ICSE

INDIAN CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

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ENVIRONMENTAL APPLICATIONS

(89)

Developed by:
Research, Development and Curriculum Division (RDCD)
CISCE

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Council for the Indian School Certificate Examinations (CISCE)

MISSION STATEMENT

The Council for the Indian School Certificate Examinations is committed to serving the nation's children, through high quality educational endeavours, empowering them to contribute towards a humane, just and pluralistic society, promoting introspective living, by creating exciting learning opportunities, with a commitment to excellence.

ETHOS OF CISCE

- Trust and fair play.
- Minimum monitoring.
- Allowing schools to evolve their own niche.
- Catering to the needs of the children.
- Giving freedom to experiment with new ideas and practices.
- Diversity and plurality - the basic strength for evolution of ideas.
- Schools to motivate pupils towards the cultivation of:
  Excellence - The Indian and Global experience.
  Values - Spiritual and cultural - to be the bedrock of the educational experience.
- Schools to have an 'Indian Ethos', strong roots in the national psyche and be sensitive to national aspirations.

CLASS X

*There will be **one** paper of **two hours** duration carrying 100 marks and Internal Assessment of 100 marks.*

THEORY – 100 Marks

1. Caring for our Basic Resources

(i) Caring for our Soil.

(a) Causes and consequences of soil erosion.

Study improper land use, deforestation, overgrazing, etc. and also the impact of soil erosion on food production, generation of wastelands, silting of waterways and dams.

(b) Soil conservation strategies.

- *Contour bunding.*
- *Tree breaks.*
- *Check dams.*
- *Terrace farming.*
- *Mulching.*

A study of solutions and their applicability. Example such as Auroville and Tarun Bharat Sangh's work.

(c) Fuel wood crisis.

To develop an understanding in students that a very large section of Indians still use firewood as fuel, the impact it has on nature in terms of a fast dwindling resource and the pressure put on surviving forests. Impact on health of the poor, particularly women, from inhaling the smoke.

(d) Waste generation - its toxicity and its impact on life and land.

The politics of waste dumping, the unmanageable wastes that we generate, leaching of toxins from landfills into water bodies, agricultural lands, and issues around incinerating waste.

(e) Treatment of wastes.

- *Effluent treatment plants.*
- *Biological treatment.*
- *Landfill.*
- *Incineration.*
- *Strategies to reduce, reuse and recycle of waste.*

Evolving solutions to treat wastes. The scope and limitation of end of the pipe treatment.

(f) Alternatives to timber.

- *Design solutions-alternate materials, etc.*
- *Combating deforestation.*
  Joint Forest Management (JFM), Community forestry (social and agro-forestry).

Suggested Activities/ Visits:

- *Visit an industry to study waste generated and waste treatment.*
- *Make models of Chula for reduced firewood consumption.*
- *Model of solar cooker.*
- *Setting of compost pit.*

(ii) Caring for our Air.

(a) Technical methods to control air pollution.

Electrostatic precipitators, cyclone separators, wet scrubber, bag filters, fluidized bed boilers.

(b) Strategies to reduce air pollution.

- Economic.

  Penalties and subsidies.

- Technical.

  Hybrid vehicles, alternate fuels, alternate energy vehicles.

- Traffic management.

  Study of Curitiba in Brazil, synchronised signals, use of lanes, one-way roads, etc.

(c) Legislation as a means to reduce air pollution.

The role of law in controlling and reducing pollution with examples like the Taj Mahal trapezium, Delhi city, etc.

(d) Remote sensing satellites and their applications.

Why is it such a good tool? What can it be used for?

(e) International norms on air pollution.

What are the international norms on air pollution? How are they drawn? Limitations with the implementation.

Example: Euro 1, Euro 2.

Suggested Activities/ Visits:

- *Visit to a pollution control board.*
- *Interaction with an NGO working in the field of environment.*

(iii) Caring for our Water.

(a) Techniques of watershed management.

Conserving water bodies; Study of indigenous examples like the Eri system of Tamil Nadu or Rajasthan's traditional systems like Johad and Kunds and newly evolving modern techniques of water management; Ramsar convention.

(b) Rain water harvesting.

- *Roof water harvesting through percolation pits, etc.*
- *Water harvesting in rural areas through check dams, bunds etc.*

The need for the above and the scope.

(c) Small dams versus large dams.

An analysis - can many small dams replace a large dam? Do large rivers require large dams only?

Issues around large dams.

Scope and limitation of small dams.

Other possibilities like Micro hydel, Mini hydel, run off the river.

(d) Water recycling.

The scope of water recycling and importance.

(e) Alternatives to existing sewage treatment like dry compost toilets.

Use of decomposed night soil as a fertiliser as in China.

Suggested Activities / Visits

- *Carry out rain water harvesting in the neighbourhood.*
- *Visit a catchment area of the city.*
- *Visit to a nearby dam.*

2. Resource use

(i) Impact of globalisation on environment.

Understanding the basic intention of globalisation; the possibility and challenge of a global economy; impact of globalisation on developing countries - increased disparities, national debt and recession; impact on human resources and natural resources.

(ii) Role of NGOs in sustaining environment.

Study the work of a few NGOs.

Choose an international, national and a local NGO working in different areas - environmental issue based, women's collectives and child welfare organisations.

(iii) Evolving a sustainable growth paradigm e.g., Mahatma Gandhi's concept of Large-scale development versus Village community based self-sufficient growth.

What does sustainability mean?

GDP versus Growth paradox. (Questioning the notion that increase in power will bring about economic growth and this in turn will alleviate poverty.)

How to integrate the principle of sustainability in development?

Gandhi's model of decentralised governance like Panchayati Raj.

A study of a few working examples like Khadi, Gram Vikas, Auroville, Gandhi gram.

(iv) North - South divide.

Patterns of resource use in the North and the South and the impact they have on the environment of both the regions.

Suggested Activities / Visits

- *Visit to a Khadi production centre or other such units.*

3. Appropriate Eco-friendly Technologies

(i) Scope and limitation of indigenous technology and modern technology.

Study an industry like fishing and/or weaving - where both technologies are practised.

(ii) Need for developing intermediate and appropriate technology.

To be studied through the analysis of the power sector - the limitation of all conventional sources and the scope of alternate energy sources like Biogas, Solar energy, Wind energy.

(iii) Developing least cost options.

Environment Impact Assessments (EIA), their role including impacts while planning and the method to develop least cost options.

Dynamics of implementation.

Steps of EIA.

Scope of grass root upward planning rather than trickle down planning.

(iv) Natural resource accounting.

What is natural resource accounting? How to go about it? Difficulty in Natural Resource Accounting.

Suggested Activities / Visits

- *Visit a modern power plant.*
- *Visit a village with traditional occupation like weaving, pottery, etc.*
- *Visit a Bio-gas plant.*

4. Initiatives I can take

(i) In my local environment.

(ii) In my future career choice.

(iii) In supporting initiative in my State or Country.

By the end of Class X, the student must have a working understanding of the broad impact that his /her personal decisions can have on the environment and on society. The implications of such an understanding are that:

- *the student is responsible for choices made.*
- *he/she is capable of mobilising responses to things that happen into meaningful and productive action.*
- *in whatever career context the student may function in later life, there is scope for applying environmental sensitivity.*
- *there is a clear connectedness to people and a capacity to interpret processes and decisions in society and governance and its impact on people.*

This can be brought about by discussions in class or facilitated through any other empowering process.

INTERNAL ASSESSMENT – 100 Marks

Students are recommended to complete **two** case studies and **one** project from the list given below.

Suggested list of Projects/ Case studies for topics from the syllabus.

1. Caring for our Basic Resources.

(i) ***Caring for our soil***

Projects

- *How can a society produce less waste?*
- *Examine the problem of plastic.*
- *Setting up a safe plastic disposal system in a city.*
- *What are toxic wastes?*
- *Should oceans act as waste dumps?*

Case Studies

- *Tarun Bharat Sangh's work in Alwar.*
- *Case study of Anna Hazare's work in Ralegan Siddhi.*
- *Auroville's afforestation effort.*
- *Environmental effects of mining, brick industry.*
- *Use of resources in a city. Compare with the resources used in a rural community.*
- *Leachates and their effect on soil.*

(ii) Caring for our Air.

Projects

- *Monitor pollution in busy traffic places.*
- *Role of vehicles in causing respiratory health problems.*
- *Is better public transport an answer to reducing air pollution in cities?*

Case Studies

- *Generating power through burning garbage - is it a good way of dealing with garbage?*
- *Medical waste disposal through incineration - is there an option?*
- *Can pollution be reduced by better city planning (one way lanes, synchronized signals etc).*
- *Bhopal gas tragedy.*
- *Chernobyl tragedy.*

(iii) Caring for our Water.

Project

- *Is water being wasted due to the modern sewage disposal system in cities?*
- *Damages caused by modern agriculture on water resources.*

Case Studies

- *Water shortage in Kerala and Chirapunji.*
- *Rajasthan's water conservation systems.*
- *Salt water intrusion.*
- *Ground water depletion.*
- *Contamination of surface water.*
- *Laws relating to rain water harvesting in cities.*
- *The politics of water sharing like the Cauvery issue.*
- *Narmada issue.*
- *The Tehri dam issue.*
- *The three gorges project in China.*

2. Resource Use.

Projects

- *Assess the impact of any mass movement related to displacements of people or violations of environmental laws.*
- *Look at Governmental and Non-Governmental supports to promote local initiative in the area of sustainable growth.*

Case Studies

- *Reports by NGOs on Globalisation impacts.*
- *Captive minds captive lives – Vandana Shiva.*
- *The unseen worker – National Foundation of India.*
- *Excerpts from E.F. Schumacher's work "small is Beautiful".*
- *Voluntary action and Gandhian approach – D.K. Oza.*
- *J.C. Kumarappa's writing.*
- *Gandhi's writings.*

3. Appropriate Eco-friendly Technologies Projects.

- *Can Non-conventional sources meet the growing demand for power?*
- *How far the use of biogas is successful in conserving fuel wood and protecting women's health in rural India?*

Case Studies

- *Dr. A.K.N. Reddy's work in creating a network of villages in Tumkur district based on appropriate technologies.*
- *MNES publications.*

Guidelines for evaluating Project Work

The project has to be evaluated for the efficacy of the following steps:

1. Coming up with a clear question or problem statement, which will be the basis of the student's project work. This is critical because without a clear question the research tends to be broad and unfocussed, with the student tending to gather whatever information is available rather what they need to have.

   Criteria of evaluation for this stage will therefore include definition in terms of the focus and clarity of the question.

2. Formulating an action plan, which states the steps to be taken to move the question forward.

   Criteria of evaluation for this stage will include how pragmatically the plan takes the question forward.

3. Gathering primary data.

   50% - 70% of information gathered needs to be primary data i.e., data gathered by the student by going into the field.

   This may involve evolving a questionnaire for social issues and formats for ecology related projects. Sample size and type have to be adequate and scrutinized carefully.

   Criteria of evaluation for this stage will therefore be based on quantum of fieldwork and efficacy of sampling.

4. Secondary data.

   Secondary data from books, Internet and other publications is used only as a basis to substantiate, analyse and to construct an argument.

   Criteria of evaluation for this stage will therefore include appropriate choice and use of secondary data.

5. Collating data and generating solutions.

   This phase after the gathering of the data is one of stock taking i.e. putting together of information. The data is then analysed and the solutions generated. The initial project report is put together.

   Criteria of evaluation for this stage will therefore include sifting and organisation of relevant data, complexity of analysis in terms of number and relevance of parameter chosen and feasibility and innovation of solutions generated.

6. Project Report.

   The research the student does is submitted as a project report comprising of the following:

   i. Statement of the topic, issue or problem being studied / researched.

   ii. Statement of the action plan.

   iii. Presentation of data using different methods such as bar charts/ pie diagram etc. A clear distinction has to be made between primary and secondary data.

   iv. Analysis of data.

   v. Solutions offered.

   vi. Personal learning for the student.

vii. Bibliography and acknowledging resource persons.

Criteria of evaluation for this stage will therefore include readability, precision, neatness and indexing.

Therefore, the evaluation is on-line and does not base itself entirely on the project report.

7. **VIVA-VOCE** (Optional).

A viva may be conducted with the subject teacher and an External Examiner who could be another teacher from the school itself or an experienced person from the environmental field, preferably a researcher.

The purpose of the viva is to give the student an opportunity to converse with an expert in the field regarding his / her project. This would help to deepen the learning for the students and help them understand the lacunae in their thinking and process.

Guidelines for evaluating Case Studies

Case studies unlike projects are not based on primary data but entirely on secondary data mostly about a particular event or case.

The student presents it as a report about 1500 words long. It may be evaluated for:

- Comprehensiveness;
- Accuracy;
- Range of sources;
- Inferences drawn;
- Connections made;
- Perspective gained, etc.

EVALUATION

The assignments/project work is to be evaluated by the subject teacher and by an External Examiner. The External Examiner may be a teacher nominated by the Head of the school, who could be from the faculty, **but not teaching the subject in the section/class.**

The Internal Examiner and the External Examiner will assess the assignments independently.

Marks may be awarded on the following break up:

	Case Study 1	**Case Study 2**	**Project**	**Total Marks**
Subject Teacher (Internal Examiner	**10**	**10**	**30**	**50**
External Examiner	**10**	**10**	**30**	**50**

Award of Marks **(100 Marks)**

Subject Teacher (Internal Examiner) 50 marks

External Examiner 50 marks

The total marks obtained out of 100 are to be sent to CISCE by the Head of the school.

The Head of the school will be responsible for the online entry of marks on CISCE's CAREERS portal by the due date.

INTERNAL ASSESSMENT IN ENVIRONMENTAL APPLICATIONS - GUIDELINES FOR MARKING WITH GRADES

Criteria	Preparation	Investigation/Gathering Data	Analysis/Inference	Solutions Alternatives/ Innovations	Presentation
Grade I (4 marks)	Follows instructions with understanding; modifies if needed. Background information correct. Level of awareness high.	Is able to ask correct questions. Knows whom to ask, when and how. Can deal with more than one variable.	Analyses systematically. Can see sequences or correlation. Can segregate fact from opinion.	Innovative ideas presented. Alternatives suggested.	Accurate. Feasible, neat, well labelled diagrams. Index and references given.
Grade II (3 marks)	Follows instructions step-by-step. Awareness is good. Background information correct.	Is able to ask questions and identify whom to ask, when and how. Can handle two variables only.	Makes observations correctly. Analysis fair.	Alternatives presented. Innovative but not practical.	Accurate. Neat, well labelled diagrams. Index and references given.
Grade III (2 marks)	Follows simple instructions only. Awareness basic. Background information sketchy.	Needs help with the investigations. Has suggestions but cannot decide.	Observation - help needed. Needs guidance to see correlations or sequence.	Obvious solutions presented. Not innovative.	A bit disorganised, but neat and accurate. Either index or references missing.
Grade IV (1 mark)	Follows some instructions but confused. Has to be made aware. Background information incorrect in places.	Needs to be told what questions to be asked, whom to ask or where to gather the data from.	Detailed instructions required to draw inferences. Charts have to be made.	Thinks of solutions under guidance.	Poorly organised. Some points missing. Index and references missing.
Grade V (0 mark)	Confused about instructions. Has to be made aware. Needs help with background information.	Gets stuck at every step. Questionnaire has to be formulated.	Even with help, analysis is not clear. Takes teacher's word for it.	Solutions not forthcoming.	Overall impression very poor. Not very accurate.