## BOARD 5 QUESTION PAPER - MARCH 2023 (WITH SOLUTION AND MARKING SCHEME)

## BIOLOGY

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Max. Marks: 70

instructions :

on paper is divided into four sections.

A: Q. No. I contains ten multiple choice type of questions carrying one mark each. we cach multiple choice type of question, it is mandatory to write the correct answer along alphabet, e.g., (a) ....../ (b) ....../ (c) ....../ (d) ...... etc. No mark/s shall be given TONLY the correct answer or alphabet of the correct answer is written.

west of MCQ, evaluation will be done for the first attempt only.

n. No. 2 contains eight very short answer type of questions carrying one mark each.

B: Q. No. 3 to 14 are short answer type of questions carrying two marks each.

C: Q. No. 15 to 26 are short answer type of questions carrying three marks each.

D: Q. No. 27 to 31 are long answer type of questions carrying four marks each. the answer of each section on a new page.

#### SECTION-A

sect and write the correct answer for the following multiple choice type of 1101 spestions :

- Histones are rich in ......
  - (b) Leucine and methionine (a) Lysine and arginine
  - (d) Phenylalanine and lysine (1)(c) Serine and leucine
- (ii) How many mitotic divisions take place during the formation of a female gametophyte from a functional megaspore?
  - (a) One (b) Two
  - (1)(d) Four (c) Three
- Which of the following is the only gaseous plant growth regulator?
  - (b) Cytokinin (a) ABA
  - (1)(d) Gibberellin (e) Ethylene
- (b) The pH of nutrient medium for plant tissue culture is in the range of .......
  - (a) 2 to 4.2 (b) 5 to 5.8
    - (1) (c) 7 to 7.5 (d) 8 to 9.5

BIOLOGY

205

# **Sl Biology Paper 2012**

**Kendall A. Smith** 

#### Sl Biology Paper 2012:

**Vertebrate Palaeontology** Michael J. Benton, 2014-10-20 Vertebrate palaeontology is a lively field with new discoveries reported every week and not only dinosaurs This new edition reflects the international scope of vertebrate palaeontology with a special focus on exciting new finds from China A key aim is to explain the science Gone are the days of guesswork Young researchers use impressive new numerical and imaging methods to explore the tree of life macroevolution global change and functional morphology The fourth edition is completely revised The cladistic framework is strengthened and new functional and developmental spreads are added Study aids include key questions research to be done and recommendations of further reading and web sites The book is designed for palaeontology courses in biology and geology departments It is also aimed at enthusiasts who want to experience the flavour of how the research is done The book is strongly phylogenetic and this makes it a source of current data on vertebrate evolution The Action Plan for Australian Mammals 2012 Andrew Burbidge, John Woinarski, Peter Harrison, 2014-06-02 The Action Plan for Australian Mammals 2012 is the first review to assess the conservation status of all Australian mammals It complements The Action Plan for Australian Birds 2010 Garnett et al 2011 CSIRO Publishing and although the number of Australian mammal taxa is marginally fewer than for birds the proportion of endemic extinct and threatened mammal taxa is far greater These authoritative reviews represent an important foundation for understanding the current status fate and future of the nature of Australia This book considers all species and subspecies of Australian mammals including those of external territories and territorial seas For all the mammal taxa about 300 species and subspecies considered Extinct Threatened Near Threatened or Data Deficient the size and trend of their population is presented along with information on geographic range and trend and relevant biological and ecological data The book also presents the current conservation status of each taxon under Australian legislation what additional information is needed for managers and the required management actions Recovery plans where they exist are evaluated The voluntary participation of more than 200 mammal experts has ensured that the conservation status and information are as accurate as possible and allowed considerable unpublished data to be included All accounts include maps based on the latest data from Australian state and territory agencies from published scientific literature and other sources The Action Plan concludes that 29 Australian mammal species have become extinct and 63 species are threatened and require urgent conservation action However it also shows that where guided by sound knowledge management capability and resourcing and longer term commitment there have been some notable conservation success stories and the conservation status of some species has greatly improved over the past few decades The Action Plan for Australian Mammals 2012 makes a major contribution to the conservation of a wonderful legacy that is a significant part of Australia s heritage For such a legacy to endure our society must be more aware of and empathetic with our distinctively Australian environment and particularly its marvellous mammal fauna relevant information must be readily accessible environmental policy and law must be based on sound evidence those

with responsibility for environmental management must be aware of what priority actions they should take the urgency for action and consequences of inaction must be clear and the opportunity for hope and success must be recognised It is in this spirit that this account is offered Animal Contests Ian C. W. Hardy, Mark Briffa, 2013-05-30 Contests are an important aspect of the lives of diverse animals from sea anemones competing for space on a rocky shore to fallow deer stags contending for access to females Why do animals fight What determines when fights stop and which contestant wins Addressing fundamental questions on contest behaviour this volume presents theoretical and empirical perspectives across a range of species The historical development of contest research the evolutionary theory of both dyadic and multiparty contests and approaches to experimental design and data analysis are discussed in the first chapters This is followed by reviews of research in key animal taxa from the use of aerial displays and assessment rules in butterflies and the developmental biology of weapons in beetles through to interstate warfare in humans The final chapter considers future directions and applications of contest research making this a comprehensive resource for both graduate students and researchers in the field The Molecular Mechanisms of Regulatory T cell Immunosuppression Kendall A. Smith, Ever since Regulatory T cells T Regs were first defined as peripheral CD4 T cells that express the interleukin 2 IL 2 receptor alpha chain IL 2Ra there have been intensive efforts to determine the molecular mechanisms whereby this minor subset of CD4 T cells 5 10% nonspecifically suppresses all potential effector T cells whether reactive to self or non self antigens Multiple possible molecular mechanisms have been implicated including the scavenging of IL 2 via the expression of high densities of IL 2Rs the inhibition of antigen presentation via CTLA 4 molecules leading to decreased IL 2 production the activation of intracellular cAMP thereby suppressing both IL 2 production and action and the production of suppressive cytokines such as IL 10 and Tumor Growth Factor beta to list a few However the field has thus far failed to come to a consensus such that some investigators have now asserted that many molecular mechanisms may be operative in fact that perhaps all of the described mechanisms may account for the suppressive effects of these cells acting either simultaneously or sequentially Thus this Research Topic is focused on articles that can shed some new light on the molecular mechanisms responsible for T Reg Reimagining (Bio)Medicalization, Pharmaceuticals and Genetics Susan E. Bell, Anne E. immunosuppression Figert, 2015-02-11 In recent years medicalization the process of making something medical has gained considerable ground and a position in everyday discourse In this multidisciplinary collection of original essays the authors expertly consider how issues around medicalization have developed ways in which it is changing and the potential shapes it will take in the future They develop a unique argument that medicalization biomedicalization pharmaceuticalization and geneticization are related and co evolving processes present throughout the globe This is an ideal addition to anthropology sociology and STS courses about medicine and health The Evolution and Development of the Antibody Repertoire Harry W. Schroeder Jr., 2015-05-26 Although at first glance mechanisms used to create the variable domains of immunoglobulin appear to be

designed to generate diversity at random closer inspection reveals striking evolutionary constraints on the sequence and structure of these antigen receptors suggesting that natural selection is operating to create a repertoire that anticipates or is biased towards recognition of specific antigenic properties This Research Topics issue will be devoted to an examination of the evolution of antigen receptor sequence at the germline level an evaluation of the repertoire in B cells from fish pigs and human an introduction into bioinformatics approaches to the evaluation and analysis of the repertoire as ascertained by high throughput sequencing and a discussion of how study of the normal repertoire informs the construction or selection of in vitro antibodies for applied purposes

U.S. Geological Survey Professional Paper Zhiliang Zhu, Bradley C. Reed, 1984

Summer Wildflowers of the Northeast Carol Gracie, 2020-04-28 This is a follow up volume to Gracie's Spring Wildflowers of the Northeast This new book treats 35 species of summer blooming wildflower some common others less so concentrating on each species life history and in the same manner as the earlier book providing intriguing insights into the biology ecology folklore and where relevant ethno botany of each flower Each species account is richly illustrated with a The Selection Process of Biomass Materials for the Production of Bio-Fuels and Co-firing N. range of color photos Altawell, 2014-03-28 A functional discussion of the crop selection process for biomass energy The Selection Process of Biomass Materials for the Production of Bio fuels and Co firing provides a detailed examination and analysis for a number of energy crops and their use as a source for generating electricity and for the production of bio fuels Renowned renewable energy expert and consultant Dr Najib Altawell begins with the fundamentals of bio fuels and co firing and moves on to the main feature which is the methodology that assists energy scientists and engineers to arrive at the most suitable biomass materials tailored to each company s business and economic environments and objectives This methodology provides a framework whereby power generating companies can insert their own values for each factor whether business factor BF or scientific technical factors S T or both simultaneously The methodology provides a list of factors related to the biomass energy business The average values have been obtained from the survey method and laboratory tests These values are the standard values power companies can use if they need or wish to use them The Selection Process of Biomass Materials for the Production of Bio fuels and Co firing has been designed and compiled for the widest possible range of readers researchers businesspeople and economists who are connected to the renewable energy field in general and biomass energy in particular Because of its focus on practical data and applications the book is also accessible for general readers who may or may not have a technical or scientific background **Cloud Computing and Big Data** C. Catlett, W. Gentzsch, L. Grandinetti, 2013-10-22 Cloud computing offers many advantages to researchers and engineers who need access to high performance computing facilities for solving particular compute intensive and or large scale problems but whose overall high performance computing HPC needs do not justify the acquisition and operation of dedicated HPC facilities There are however a number of fundamental problems which must be addressed such as the limitations imposed by accessibility security and

communication speed before these advantages can be exploited to the full This book presents 14 contributions selected from the International Research Workshop on Advanced High Performance Computing Systems held in Cetraro Italy in June 2012 The papers are arranged in three chapters Chapter 1 includes five papers on cloud infrastructures while Chapter 2 discusses cloud applications The third chapter in the book deals with big data which is nothing new large scientific organizations have been collecting large amounts of data for decades but what is new is that the focus has now broadened to include sectors such as business analytics financial analyses Internet service providers oil and gas medicine automotive and a host of others. This book will be of interest to all those whose work involves them with aspects of cloud computing and big data applications.

PI3K signalling Klaus Okkenhaug, Martin Turner, Michael R Gold, 2015-03-05 The PI3Ks control many key functions in immune cells PI3Ks phosphorylate PtdIns 4 5 P2 to yield PtdIns 3 4 5 P3 Initially PI3K inhibitors such as Wortmannin LY294002 and Rapamycin were used to establish a central role for Pi3K pathway in immune cells Considerable progress in understanding the role of this pathway in cells of the immune system has been made in recent years starting with analysis of various PI3K and Pten knockout mice and subsequently mTOR and Foxo knockout mice Together these experiments have revealed how PI3Ks control B cell and T cell development T helper cell differentiation regulatory T cell development and function B cell and T cell trafficking immunoglobulin class switching and much much more The PI3Kd inhibitor idelalisib has recently been approved for the treatment of B cell lymphoma Clinical trials of other PI3K inhibitors in autoimmune and inflammatory diseases are also in progress This is an opportune time to consider a Research Topic considering when what we have learned about the PI3K signalling module in lymphocyte biology and how this is making an impact on clinical immunology and haematology Therapeutic targeting of circulating tumor cells Michael R. King, There has been increased interest in circulating tumor cells CTC as a diagnostic readout of disease progression and a tool for personalized medicine The next generation of therapy for metastatic cancer may well involve neutralizing CTC as a means to prevent metastasis In this topic we focus on recent research exploring this concept Handbook of Research on Data Science for Effective Healthcare Practice and Administration Noughabi, Elham Akhond Zadeh, Raahemi, Bijan, Albadvi, Amir, Far, Behrouz H., 2017-07-20 Data science has always been an effective way of extracting knowledge and insights from information in various forms One industry that can utilize the benefits from the advances in data science is the healthcare field The Handbook of Research on Data Science for Effective Healthcare Practice and Administration is a critical reference source that overviews the state of data analysis as it relates to current practices in the health sciences field Covering innovative topics such as linear programming simulation modeling network theory and predictive analytics this publication is recommended for all healthcare professionals graduate students engineers and researchers that are seeking to expand their knowledge of efficient techniques for information analysis in the healthcare professions A Milestone in Frontiers in Pharmacology: 1,000 Published Papers in the Section Experimental Pharmacology and Drug Discovery Salvatore

Salomone, 2020-04-14 Frontiers in Pharmacology was launched in 2010 with a number of sections which were eventually reorganized The founding Field Chief Editor was Prof Th ophile Godfraind an eminent scientist active in cardiovascular pharmacology who pioneered the discovery of calcium antagonists At that time he invited me to serve as Chief Editor for a section named Analytical and Experimental Pharmacology Later on our section enlarged and was re named as Experimental Pharmacology and Drug Discovery to outline the translational potential of fundamental pharmacological research and theoretical analysis to the improvement of human health through the invention of novel medicinal products We are now entering the 10th year of editorial activity which sees the publication of the 1 000th paper in our section Such an achievement is very rewarding for us and our community but it is even more remarkable when placed into the timeline of our development In fact in a 10 year frame we have significantly grown in quantity and quality e q both in number of published papers and in scientific impact From a personal perspective by Salvatore Salomone Specialty Chief Editor Climate Change 2014 - Impacts, Adaptation and Vulnerability: Regional Aspects Christopher B. Field, Vicente R. Barros, 2014-12-29 This latest Fifth Assessment Report of the Intergovernmental Panel on Climate Change IPCC will again form the standard reference for all those concerned with climate change and its consequences including students researchers and policy makers in environmental science meteorology climatology biology ecology atmospheric chemistry and environmental policy Retroviruses, retroelements and their restrictions Atsushi Koito, Yukihito Ishizaka, 2015-05-01 Human retroviruses HIV and HTLV have been recognized as important pathogens because of their association with lethal diseases such as AIDS and ATL Considerable resources and efforts have been directed at understanding the interaction between these retroviruses and their host which may provide clues as to how the infection can be controlled or prevented Among the key scientific successes is the identification of intracellular restriction factors that have evolved as obstacles to the replication of pathogens including infectious retroviruses The discovery of APOBEC which are strong mutagens of retroviral genomes and intracellular retroelements began a new era of intense research activities into the spectrum of intrinsic anti HIV activity leading to the identification of TRIM5a BST2 Tetherin and SAMHD1 In response HIV has evolved several accessory genes as weaponries to evade these intracellular restriction activities. The intracellular antiretroviral defenses evolved in response to endogenous retroelements that make up more than 40% of the entire mammalian genome and which are regarded as ancestors of infectious retroviruses LTR type retroelements are present in all higher eukaryotes representing about 8% of the human genome Non LTR retroelements can be found at extremely high copy numbers also with a significant portion of mammalin genomes consisting of LINEs Mammalian genomes are modified by LINEs through insertions but also by the indirect replication of non autonomous retrotransposons such as SINEs LINEs insertion was shown to have played and continue to play important roles in genomic evolution and somatic genome mosaicism mediated physiology And because retrotransposition can confer genetic diversity that is beneficial to the host the vertebrate intrinsic

immunity has evolved to support a balance between retroelement insertions that confer beneficial and those that cause deleterious gene disruptions The articles published in this Research Topic should serve not only as valuable references for the field but provide future topics of research for investigators that should further our understanding of the retrovirus retroelements and their restrictions <u>Virus Discovery by Metagenomics: The (Im)possibilities</u> Bas E. Dutilh, Alejandro Reyes, Richard J. Hall, Katrine L. Whiteson, 2017-10-25 Since the late 1800s the discovery of new viruses was a gradual process Viruses were described one by one using a suite of techniques such as electron microscopy and viral culture Investigators were usually interested in a disease state within an organism and expeditions in viral ecology were rare The advent of metagenomics using high throughput sequencing has revolutionized not only the rate of virus discovery but also the nature of the discoveries For example the viral ecology and etiology of many human diseases are being characterized non pathogenic viral commensals are ubiquitous and the description of environmental viromes is making progress This Frontiers in Virology Research Topic showcases how metagenomic and bioinformatic approaches have been combined to discover classify and characterize novel viruses Environmental Radiobiology Paul N. Schofield, Carmel E. Mothersill, 2023-10-17 This book focuses on the impacts of anthropogenic radiation on wildlife and ecosystems and provides an in depth look at the approaches and available tools we can use to gain information about biological effects of radiation in the environment The nuclear accidents in Chornobyl in 1986 and Fukushima in 2011 focussed the attention of the world on the vulnerability of ecosystems to radiation In Chornobyl there still remains an exclusion zone where levels are considered to be too high for people and impacts on terrestrial and aquatic ecosystems can still be measured 35 years later. In the area impacted by the Fukushima disaster intense remediation is still under way at tremendous cost and causing widespread disruption to the environment That accident impacted the terrestrial and marine ecosystems In both accidents it became obvious that a radiation protection framework focussing on protection of humans a single species and using evacuation as a key strategy was not sufficient to protect the natural environment The complexity of ecosystems makes developing a protection framework very challenging but in order to even start the process it is vital to gather information about likely impacts of low dose exposures on wildlife and to develop monitoring tools to measure changes over time This book contains reviews and original research aimed at filling our knowledge gaps about these important areas Environmental Radiobiology will be a key resource for academics researchers and advanced students of Radiobiology Radioecology Biology Ecology Biomedicine and Research Methods The chapters included in this book were originally published as a special issue of International Journal of Hydrogeology, Chemical Weathering, and Soil Formation Allen Hunt, Markus Egli, Boris Radiation Biology Faybishenko, 2021-04-06 Explores soil as a nexus for water chemicals and biologically coupled nutrient cycling Soil is a narrow but critically important zone on Earth's surface It is the interface for water and carbon recycling from above and part of the cycling of sediment and rock from below Hydrogeology Chemical Weathering and Soil Formation places chemical

weathering and soil formation in its geological climatological biological and hydrological perspective Volume highlights include The evolution of soils over 3 25 billion years Basic processes contributing to soil formation How chemical weathering and soil formation relate to water and energy fluxes The role of pedogenesis in geomorphology Relationships between climate soils and biota Soils aeolian deposits and crusts as geologic dating tools Impacts of land use change on soils The American Geophysical Union promotes discovery in Earth and space science for the benefit of humanity Its publications disseminate scientific knowledge and provide resources for researchers students and professionals Find out more about this book from this Q A with the Editors Emerging Technologies for Health and Medicine Dac-Nhuong Le, Chung Van Le, Jolanda G. Tromp, Gia Nhu Nguyen, 2018-11-12 Showcases the latest trends in new virtual augmented reality healthcare and medical applications and provides an overview of the economic psychological educational and organizational impacts of these new applications and how we work teach learn and provide care With the current advances in technology innovation the field of medicine and healthcare is rapidly expanding and as a result many different areas of human health diagnostics treatment and care are emerging Wireless technology is getting faster and 5G mobile technology allows the Internet of Medical Things IoMT to greatly improve patient care and more effectively prevent illness from developing This book provides an overview and review of the current and anticipated changes in medicine and healthcare due to new technologies and faster communication between users and devices The groundbreaking book presents state of the art chapters on many subjects including A review of the implications of Virtual Reality VR and Augmented Reality AR healthcare applications A review of current augmenting dental care An overview of typical human computer interaction HCI that can help inform the development of user interface designs and novel ways to evaluate human behavior to responses in VR and other new technologies A review of telemedicine technologies Building empathy in young children using augmented reality AI technologies for mobile health of stroke monitoring rehabilitation robotics control Mobile doctor brain AI App An artificial intelligence mobile cloud computing tool Development of a robotic teaching aid for disabled children Training system design of lower limb rehabilitation robot based on virtual reality

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#### **Table of Contents SI Biology Paper 2012**

- 1. Understanding the eBook Sl Biology Paper 2012
  - The Rise of Digital Reading Sl Biology Paper 2012
  - Advantages of eBooks Over Traditional Books
- 2. Identifying Sl Biology Paper 2012
  - 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 Sl Biology Paper 2012
  - User-Friendly Interface
- 4. Exploring eBook Recommendations from Sl Biology Paper 2012
  - Personalized Recommendations
  - Sl Biology Paper 2012 User Reviews and Ratings
  - Sl Biology Paper 2012 and Bestseller Lists
- 5. Accessing Sl Biology Paper 2012 Free and Paid eBooks
  - Sl Biology Paper 2012 Public Domain eBooks
  - Sl Biology Paper 2012 eBook Subscription Services
  - Sl Biology Paper 2012 Budget-Friendly Options
- 6. Navigating Sl Biology Paper 2012 eBook Formats
  - ePub, PDF, MOBI, and More
  - Sl Biology Paper 2012 Compatibility with Devices
  - Sl Biology Paper 2012 Enhanced eBook Features
- 7. Enhancing Your Reading Experience
  - Adjustable Fonts and Text Sizes of Sl Biology Paper 2012
  - Highlighting and Note-Taking Sl Biology Paper 2012
  - Interactive Elements Sl Biology Paper 2012
- 8. Staying Engaged with Sl Biology Paper 2012

- Joining Online Reading Communities
- Participating in Virtual Book Clubs
- Following Authors and Publishers Sl Biology Paper 2012
- 9. Balancing eBooks and Physical Books Sl Biology Paper 2012
  - Benefits of a Digital Library
  - Creating a Diverse Reading Collection Sl Biology Paper 2012
- 10. Overcoming Reading Challenges
  - Dealing with Digital Eye Strain
  - Minimizing Distractions
  - Managing Screen Time
- 11. Cultivating a Reading Routine Sl Biology Paper 2012
  - Setting Reading Goals Sl Biology Paper 2012
  - Carving Out Dedicated Reading Time
- 12. Sourcing Reliable Information of Sl Biology Paper 2012
  - Fact-Checking eBook Content of Sl Biology Paper 2012
  - 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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