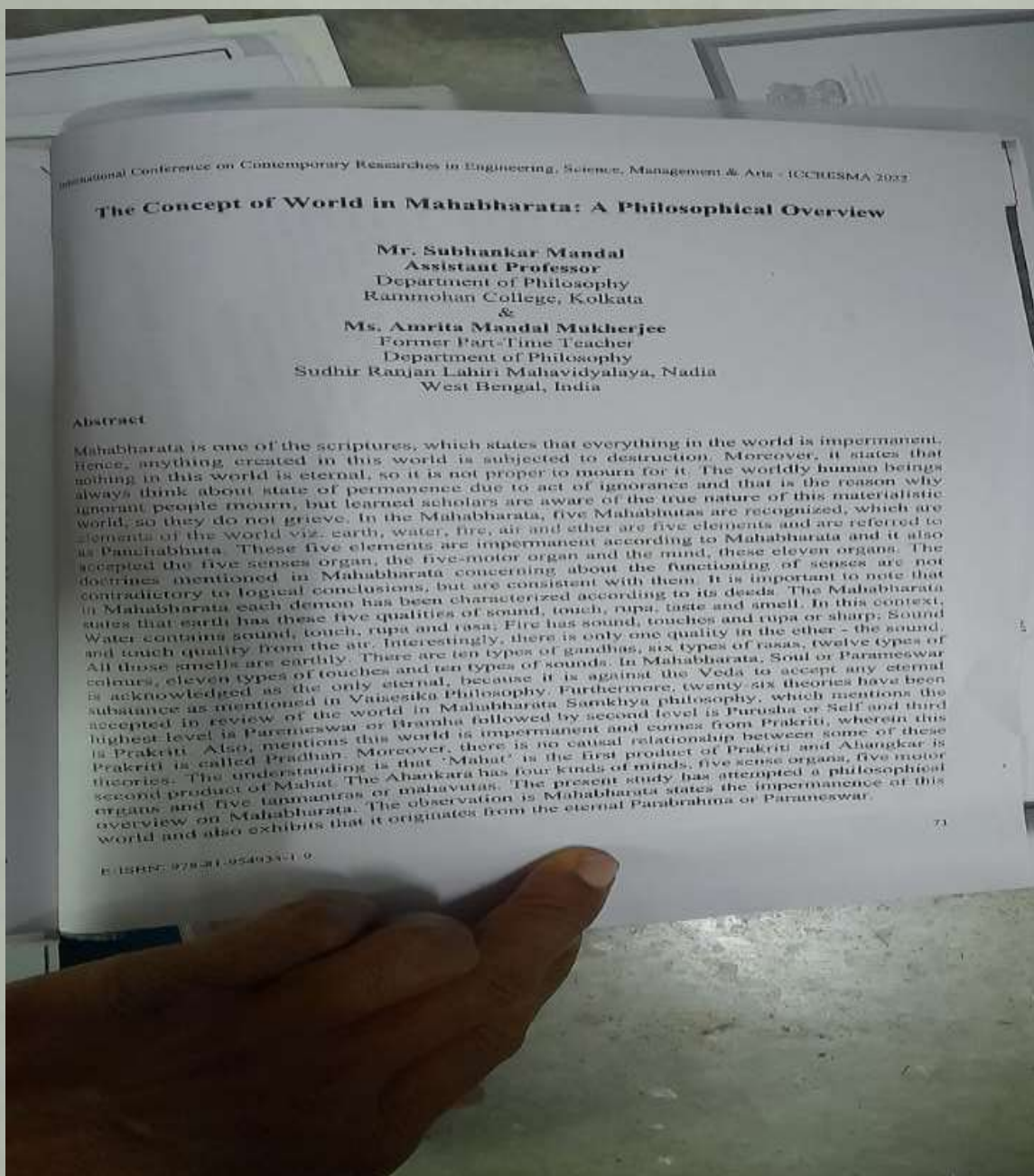
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Year: 2022

Date ..... 20

Name of the teacher: Dr.Subhankar Mandal

Title of book/chapter/paper: The Concept of World in Mahabharata: A Philosophical Overview (pp. 71 & January 2022)



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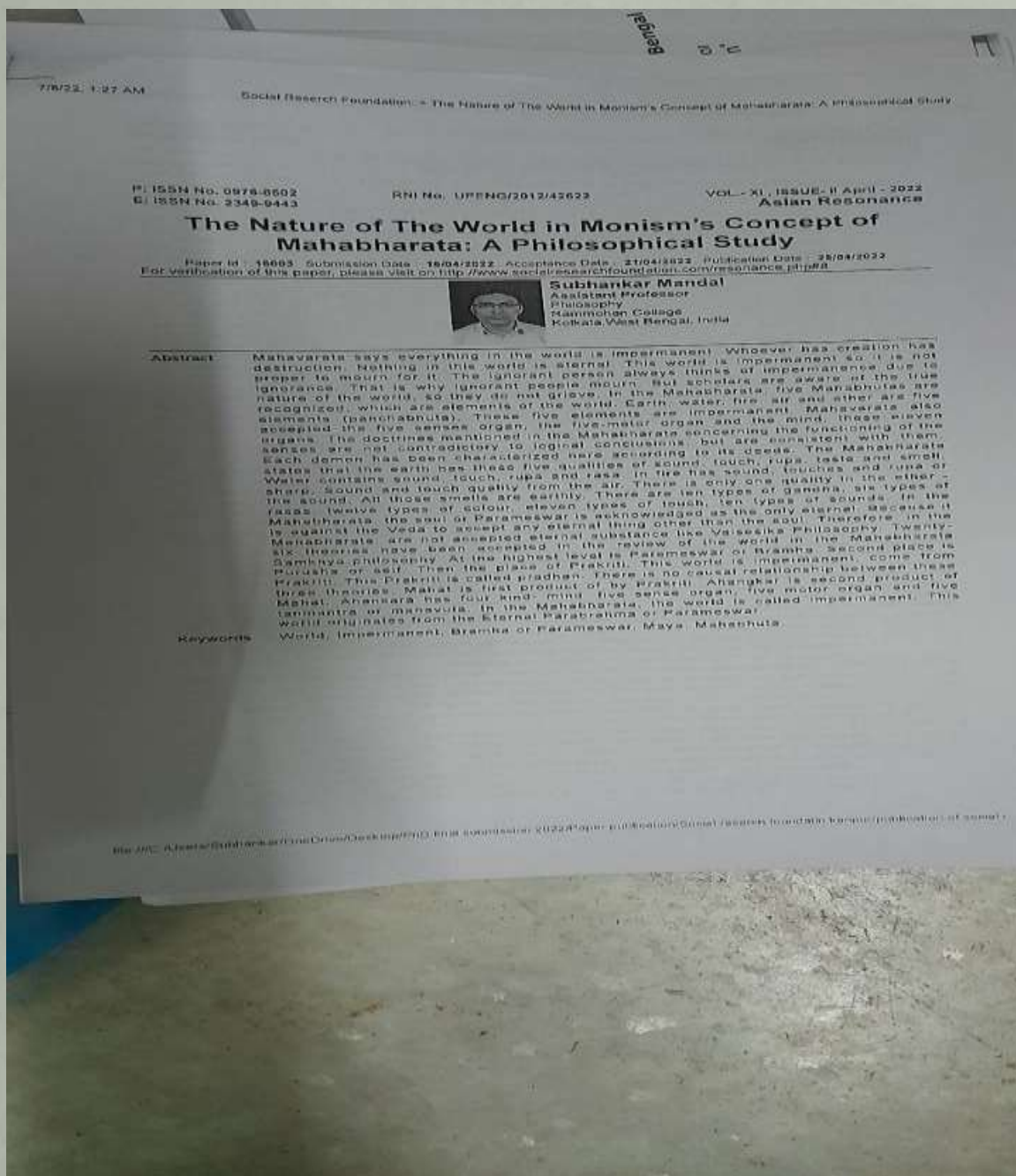
Ref. ....

Year: 2022

Date ..... 20

Name of the teacher: Dr.Subhankar Mandal

Title of book/chapter/paper: The Nature of The World in Monism's concept of Mahabharata: A Philosophical Study (1-7)



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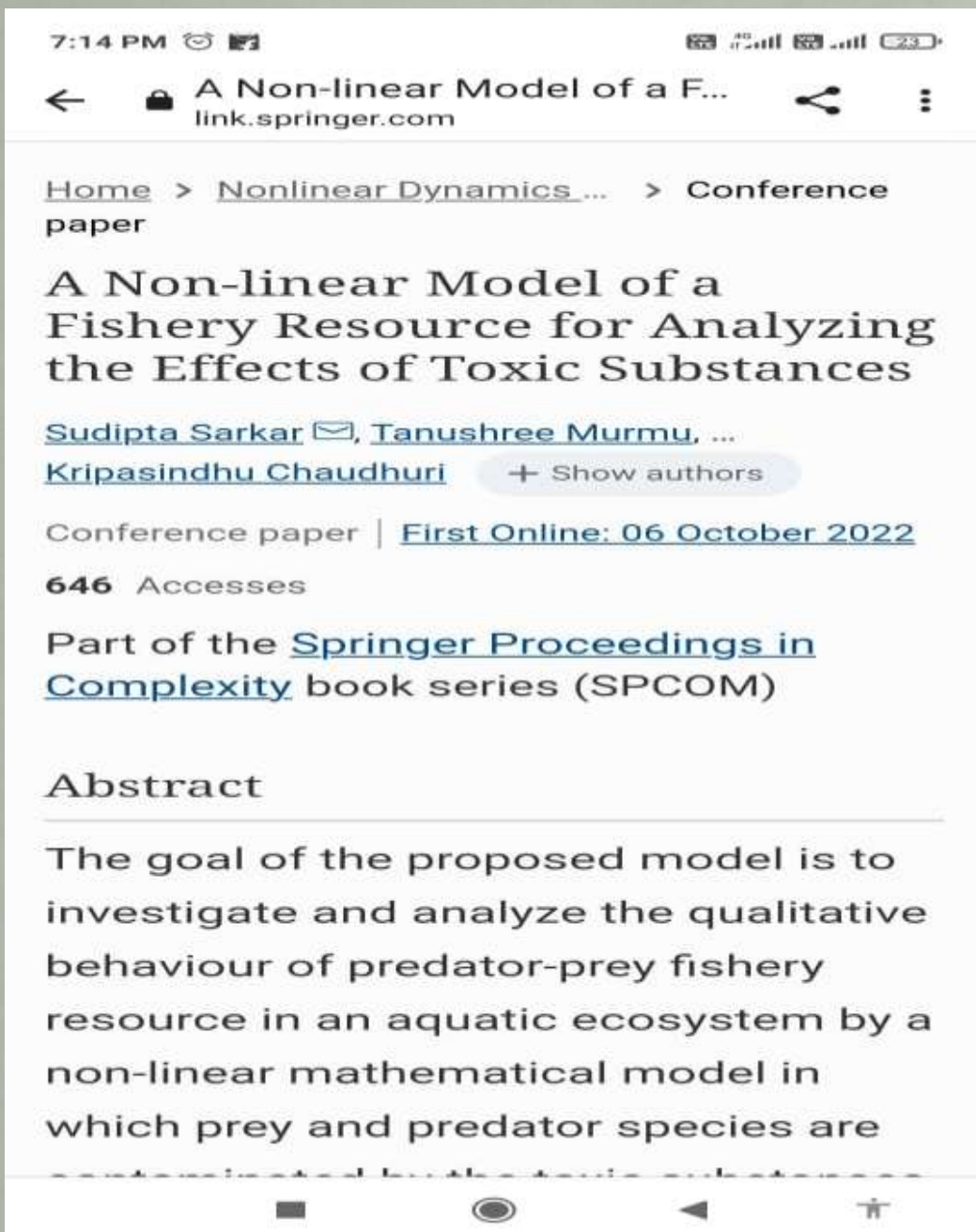
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Date ..... 20

Year: 2022

Name of the teacher: Tanushree Murmu

Title of book/chapter/paper: A non-linear model of a fishery resource for analyzing the effects of toxic substances



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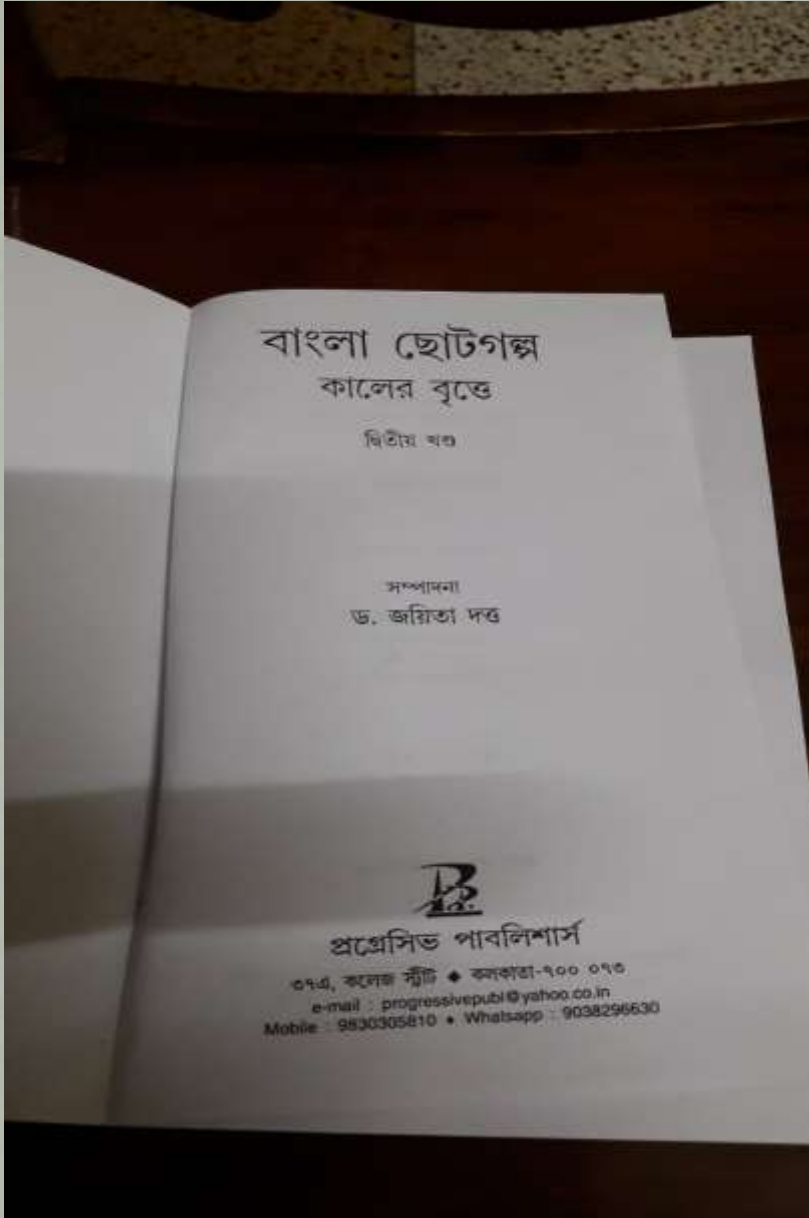
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Date ..... 20

Year: 2022

Name of the teacher: Dr. Sumita Das Majumdar

Title of book/chapter/paper: বাংলা ছোটগল্প কালের বৃত্তে :  
দ্বিতীয় খন্ড(পয়লানস্বর)



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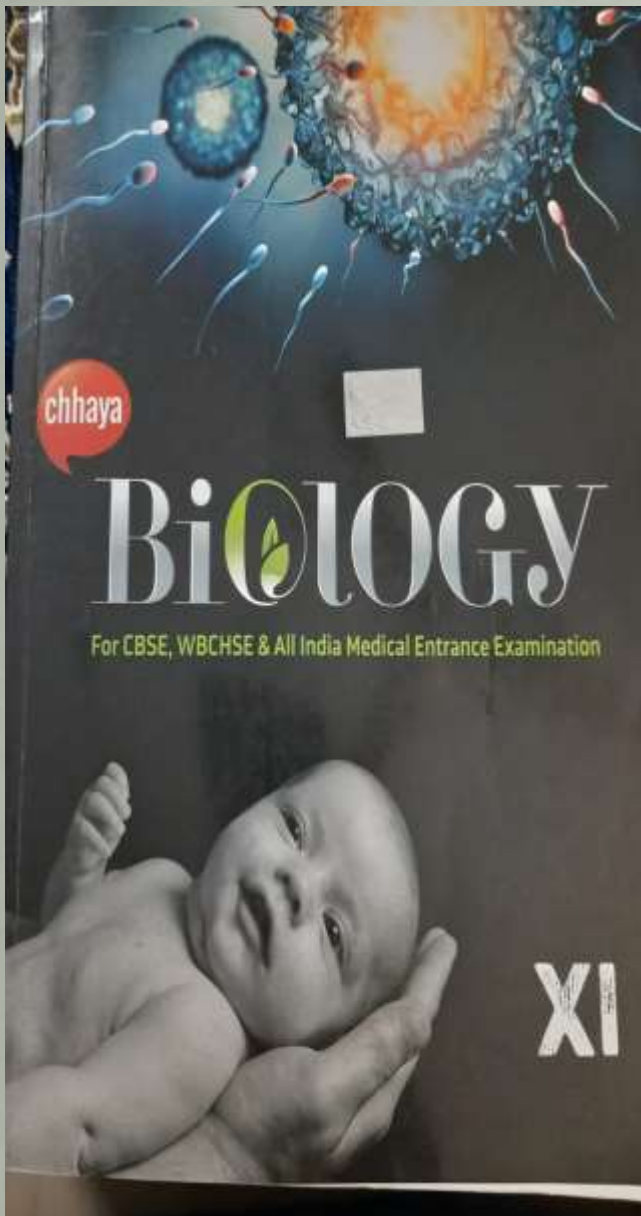
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Date ..... 20

Year: 2022

Name of the teacher: Dr. Samarendra Nath Banerjee

Title of book/chapter/paper: Text Book on Biology (Editions: 2018-22)



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