

**First/Second Semester B.E. Degree Examination, June/July 2013**  
**Engineering Physics**

Time: 3 hrs.

Max. Marks:100

Note: 1. Answer any FIVE full questions, choosing at least two from each part.

2. Answer all objective type questions only on OMR sheet page 5 of the answer booklet.

3. Answer to objective type questions on sheets other than OMR will not be valued.

4. Physical Constants : Planck's constant,  $h = 6.63 \times 10^{-34}$  Js, Electron charge,  $e = 1.6 \times 10^{-19}$  C  
Electron mass,  $m = 9.11 \times 10^{-31}$  kg, Velocity of light,  $C = 3 \times 10^8$  mS<sup>-1</sup>**PART - A**

- 1 a. Choose the correct answers for the following : (04 Marks)
- If red and blue stars emits radiations of continuous wavelengths, then according to Wien's displacement law.  
 A) Blue star is hotter than red star  
 B) Red star is hotter than blue star  
 C) Both stars are at same temperature  
 D) Difficult to conclude.
  - The expression for de-Broglie wavelength for an electron under an accelerating potential V is,  
 A)  $\frac{12.26}{\sqrt{V}}$  m  
 B)  $\frac{12.26}{\sqrt{V}}$  Å  
 C)  $\frac{12.26}{\sqrt{V}}$  nm  
 D)  $\frac{12.26}{\sqrt{V}}$  µm
  - A particle moves with velocity  $3 \times 10^8$  ms<sup>-1</sup>. The wavelength associated with it is 1 nm. Then group velocity of the particle is,  
 A)  $3 \times 10^8$  mS<sup>-1</sup>  
 B)  $3 \times 10^{10}$  mS<sup>-1</sup>  
 C)  $3 \times 10^6$  mS<sup>-1</sup>  
 D)  $1.5 \times 10^6$  mS<sup>-1</sup>
  - According to the Compton effect, the wavelength of X-rays scattered at an angle greater than zero,  
 A) Decreases  
 B) Doesn't change  
 C) Increases  
 D) None of these
- b. Derive an expression for group velocity on the basis of superposition of waves. Also obtain the relation between group velocity and phase velocity. (08 Marks)
- c. Show that Planck's law reduces to Wien's law and Rayleigh-Jeans law under certain conditions. (05 Marks)
- d. Calculate the de-Broglie wavelength associated with an electron of energy 1.5 eV. (03 Marks)
- 2 a. Choose the correct answers for the following : (04 Marks)
- The energy of the lowest state in one dimensional potential box of length  $a = 1$  unit is,  
 A)  $\frac{h^2}{8m}$   
 B) zero  
 C)  $\frac{h^2}{4ma^2}$   
 D)  $\frac{h^2}{2ma^2}$
  - For a particle which is not bound to any system and is free, the energy eigen value is,  
 A) zero  
 B) finite but not quantized  
 C) infinity  
 D) finite but quantized
  - If the uncertainty in the position of a particle is equal to its de-Broglie wavelength then uncertainty in its momentum will be,  
 A)  $\Delta P \geq \frac{h}{4\pi}$   
 B)  $\Delta P \geq \frac{h}{2\pi}$   
 C)  $\Delta P \geq \frac{P}{4\pi}$   
 D)  $\Delta P \geq \frac{h}{P}$
  - For an electron to be present inside the nucleus of an atom the uncertainty in the position of the electron must be,  
 A) more than or equal to the radius of the nucleus  
 B) more than or equal to the diameter of the nucleus.  
 C) more than the diameter of the nucleus  
 D) less than or equal to the diameter of the nucleus.



# Physics Paper 22 2013 97

**Nasir El Bassam,N El Bassam**



## Physics Paper 22 2013 97:

*Fuzzy Systems and Data Mining V A.J. Tallón-Ballesteros*, 2019-11-06 The Fuzzy Systems and Data Mining FSDM conference is an annual event encompassing four main themes fuzzy theory algorithms and systems which includes topics like stability foundations and control fuzzy application which covers different kinds of processing as well as hardware and architectures for big data and time series and has wide applicability the interdisciplinary field of fuzzy logic and data mining encompassing applications in electrical industrial chemical and engineering fields as well as management and environmental issues and data mining outlining new approaches to big data massive data scalable parallel and distributed algorithms The annual conference provides a platform for knowledge exchange between international experts researchers academics and delegates from industry This book includes the papers accepted and presented at the 5th International Conference on Fuzzy Systems and Data Mining FSDM 2019 held in Kitakyushu Japan on 18 21 October 2019 This year FSDM received 442 submissions All papers were carefully reviewed by program committee members taking account of the quality novelty soundness breadth and depth of the research topics falling within the scope of FSDM The committee finally decided to accept 137 papers which represents an acceptance rate of about 30% The papers presented here are arranged in two sections Fuzzy Sets and Data Mining and Communications and Networks Providing an overview of the most recent scientific and technological advances in the fields of fuzzy systems and data mining the book will be of interest to all those working in these fields

23 years AIIMS Chapter-wise Solved Papers (1997-2019) 13th Edition Disha Experts, 2019-07-02 AIIMS 23 years Chapter wise Solved Papers consists of past years memory based solved papers from 1997 onwards till date distributed in 29 31 38 6 topics in Physics Chemistry Biology General Knowledge respectively The book contains around 4580 straight MCQs 3200 MCQs and 1380 Assertion Reason type questions

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Educating Scientists and Engineers for Academic and Non-Academic Career Success James Speight, 2014-12-10 In an increasingly technological world the education of scientists and engineers has become an activity of growing importance Educating Scientists and Engineers for Academic and Non Academic Career Success focuses on the structure of the current educational system and describes the transformations needed to ensure the adequate education of future

*Polymer Composites and Nanocomposites for X-Rays Shielding* It Meng Low, Nurul Zahirah Noor Azman, 2020-01-03 This book focuses on the processing materials design characterisation and properties of polymer composites and nanocomposites for use as electromagnetic radiation shielding materials and to enhance radiation shielding capacity in order to meet the safety requirements for use in medical X ray

imaging facilities It presents an in depth analysis of materials synthesis methods such as melt mixing ion implantation solution casting and electrospinning In addition it measures the X ray attenuation behaviour of fabricated composites and nanocomposites in four major types of X ray equipment namely general radiography mammography X ray absorption spectroscopy and X ray fluorescence spectroscopy units Given its scope the book will benefit researchers engineers scientists and practitioners in the fields of medical imaging diagnostic radiology and radiation therapy

**Econophysics and Financial Economics** Franck Jovanovic, Christophe Schinckus, 2017 This book provides the first extensive analytic comparison between models and results from econophysics and financial economics in an accessible and common vocabulary Unlike other publications dedicated to econophysics it situates this field in the evolution of financial economics by laying the foundations for common theoretical framework and models

**Collected Papers. Volume IX** Florentin Smarandache, 2022-05-10 This ninth volume of Collected Papers includes 87 papers comprising 982 pages on Neutrosophic Theory and its applications in Algebra written between 2014-2022 by the author alone or in collaboration with the following 81 co authors alphabetically ordered from 19 countries E O Adeleke A A A Agboola Ahmed B Al Nafee Ahmed Mostafa Khalil Akbar Rezaei S A Akinleye Ali Hassan Mumtaz Ali Rajab Ali Borzooei Assia Bakali Cenap zel Victor Christianto Chunxin Bo Rakhal Das Bijan Davvaz R Dhavaseelan B Elavarasan Fahad Alsharari T Gharibah Hina Gulzar Hashem Bordbar Le Hoang Son Emmanuel Ilojide T m t p Gb l h n Ja y ol M Karthika Ilanthenral Kandasamy W B Vasantha Kandasamy Huma Khan Madad Khan Mohsin Khan Hee Sik Kim Seon Jeong Kim Valeri Kromov R M Latif Madeleine Al Tahan Mehmat Ali Ozturk Minghao Hu S Mirvakili Mohammad Abobala Mohammad Hamidi Mohammed Abdel Sattar Mohammed A Al Shumrani Mohamed Talea Muhammad Akram Muhammad Aslam Muhammad Aslam Malik Muhammad Gulistan Muhammad Shabir G Muhiuddin Memudu Olaposi Olatinwo Osman Anis Choonkil Park M Parimala Ping Li K Porselvi D Preethi S Rajareega N Rajesh Udhayakumar Ramalingam Riad K Al Hamido Yaser Saber Arsham Borumand Saeid Saeid Jafari Said Broumi A A Salama Ganeshsree Selvachandran Songtao Shao Seok Zun Song Tahsin Oner M Mohseni Takallo Binod Chandra Tripathy Tugce Katican J Vimala Xiaohong Zhang Xiaoyan Mao Xiaoying Wu Xingliang Liang Xin Zhou Yingcang Ma Young Bae Jun Juanjuan Zhang

**One Hundred Years Of General Relativity: From Genesis And Empirical Foundations To Gravitational Waves, Cosmology And Quantum Gravity - Volume 1** Wei-tou Ni, 2017-05-26 The aim of this two volume title is to give a comprehensive review of one hundred years of development of general relativity and its scientific influences This unique title provides a broad introduction and review to the fascinating and profound subject of general relativity its historical development its important theoretical consequences gravitational wave detection and applications to astrophysics and cosmology The series focuses on five aspects of the theory The first three topics are covered in Volume 1 and the remaining two are covered in Volume 2 While this is a two volume title it is designed so that each volume can be a standalone reference volume for the related topic

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Experts,2020-07-04      *NTA UGC NET Paper 1 Topic-wise 52 Solved Papers (2020 to 2004) 2nd Edition* Disha

Experts,2021-02-04      **Theory Of Macroeconomic Hysteresis** Isaak D Mayergoyz,Can E Korman,2024-06-27 This book deals with the mathematical theory of macroeconomic hysteresis which is the theory of aggregation of microeconomic hysteresis Microeconomic sunk cost hysteresis is usually represented by relatively simple hysteresis loops with no discrete memory of past economic shocks It turns out that macroeconomic aggregation leads to the formation of complex multibranch hysteresis with discrete memory of past economic shocks Consequently the macroeconomic aggregation of microeconomic hysteresis results in the emergence of new economic phenomena In the book the basic properties of macroeconomic hysteresis are mathematically studied It is demonstrated that certain important properties of macroeconomic hysteresis such as history dependent branching erasure effects of some past economic shocks geometric features of macroeconomic hysteresis loops etc are insensitive to specific structures of microeconomic hysteresis subject to aggregation This suggests that the above properties may be viewed as universal Furthermore it is pointed out that these aggregation models have the prediction power of future macroeconomic branching which may be employed for the prediction of future economic evolution

Handbook of Bioenergy Crops Nasir El Bassam,N El Bassam,2010 This completely revised second edition includes new information on biomass in relation to climate change new coverage of vital issues including the food versus fuel debate and essential new information on second generation fuels and advances in conversion techniques The book begins with a guide to biomass accumulation harvesting transportation and storage as well as conversion technologies for biofuels This is followed by an examination of the environmental impact and economic and social dimensions including prospects for renewable energy The book then goes on to cover all the main potential energy crops      *Fundamental Controls on Fluid Flow in Carbonates* S.M. Agar,S. Geiger ,2015-02-02 This volume highlights key challenges for fluid flow prediction in carbonate reservoirs the approaches currently employed to address these challenges and developments in fundamental science and technology The papers span methods and case studies that highlight workflows and emerging technologies in the fields of geology geophysics petrophysics reservoir modelling and computer science Topics include detailed pore scale studies that explore fundamental processes and applications of imaging and flow modelling at the pore scale case studies of diagenetic processes with complementary perspectives from reactive transport modelling novel methods for rock typing petrophysical studies that investigate the impact of diagenesis and fault rock properties on acoustic signatures mechanical modelling and seismic imaging of faults in carbonate rocks modelling geological influences on seismic anisotropy novel approaches to geological modelling methods to represent key geological details in reservoir simulations and advances in computer visualization analytics and interactions for geoscience and engineering      **Memristor-Based Nanoelectronic Computing Circuits and Architectures** Ioannis Vourkas,Georgios Ch. Sirakoulis,2015-08-26 This book considers the design and development of nanoelectronic computing circuits systems and architectures focusing particularly on memristors which

represent one of today's latest technology breakthroughs in nanoelectronics. The book studies, explores, and addresses the related challenges and proposes solutions for the smooth transition from conventional circuit technologies to emerging computing memristive nanotechnologies. Its content spans from fundamental device modeling to emerging storage system architectures and novel circuit design methodologies targeting advanced non-conventional analog, digital, massively parallel computational structures. Several new results on memristor modeling, memristive interconnections, logic circuit design, memory circuit architectures, computer arithmetic systems, simulation software tools, and applications of memristors in computing are presented. High-density memristive data storage combined with memristive circuit design paradigms and computational tools applied to solve NP-hard artificial intelligence problems, as well as memristive arithmetic logic units, certainly pave the way for a very promising memristive era in future electronic systems. Furthermore, these graph-based NP-hard problems are solved on memristive networks and coupled with Cellular Automata (CA)-inspired computational schemes that enable computation within memory. All chapters are written in an accessible manner and are lavishly illustrated. The book constitutes an informative cornerstone for young scientists and a comprehensive reference to the experienced reader hoping to stimulate further research on memristive devices, circuits, and systems. Fiber Optic Sensors Ignacio R.

Matias, Satoshi Ikezawa, Jesus Corres, 2016-11-01. This book describes important recent developments in fiber optic sensor technology and examines established and emerging applications in a broad range of fields and markets including power engineering, chemical engineering, bioengineering, biomedical engineering, and environmental monitoring. Particular attention is devoted to niche applications where fiber optic sensors are or soon will be able to compete with conventional approaches. Beyond novel methods for the sensing of traditional parameters such as strain, temperature, and pressure, a variety of new ideas and concepts are proposed and explored. The significance of the advent of extended infrared sensors is discussed, and individual chapters focus on sensing at THz frequencies and optical sensing based on photonic crystal structures. Another important topic is the resonances generated when using thin films in conjunction with optical fibers and the enormous potential of sensors based on lossy mode resonances, surface plasmon resonances, and long-range surface exciton polaritons. Detailed attention is also paid to fiber Bragg grating sensors and multimode interference sensors. Each chapter is written by an acknowledged expert in the subject under discussion. **Darwin's Medicine** Brian D. Smith, 2016-10-14. Darwin's

Medicine is the sequel to Brian D. Smith's influential and critically acclaimed *Future of Pharma* (Gower, 2011). Whereas the earlier book predicted the evolution of the pharmaceutical market and the business models of pharmaceutical companies, *Darwin's Medicine* goes much deeper into the drivers of industry change and how leading pharmaceutical and medical technology companies are adapting their strategies, structures, and capabilities in practice. Through the lens of evolutionary science, Professor Smith explores the speciation of new business models in the Life Sciences Industry. This sophisticated and highly original approach offers insights into the mechanisms of evolution in this exceptional industry. The six great

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**Collected Papers. Volume V** Florentin

Smarandache,2014-10-14 This volum includes 37 papers of mathematics or applied mathematics written by the author alone or in collaboration They were written during the years 2010 2014 about the hyperbolic Menelaus theorem in the Poincare disc of hyperbolic geometry and the Menelaus theorem for quadrilaterals inhyperbolic geometry about some properties of the harmonic quadrilateral related to triangle simedians and to Apollonius circles etc

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**Geophysics, Realism, and**

**Industry** Aitor Anduaga,2015-12-17 Did industry and commerce affect the concepts values and epistemic foundations of different sciences If so how and to what extent This book suggests that the most significant influence of industry on science in the two case studies treated here had to do with the issue of realism Using wave propagation as the common thread this is the first book to simultaneously analyse the emergence of realist attitudes towards the entities of the ionosphere and of the earth s crust However what led physicists and engineers to adopt realist attitudes This book suggests that a new kind of realism a realism of social and cultural origins is the answer a preliminary entity realism responding to specific commercial and engineering interests and a realism that was neither strictly instrumental nor exclusively operational The book has two parts while Part I focuses on the study of the ionosphere and how the British radio industry affected ionospheric physics Part II focuses on the study of the Earth s crust and how the American oil industry affected crustal seismology

*Energy*

*Efficiency and Sustainable Lighting* Manuel J. Hermoso-Orzáez,Alfonso Gago-Calderón,2020-03-25 The lighting of both exteriors and interiors is a field within electrical and lighting engineering where important technological changes have been taking place oriented towards environmental sustainability and energy efficiency LED technology has been gradually gaining

ground in the world of lighting over other technologies due to its high lighting and energy efficiency and savings However some problems related to overheating or associated regulation are emerging This has prompted the search for new more efficient and sustainable forms of lighting This book presents successful cases related to energy efficiency and lighting that may be of great interest to those trying to enter the world of scientific research



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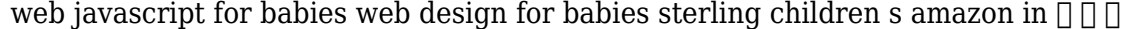
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