

Exemplar Problems

BIOLOGY

Class XII



राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण परिषद्
NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

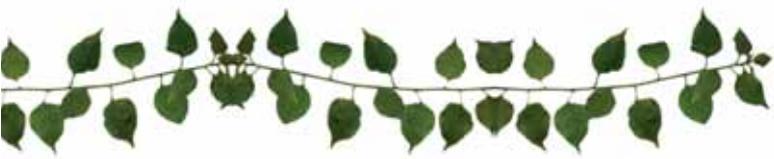


FOREWORD

The National Curriculum Framework (NCF) – 2005 initiated a new phase of development of syllabi and textbooks for all stages of school education. Conscious effort has been made to discourage rote learning and to diffuse sharp boundaries between different subject areas. This is well in tune with the NPE–1986 and *Learning Without Burden -1993* that recommend child-centred system of education. The textbooks for Classes IX and XI were released in 2006 and for Classes X and XII in 2007. Overall the books have been well received by students and teachers.

NCF–2005 notes that treating the prescribed textbooks as the sole basis of examination is one of the key reasons why other resources and sites of learning are ignored. It further reiterates that the methods used for teaching and evaluation will also determine how effective these textbooks prove for making children's life at school a happy experience, rather than source of stress or boredom. It calls for reform in examination system currently prevailing in the country.

The position papers of the National Focus Groups on *Teaching of Science, Teaching of Mathematics and Examination Reform* envisage that the question papers, set in annual examinations conducted by the various Boards do not really assess genuine understanding of the subjects. The quality of question papers is often not upto the mark. They usually seek mere information based on rote memorisation, and fail to test higher-order skills like reasoning and analysis, let alone lateral thinking, creativity, and judgement. Good unconventional questions, challenging problems and experiment-based problems rarely find a place in question papers. In order to address to the issue, and also to provide additional learning material, the Department of Education in Science and Mathematics (DESM) has made an attempt to develop resource book of exemplar problems in different subjects at secondary and higher-secondary stages. Each resource book contains different types of questions of varying difficulty level. Some questions would require the students to apply simultaneously understanding of more than one chapters/units. These problems are *not* meant to serve merely as question bank for examinations but are primarily meant to improve the quality of teaching-learning process in schools. It is expected that these problems would encourage teachers to design quality questions on their own. Students and teachers should always keep in mind that examination and assessment should test comprehension, information, recall, analytical thinking and problem-solving ability, creativity and speculative ability.



A team of experts and teachers with an understanding of the subject and a proper role of examination worked hard to accomplish this task. The material was discussed, edited, and finally included in this resource book.

NCERT would welcome suggestions from students, teachers and parents which would help us to further improve the quality of material in subsequent editions.



Yash Pal

Chairperson

National Steering Committee

National Council of Educational

Research and Training

New Delhi
21 May 2008



PREFACE

The Department of Education in Science and Mathematics (DESM), National Council of Educational Research and Training (NCERT), initiated the development of 'Exemplar Problems' in science and mathematics for secondary and higher secondary stages after completing the preparation of textbooks based on National Curriculum Framework-2005.

The main objective of the book *Exemplar Problems in Biology* for class XII is to provide the teachers and students a large number of quality problems with varying cognitive levels to facilitate teaching-learning of concepts in Biology that are presented through the textbook for Class XII. It is envisaged that the problems included in this volume would help the teachers to design tasks to assess effectiveness of their teaching and to know about the achievement of their students besides facilitating preparation of balanced question papers for unit and terminal tests. The feedback based on the analysis of students' responses may help the teachers in further improving the quality of classroom instructions. In addition, the problems given in this book are also expected to help the teachers to perceive the basic characteristics of good quality questions and motivate them to frame similar questions on their own. Students can benefit themselves by attempting the exercises given in the book for self-assessment and also in mastering the basic techniques of problem solving. Some of the questions given in the book are expected to challenge the understanding of the concepts of biology of the students and their ability to apply them in novel situations.

The problems included in this book were prepared through a series of workshops organised by the DESM for their development and refinement involving practising teachers, subject experts from universities and institutes of higher learning, and the members of the biology group of the DESM whose names appear separately. We gratefully acknowledge their efforts and thank them for their valuable contribution in our endeavour to provide good quality instructional material for the school system.

I express my gratitude to Professor Krishna Kumar, Director, and Professor G. Ravindra, Joint Director, NCERT, for their valuable motivation and guidance from time to time. Special thanks are due to Dr. B. K. Tripathi, *Professor*, DESM for coordinating the programme, taking pains in editing and refinement of problems and for making the manuscript pressworthy.

We look forward to feedback from students, teachers and parents for further improvement of the contents of the book.

New Delhi

HUKUM SINGH
Professor and Head
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Science and Mathematics
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CHILDREN'S BILL OF RIGHTS

A child is every person under the age of 18 years. Parents have the primary responsibility for the upbringing and development of the child. The State shall respect and ensure the rights of the child.



- I have the Right to express my views freely which should be taken seriously, and everyone has the Responsibility to listen to others. (Article 12,13)



- I have the Right to good health care, and everyone has the Responsibility to help others get basic health care and clean water. (Article 24)
- I have the Right to a good education, and everyone has the Responsibility to encourage all children to go to school. (Article 28,29,23)



- I have the Right to be loved and protected from harm and abuse, and everyone has the Responsibility to love and care for others. (Article 19)
- I have the Right to be included whatever my abilities, and everyone has the Responsibility to respect others for their differences. (Article 23)
- I have the Right to be proud of my heritage and beliefs, and everyone has the Responsibility to respect the culture and belief of others. (Article 29,30)



- I have the Right to a safe and comfortable home and everyone has the Responsibility to make sure all children have homes. (Article 27)
- I have the Right to make mistakes, and everyone has the Responsibility to accept we can learn from our mistakes. (Article 28)
- I have the Right to be well fed, and everyone has the Responsibility to prevent people from starving. (Article 24)



- I have the Right to a clean environment, and everyone has the Responsibility not to pollute it. (Article 29)
- I have the Right to live without violence (verbal, physical, emotional), and everyone has the Responsibility not to be violent to others. (Article 28,37)



- I have the Right to be protected from economic and sexual exploitation, and everyone has the Responsibility to ensure that no child is forced to work and is given a free and secure environment. (Article 32,34)

These rights and responsibilities are enshrined in the United Nations Convention on the Rights of the Child, 1989. It contains all the rights which children and young people have all over the world. The Government of India signed this document in 1992.



DEVELOPMENT TEAM

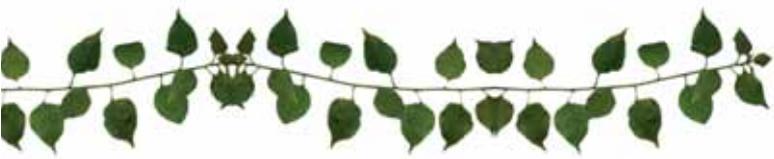
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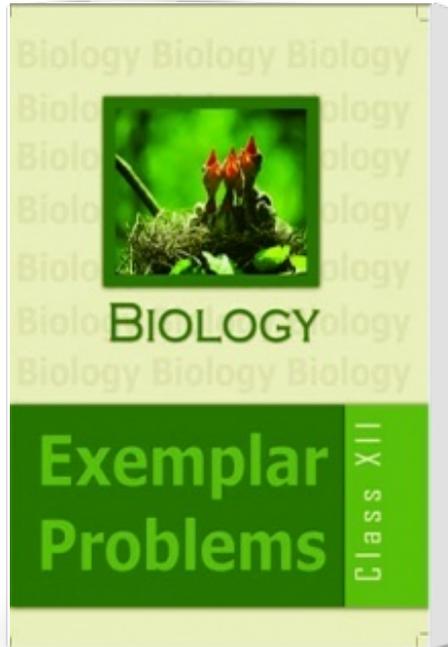
CHAPTER 1

REPRODUCTION IN ORGANISMS

MULTIPLE-CHOICE QUESTIONS

1. A few statements describing certain features of reproduction are given below:
 - i. Gametic fusion takes place
 - ii. Transfer of genetic material takes place
 - iii. Reduction division takes place
 - iv. Progeny have some resemblance with parentsSelect the options that are true for both asexual and sexual reproduction from the options given below:
(a) i and ii; (b) ii and iii; (c) ii and iv; (d) i and iii.
2. The term 'clone' cannot be applied to offspring formed by sexual reproduction because:
 - a. Offspring do not possess exact copies of parental DNA
 - b. DNA of only one parent is copied and passed on to the offspring
 - c. Offspring are formed at different times
 - d. DNA of parent and offspring are completely different.
3. *Amoeba* and Yeast reproduce asexually by fission and budding respectively, because they are:
 - a. Microscopic organisms
 - b. Heterotrophic organisms
 - c. Unicellular organisms
 - d. Uninucleate organisms.
4. A few statements with regard to sexual reproduction are given below:
 - i. Sexual reproduction does not always require two individuals
 - ii. Sexual reproduction generally involves gametic fusion
 - iii. Meiosis never occurs during sexual reproduction
 - iv. External fertilisation is a rule during sexual reproduction

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