

**ROYAL CIVIL SERVICE COMMISSION
BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2021
EXAMINATION CATEGORY: TECHNICAL**

PAPER III: SUBJECT SPECIALISATION PAPER FOR AGRICULTURE

Date	: October 31, 2021
Total Marks	: 100
Writing Time	: 150 minutes (2.5 hours)
Reading Time	: 15 Minutes (prior to writing time)

GENERAL INSTRUCTIONS:

1. Write your Registration Number clearly and correctly on the Answer Booklet.
2. The first 15 minutes is to check the number of pages of Question Paper, printing errors, clarify doubts and to read the instructions. You are NOT permitted to write during this time.
3. This paper consists of **TWO SECTIONS**, namely SECTION A & SECTION B:
 - **SECTION A** has two parts: Part I - 30 Multiple Choice Questions
Part II - 4 Short Answer Questions
All questions under SECTION A are **COMPULSORY**.
 - **SECTION B** consists of two Case Studies. Choose only **ONE** case study and answer the questions of your choice.
4. All answers should be written on the Answer Booklet provided to you. Candidates are not allowed to write anything on the question paper. If required, ask for additional Answer Booklet.
5. All answers should be written with correct numbering of Section, Part and Question Number in the Answer Booklet provided to you. Note that any answer written without indicating the Section, Part and Question Number will NOT be evaluated and no marks will be awarded.
6. Begin each Section and Part on a fresh page of the Answer Booklet.
7. You are not permitted to tear off any sheet(s) of the Answer Booklet as well as the Question Paper.
8. Use of any other paper including paper for rough work is not permitted.
9. **You must hand over the Answer Booklet to the Invigilator before leaving the examination hall.**
10. This paper has **6 printed pages**, including this instruction page.

GOOD LUCK

SECTION A

PART I: Multiple Choice Questions [30 marks]

Choose the correct answer and write down the letter of your chosen answer in the Answer Booklet against the question number e.g. 31 (d). Each question carries ONE mark. Any double writing, smudgy answers or writing more than one choice shall not be evaluated.

1. Deficiency symptoms of calcium on plants first appear at
 - a) Lower leaves
 - b) Middle leaves
 - c) Terminal leaves
 - d) All leaves

2. Which one of the following is not a PRA tool?
 - a) Transect walk
 - b) Resource mapping
 - c) Venn Diagram
 - d) Mind mapping

3. Chemically or bio-chemically, enzymes are primarily _____ in nature.
 - a) protein
 - b) carbohydrate
 - c) lipids
 - d) vitamin

4. International research institute CIMMYT primarily coordinates research on
 - a) Maize and millet
 - b) Maize and wheat
 - c) Potato and wheat
 - d) Maize and potato

5. The phenotypic superiority of crops is based on
 - a) pure line selection.
 - b) mass selection.
 - c) both a) and b)
 - d) None of the above.

6. Leaf blight in rice is caused by
 - a) Virus
 - b) Bacteria
 - c) Fungus
 - d) Protozoa

7. The removal of upper part of a plant is called
 - a) Pruning
 - b) Heading back
 - c) Desukering
 - d) None of the above.

8. The diseases caused by abiotic factors are called
- Infectious
 - Non-infectious
 - Both a) and b)
 - None of the above.
9. Abnormal proliferation of stem due to some external stimulus is called
- Gall formation
 - Malformation
 - Both a) and b)
 - None of the above.
10. _____ is a gaseous hormone.
- Ethylene
 - Acetic acid
 - Auxin
 - IAA
11. United Nation Organization has set _____ sustainable goals.
- 10
 - 14
 - 17
 - 19
12. _____ is used for soil water conservation.
- Mulching
 - Soil organic matter
 - Deep tillage
 - All of the above.
13. The initial uptake of water by seed is called
- Imbibition
 - Hydrolysis
 - Hydration
 - None of the above.
14. The part of the stem below cotyledon is called
- Epicotyl
 - Hypocotyl
 - both a) and b)
 - None of the above.
15. _____ emerge first in maize plant.
- Tassel
 - Silk
 - Both a) and b)
 - None of the above.

16. *Curcuma longa* is the scientific name of
- Tree tomato
 - Yam
 - Turmeric
 - Tapioca
17. _____ micro nutrient is important for rice.
- Zn
 - Cu
 - Mg
 - None of the above.
18. A plant which needs very little water is called
- Halophytes
 - Hydrophyte
 - Xerophyte
 - None of the above.
19. Phosphorus availability is maximum at soil pH of
- 5-6
 - 6-7
 - 8-9
 - All of the above.
20. Family of wheat is
- Malvacea
 - Poaceae
 - Fabaceae
 - None of the above.
21. Pest attack stored grains because of
- moisture of grain.
 - temperature of grain.
 - smell of grain.
 - All of the above.
22. Which of the following nutrient substance gets lost when the rice is polished?
- Leucine
 - Thiamine
 - Arginine
 - Alanin
23. The fertile soil consists of
- Sand and pebbles
 - Dry leaves
 - Sand and clay
 - Loam and humus

24. *Corylus avellana* is a scientific name for
- areca nut
 - chestnut
 - cashew nut
 - hazelnut
25. One decimal of land is equal to _____ square meter.
- 40.5 sq. m
 - 45.5 sq. m
 - 35.5 sq. m
 - 50.5 sq. m
26. Moniliform antennae is in
- Termite
 - Cockroach
 - Beetle
 - Grasshopper
27. Minimum, optimum and maximum temperature for growth of individual plant is called
- Average temperature
 - Suitable temperature
 - Cardinal temperature
 - Kelvin temperature
28. The response of the plant to the relative length of day and night is called
- Thermoperiodism
 - Photoperiodism
 - Light intensity
 - Day length
29. A plant bearing both male and female flower on the same plant is called
- Diocious
 - Polygamous
 - Monocious
 - None of the above
30. Rejecting null hypothesis when it is true is known as
- Alternative Hypothesis
 - Null Hypothesis
 - Type-I error
 - Type-II error

PART II – Short Answer Questions [20 marks]

This part has 4 Short Answer Questions. Answer ALL the questions. Each question carries 5 marks.

1. Define agro-ecological zone and briefly describe the farming system in six agro-ecological zones of Bhutan.
2. Briefly describe the following terms:
 - a) Plant Disease
 - b) Global warming
 - c) Permanent wilting point
 - d) Integrated Pest Management (IPM).
 - e) Drought
3. Explain Disease triangle. How do you manage disease by manipulating environment?
4. Define Agro meteorology. How could it help Bhutanese farmer to increase crop production?

SECTION B: Case Study [50 marks]

Choose either Case I OR Case II from this section. Each case study carries 50 marks. Mark for each sub-question is indicated in the brackets.

CASE I

Sustainable agriculture consists of environment friendly methods of farming that allow the production of crops or livestock without damage to human or natural systems. Organic farming is one of the several approaches found to meet the objectives of sustainable agriculture and it is gaining momentum worldwide mainly due to its clean production approaches, which contributes to environment health and healthy food system. As such, Bhutan has set a vision to adopt fully organic production system.

In this context, please answer the following:

1. Explain in detail the four guiding principles of organic farming. (20 marks)
2. Discuss challenges and opportunities for organic sector development for Bhutan. (30 marks)

CASE II

Covid-19 pandemic has been unprecedented and it has impacted all aspect of global affairs including the food system. Bhutan was not exceptional as the pandemic has disrupted our food production, accessibility and supply arrangement. At the same time, it has also presented us the opportunities to strengthen our food system and need to enhance food self-sufficiency goal. In this scenario, please describe and discuss the following:

1. Discuss food security and food-self-sufficiency. (5 marks)
2. Discuss the challenges faced by Bhutan in terms of food production, accessibility and supply due to covid-19 pandemic in recent past. (15 marks)
3. Suggest strategies and way forward for Bhutan to achieve food self-sufficiency. (30 marks)

TASHI DELEK