



## Control Systems

Time: 3 Hours

Max. Marks: 100

Note : Answer any five questions choosing one full question from each unit.

## Unit - I

- 1 a) Draw the block diagram representation of an open loop and a closed loop control system and explain each block. Indicate two advantages, two demerits and two applications of each type. 8
- b) Find  $\frac{C(s)}{R(s)}$  for the system shown in Fig. 1(b) using i) Block diagram reduction ii) Mason's gain formula.



Fig. 1(b)

12

OR

- 2 a) What are block diagram and signal flow graphs? How are they obtained for a system? 8
- b) For the mechanical system shown in Fig. 2(b) obtain: i) Mechanical network ii) Mathematical model iii) f-V analog circuit iv) f-i analog circuit.



Fig. 2(b)

12

## Unit - II

- 3 a) Discuss the effect of damping ratio on the step response of a second order system with relevant equations and graphs. 8
- b) Derive the expressions for the peak time and maximum overshoot of the step response of a second order underdamped system. If the OLTF of a unity feedback system is  $G(s) = \frac{4}{s(2s+1)}$  find rise time, peak time and maximum overshoot. 12

OR

- 4 a) Explain the basic PI, PD and PID control actions with relevant transfer functions. 8
- b) Derive the expressions for the position, velocity and acceleration error constants of a unity feedback system. A unity feedback system has the forward path transfer function  $G(s) = \frac{K(2s+1)}{s(5s+1)(s+1)^2}$ . Find the minimum value of K, so that the steady state error is less than 0.1, when input is  $r(t) = 1+6t$ . 12

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**Jagadeesh Pandiyan**



## Control Systems N6 Question Papers 2013:

**The Report: Nigeria 2013** Oxford Business Group,2013-12-04 As the single most populous nation in Africa Nigeria recently overtook South Africa as the largest economy on the continent Natural resources oil and gas in particular comprise the country s single largest revenue earner but the 170m person economy also has seen significant activity in recent years into the industrial financial telecoms and as of 2013 power sectors Hydrocarbons reserves have traditionally attracted the vast majority of domestic and foreign investment in Nigeria Oil production capacity has remained at roughly 2.5m barrels per day bpd since the start of 2000 although output fell to 2.2m bpd on average in 2012 Still the country has long operated below its true potential and government efforts in recent years have sought to increase local value addition by boosting refining capacity and minimising theft and bunkering The country s banking sector has been through a significant shake up as well resulting in a far healthier and more robust financial industry while reforms in the telecoms and agricultural sectors have strengthened medium term prospects

**Scientific and Technical Aerospace Reports** ,1995 *Deposit Insurance in China* Ningyao Ye,2025-03-31 This book examines and compares the rationale design and implementation of deposit insurance in the US the UK and China with the aim of finding an effective solution for China s nascent deposit insurance scheme by learning from the US and UK models Deposit insurance a pillar of the financial safety net that protects insured deposits and serves as a guarantee against losses on insured accounts has become increasingly important in bank resolution Using a comparative and interdisciplinary approach this book examines the legal and regulatory issues surrounding deposit insurance schemes in three jurisdictions the US the UK and China It offers a timely analysis of the operating mechanisms and implications of deposit insurance during the global financial crisis It also provides an in depth doctrinal analysis of the US the UK and China s deposit insurance laws Based on these discussions the author proposes suggestions for reforming China s deposit insurance system and practice The title will appeal to scholars and students of banking and banking law as well as legal and financial practitioners in the fields of commercial law and banking and financial regulation

**Index to IEEE Publications** Institute of Electrical and Electronics Engineers,1980 Issues for 1973 cover the entire IEEE technical literature

*Engineering the Plant Factory for the Production of Biologics and Small-Molecule Medicines* Domenico De Martinis,Rosella Franconi,Eugenio Benvenuto,Edward P. Rybicki,Kazuhito Fujiyama,2017-04-27 Plant gene transfer achieved in the early 80s paved the way for the exploitation of the potential of gene engineering to add novel agronomic traits and or to design plants as factories for high added value molecules For this latter area of research the term Molecular Farming was coined in reference to agricultural applications in that major crops like maize and tobacco were originally used basically for pharma applications The concept of the green biofactory implies different advantages over the typical cell factories based on animal cell or microbial cultures already when considering the investment and managing costs of fermenters Although yield stability and quality of the molecules may vary among different heterologous systems and plants are competitive on a case to

case basis still the plant factory attracts scientists and technologists for the challenging features of low production cost product safety and easy scale up Once engineered a plant is among the cheapest and easiest eukaryotic system to be bred with simple know how using nutrients water and light Molecules that are currently being produced in plants vary from industrial and pharmaceutical proteins including medical diagnostics proteins and vaccine antigens to nutritional supplements such as vitamins carbohydrates and biopolymers Convergence among disciplines as distant as plant physiology and pharmacology and more recently as omic sciences bioinformatics and nanotechnology increases the options of research on the plant cell factory Farming for Pharming biologics and small molecule medicines is a challenging area of plant biotechnology that may break the limits of current standard production technologies The recent success on Ebola fighting with plant made antibodies put a spotlight on the enormous potential of next generation herbal medicines made especially in the name of the guiding principle of reduction of costs hence reduction of disparities of health rights and as a tool to guarantee adequate health protection in developing countries

*Applied Mechanics Reviews* ,1988 *Epitranscriptomics: The Novel RNA Frontier* Giovanni Nigita,Mario Acunzo,William Chi Shing Cho,Carlo Maria Croce,2019-01-31 Following the formulation of the central dogma of molecular biology and the later discovery of classes of non coding RNAs the primary focus of Genetics was essentially on variation of DNA aiming at elucidating biological pathways perturbed in diseases Recently extensive attention has shifted towards the study of posttranscriptional RNA modifications occurring in both protein coding as well as non coding RNAs revealing a novel and finer layer of complexity in gene regulation This in turn has led to the birth of the novel field of Epitranscriptomics The recent increase of applications of high throughput sequencing technology HTS has allowed the unprecedented opportunity to identify on a transcriptome wide scale millions of RNA modifications in human genes counting today more than 140 distinct types such as methylation e g m6A m1A m5C hm5C 2 OMe methylation e g m6A m1A m5C hm5C 2 OMe pseudourylation deamination e g A to I RNA editing The scope of this Research Topic was to collect both reviews and research articles addressing the wet lab approaches and bioinformatics methodologies necessary to aid in the identification of novel RNA modifications and characterization of their biological functions Among the articles embracing the aim of the Research Topic we have collected four original research and methods articles five reviews and a technology article

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**Systems** John Dillon, 2016      **PE Control Systems** Jagadeesh Pandiyan, 2011-10-17 PE Control Systems Sample Questions Solutions provides essential resources in assisting candidates who are preparing for the Principles and Practice of Engineering PE examination in the Control Systems discipline This book contains two complete sets of 80 multiple choice questions from the Control Systems October 2011 NCEES exam specifications with step by step solutions This book provides the necessary problem solving skills and confidence to succeed in passing the exam PE Control Systems Engineering exam covers i Measurement ii Signals Transmission and Networking iii Final Control Elements iv Control Systems v Safety Systems and vi Codes Standards and Regulations Additional information provided in the book Description of examinations Licensing requirements Requirements for Foreign Engineers Review courses Resource reference materials and Errata Sheet Other details Sturdy front and back covers printed on 220 gsm 80 white paper stock with glossy finish and protect the paper and double as a firm surface for writing against Glossy laminated front and back covers resistant to water and common scratches Made in USA with acid free paper      **CONTROL ENGINEERING** K.P.Ramachandran, 2011-06-01 Market\_Desc Primary Market VTU 06ME71 Control Engineering 7th Sem EC TC EE IT BM ML 06ES43 4th Sem JNTU ECE EEE Control Systems 4th Sem Anna ECE EEE PTEC 9254 PTEE 9201 Control Systems 3rd Sem UPTU ME EEE 409 Electrical Machines EC 513 Control System 5th Sem RGPV EC 402 Control Systems 4th Sem PTU ECE EIE EEE IC 204 Linear Control System 4th Sem GNDU ECE ECT 223 Linear Control System 4th Sem Secondary Market BPUT CPME 6403 Mechanical Measurement and Control 7th sem RGPV ME 8302 Mechatronics 8th Sem elective Anna PTME9035 measurement and controls 8th Sem UPTU TME 028 Automatic Controls Elective 8th Sem Mumbai Mechatronics 6th Sem WBUT ME 602 Mechatronics and Modern Control 6th Sem Special Features The book provides clear exposure to the principles of control system design and analysis techniques using frequency and time domain analysis Explains the important topics of PID controllers and tuning procedures Includes state space methods for analysis of control system Presents necessary mathematical topics such as Laplace transforms at relevant places Contains detailed artwork capturing circuit diagrams signal flow graphs block diagrams and other important topics Presents stability analysis using Bode plots Nyquist diagrams and Root locus techniques Each chapter contains a wide variety of solved problems with stepwise solutions Appendices present the use of MATLAB programs for control system design and analysis and basic operations of matrices Model question papers contain questions from various university question papers at the end of the book Excellent pedagogy includes 520 Figures and tables 200 Solved problems 90 Objective questions 100 Review questions 70 Numerical problems About The Book Control Engineering is the field in which control theory is applied to design systems to produce desirable outputs It essays the role of an incubator of emerging technologies It has very broad applications ranging from automobiles aircrafts to home appliances process plants etc This subject gains importance due to its multidisciplinary nature and thus establishes itself as a core course among all engineering curricula This textbook aims to develop knowledge and understanding of the principles of physical control

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1. Understanding the eBook Control Systems N6 Question Papers 2013
  - The Rise of Digital Reading Control Systems N6 Question Papers 2013
  - Advantages of eBooks Over Traditional Books
2. Identifying Control Systems N6 Question Papers 2013
  - Exploring Different Genres
  - Considering Fiction vs. Non-Fiction
  - Determining Your Reading Goals
3. Choosing the Right eBook Platform
  - Popular eBook Platforms
  - Features to Look for in an Control Systems N6 Question Papers 2013
  - User-Friendly Interface
4. Exploring eBook Recommendations from Control Systems N6 Question Papers 2013
  - Personalized Recommendations
  - Control Systems N6 Question Papers 2013 User Reviews and Ratings

- Control Systems N6 Question Papers 2013 and Bestseller Lists
- 5. Accessing Control Systems N6 Question Papers 2013 Free and Paid eBooks
  - Control Systems N6 Question Papers 2013 Public Domain eBooks
  - Control Systems N6 Question Papers 2013 eBook Subscription Services
  - Control Systems N6 Question Papers 2013 Budget-Friendly Options
- 6. Navigating Control Systems N6 Question Papers 2013 eBook Formats
  - ePub, PDF, MOBI, and More
  - Control Systems N6 Question Papers 2013 Compatibility with Devices
  - Control Systems N6 Question Papers 2013 Enhanced eBook Features
- 7. Enhancing Your Reading Experience
  - Adjustable Fonts and Text Sizes of Control Systems N6 Question Papers 2013
  - Highlighting and Note-Taking Control Systems N6 Question Papers 2013
  - Interactive Elements Control Systems N6 Question Papers 2013
- 8. Staying Engaged with Control Systems N6 Question Papers 2013
  - Joining Online Reading Communities
  - Participating in Virtual Book Clubs
  - Following Authors and Publishers Control Systems N6 Question Papers 2013
- 9. Balancing eBooks and Physical Books Control Systems N6 Question Papers 2013
  - Benefits of a Digital Library
  - Creating a Diverse Reading Collection Control Systems N6 Question Papers 2013
- 10. Overcoming Reading Challenges
  - Dealing with Digital Eye Strain
  - Minimizing Distractions
  - Managing Screen Time
- 11. Cultivating a Reading Routine Control Systems N6 Question Papers 2013
  - Setting Reading Goals Control Systems N6 Question Papers 2013
  - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Control Systems N6 Question Papers 2013
  - Fact-Checking eBook Content of Control Systems N6 Question Papers 2013
  - Distinguishing Credible Sources



13. Promoting Lifelong Learning
  - Utilizing eBooks for Skill Development
  - Exploring Educational eBooks
14. Embracing eBook Trends
  - Integration of Multimedia Elements
  - Interactive and Gamified eBooks

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