AGRICULTURAL SCIENCE (83)

Aims:

1. To promote an appreciation and interest in agriculture as an applied science.
2. To develop an appreciation of the nation's agricultural resources and development.
3. To help students acquire the knowledge of terms, facts, concepts, trends, principles, etc. in agriculture.
4. To develop familiarity with the basic terminology and elementary ideas of agriculture.
5. To help students acquire knowledge of the contemporary state of agriculture in the nation and the efforts being made to solve agricultural problems.

CLASS IX

*There will be **one** paper of **two** hours duration carrying 80 marks and Internal Assessment of 20 marks.*

The paper will be divided into two sections, A and B.

***Section A (Compulsory)** will consist of questions requiring short answers and will cover the entire syllabus.*

***Section B** will consist of questions that will require detailed answers. There will be a choice of questions and candidates will be required to answer **four** questions from this section.*

1. Soils

(i) Formation of soil due to physical and chemical weathering as well as biological action.

(ii) Identification of soil profile in terms of top soil, subsoil and underlying material; distinguishing between soil particles in sand, silt and clay.

(iii) Components of different types of soils: sand, silt and clay, living and dead organic matter, air and water.

(iv) Types of soil, their characteristics, size of particles, water retention properties and agricultural uses; types of soils found in different regions of India and their distribution.

(v) Soil erosion, its causes and methods used to reduce soil erosion.

2. Features of agriculture

(i) The influence of climate and weather (including temperature, evaporation, humidity, rainfall and wind) on agriculture and plant growth; climatic variations found in India and their influence on agriculture.

(ii) Preparation of land for agriculture, common methods of land use for agriculture (including shifting cultivation, settled land tenure and other types of land use).

(iii) Single and multiple cropping patterns, monoculture and mixed farming, rotation of crops.

3. Agricultural inputs

(i) Plant nutrients (N, P, K as well as trace metals), organic and inorganic sources of nutrients (manure and fertilizers), pH of soils, alkaline and acidic soils.

(ii) Irrigation and water requirements of soil, types of irrigation systems found in India; drainage of soils.

(iii) Crop protection against weeds, pests and diseases by using mechanical, chemical and biological means; common types of crop diseases found in the major Indian food crops.

(iv) Seeds and their influence on yield; special planting techniques such as *ratoon* sugarcane.

INTERNAL ASSESSMENT

Please note the guidelines for internal assessment as given for **Class X**.

CLASS X

*There will be **one** paper of **two** hours duration carrying 80 marks and Internal Assessment of 20 marks.*

The paper will be divided into two sections, A and B.

Section A **(Compulsory)** *will consist of questions requiring short answers and will cover the entire syllabus. There will be no choice of questions in this section.*

Section B *will consist of questions that will require detailed answers. There will be a choice of questions and candidates will be required to answer **four** questions from this section.*

1. Agricultural Economics

(i) Contribution of agriculture to the national economy.

(ii) Food production, self-sufficiency in food grains production, agricultural productivity, the Green Revolution.

(iii) Land holdings, fragmentation and consolidation, land ceiling, common property and village lands, land reform.

(iv) Agricultural labour.

(v) Agricultural credit, crop insurance, role of institutions such as NABARD.

(vi) Subsistence farming, food grain production, cash crops, changing patterns of agricultural production in India, horticulture, food processing.

(vii) Problems faced by agriculture in India (with a discussion of their possible resolution).

2. In-depth study of Crop Production

(i) With reference to one locally grown cereal crop, the study of crop cultivation and production; recognition of the suitability of the crop to local environmental and soil conditions.

(ii) With reference to the cereal crop locally grown, study of the soil and climatic requirements; land preparation; sowing/planting/harvesting cycle; manure and fertilizers; prevention of pests, weeds and diseases; maturity and storage of the cereal crop.

3. Agriculture and Energy

(i) Photosynthesis; food webs and energy flows; energy pyramid; trophic levels; pyramid of numbers; pyramid of biomass; biomass energy.

(ii) The energy cost of agriculture; differences of energy usage in traditional and technological agricultural practices.

(iii) Conventional energy sources for agriculture (thermal, hydroelectric and nuclear - all in the form of electricity; petroleum - as motor fuel); alternative energy sources (solar, biogas, gasohol, wind and geothermal energy).

4. Agricultural Technology

(i) Mechanisation in agriculture.

(ii) Hybridisation, genetic engineering, tissue culture, hydroponics, microtechnology (for example, mushrooms, orchids), artificial ecosystems (for example, on the moon).

INTERNAL ASSESSMENT

Suggested Project Work

1. The students should attempt to prepare a small piece of land and grow a suitable local crop on it. They must document the process they used in growing the crop.
2. Test and study the effect of seed depth, spacing and soil preparation on plant growth.
3. Field study of soil erosion or conservation in a local area near the school.
4. Laboratory growth of plants or tissue cultures.

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**. For example, a teacher of Science of Class VIII may be deputed to be an External Examiner for Class X projects.)

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

Award of marks (20 Marks)

Subject Teacher (Internal Examiner)	10 marks
External Examiner	10 marks

The total marks obtained out of 20 are to be sent to the Council by the Head of the school.

The Head of the school will be responsible for the entry of marks on the mark sheets provided by the Council.

INTERNAL ASSESSMENT IN AGRICULTURAL SCIENCE - GUIDELINES FOR MARKING WITH GRADES

Criteria	Preparation	Procedure/ Testing	Observation	Inference/ Results	Presentation
Grade I (4 marks)	Follows instructions (written, oral, diagrammatic) with understanding; modifies if needed. Familiarity with and safe use of apparatus, tools, materials, techniques.	Analyses problem systematically. Recognises a number of variables and attempts to control them to build a logical plan of investigation.	Records data/ observations without being given a format. Comments upon, recognises use of instruments, degree of accuracy. Recording is systematic.	Processes data without format. Recognises and comments upon sources of error. Can deal with unexpected results, suggesting modifications.	Presentation is accurate and good. Appropriate techniques are well used.
Grade II (3 marks)	Follows instructions to perform experiment with step-by-step operations. Awareness of safety. Familiarity with apparatus, tools, materials and techniques.	Specifies sequence of operation; gives reasons for any change in procedure. Can deal with two variables, controlling one.	Makes relevant observations. No assistance is needed for recording format that is appropriate.	Processes data appropriately as per a given format. Draws qualitative conclusions consistent with required results.	Presentation is adequate. Appropriate techniques are used.
Grade III (2 marks)	Follows instructions to perform a single operation at a time. Safety awareness. Familiarity with apparatus, tools & materials.	Develops simple experimental strategy. Trial and error modifications made to proceed with the experiment.	Detailed instructions needed to record observations. Format required to record results.	Processes data approximately with a detailed format provided. Draws observations qualitative conclusions as required.	Presentation is fair, but disorganised in some places. Overwriting; rough work is untidy.
Grade IV (1 mark)	Follows some instructions to perform a single practical operation . Casual about safety. Manages to use apparatus, tools & materials.	Struggles through the experiment. Follows very obvious experimental strategy.	Format required to record observations/ readings, but tends to make mistakes in recording.	Even when detailed format is provided, struggles or makes errors while processing data. Reaches conclusions with help.	Presentation is poor and disorganised but follows an acceptable sequence. Rough work missing or untidy.
Grade V (0 marks)	Not able to follow instructions or proceed with practical work without full assistance. Unaware of safety.	Cannot proceed with the experiment without help from time to time.	Even when format is given, recording is faulty or irrelevant.	Cannot process results, nor draw conclusions, even with considerable help.	Presentation unacceptable; disorganised, untidy, poor. Rough work missing.