ROYAL CIVIL SERVICE COMMISSION
BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2024
EXAMINATION CATEGORY: TECHNICAL

PAPER III: SUBJECT SPECIALISATION PAPER FOR AGRICULTURE

Date : October 5, 2024
Total Marks : 100
Writing Time : 150 minutes (2.5 hours)
Reading Time : 15 Minutes (prior to examination time)

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GENERAL INSTRUCTIONS:

1. Write your Registration Number clearly and correctly on the Answer Booklet.
2. The first 15 minutes is being provided to check the number of pages of the 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 - 2 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 correct 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 **8 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. Why is a soil pH range of 5.5 to 7.0 generally considered optimal for the availability of most nutrients to plants?
    a) Because it promotes microbial activity
    b) Because it reduces the leaching of nutrients
    c) Because most nutrients are soluble in this pH range
    d) Because it prevents soil compaction

2. How does clayey soil compare to sandy and loamy soils regarding water-holding capacity?
    a) It has the lowest water-holding capacity
    b) It has a moderate water-holding capacity
    c) It has the highest water-holding capacity
    d) It does not retain water at all

3. Why is drip irrigation considered the most efficient irrigation method, especially in areas with water scarcity?
    a) Because it waters the entire field evenly
    b) Because it uses the least amount of water by targeting only the root zones
    c) Because it requires minimal maintenance
    d) Because it increases evaporation rates

4. How does contour plowing help in preventing soil erosion on agricultural land?
    a) By increasing soil fertility
    b) By reducing water runoff and retaining soil on the slopes
    c) By allowing more water to infiltrate the soil
    d) By decreasing the amount of tillage needed

5. The enzyme secreted by the embryo of seeds which induces the germination process is
    a) Auxin
    b) Gibberellin
    c) Cytokinin
    d) Ethylene

6. Why sustainable land management is considered crucial for maintaining and enhancing agricultural productivity in Bhutan?
    a) Because it allows for the rapid expansion of agricultural land into forested areas
    b) Because Bhutan's steep terrain increases the risk of soil erosion and land degradation
    c) Because it enables the substitution of traditional farming methods with high-tech farming solutions
    d) Because it ensures that all available land is converted into monoculture plantations

7. Aflatoxin contamination in stored maize is a major issue. Which fungus is primarily responsible for producing aflatoxins?
    a) Penicillium chrysogenum
    b) Rhizopusstolonifer
    c) Aspergillus flavus
    d) Fusarium oxysporum

8. How do the significant altitudinal variations across Bhutan's agricultural regions influence the design and implementation of irrigation systems?
    a) They require the use of gravity-fed irrigation systems exclusively
    b) They necessitate the adaptation of irrigation systems to prevent waterlogging in lower regions
    c) They demand the integration of diverse irrigation methods tailored to specific altitude-related challenges
    d) They allow for the uniform application of sprinkler systems across all regions

9. Why is the implementation of climate-smart irrigation systems increasingly critical for the sustainability of agriculture in Bhutan?
    a) To solely increase the country's agricultural exports to neighboring countries
    b) To mitigate the impact of erratic monsoon patterns and reduce the dependence on seasonal rainfall
    c) To replace all traditional irrigation methods that are now considered outdated
    d) To decrease the energy consumption of irrigation systems by transitioning to entirely solar-powered systems

10. Match the following research centers and their mandates correctly.

A. Yusipang	1.Field Crops
B. Wengkhar	2. Plantation Crops
C. Bajo	3. Organic Agriculture
D. Samtenling	4. Horticulture

    a) A-1; B-2; C-3; D-4
    b) A-3; B-4; C-2; D-1
    c) A-2; B-3; C-4; D-1
    d) A-3; B-4; C-1; D-2

11. The initial uptake of water by seed is called
    a) Imbibition
    b) Hydrolysis
    c) Hydration
    d) None of the above.

12. Why the Cation Exchange Capacity (CEC) of soil is considered a crucial factor in determining soil fertility?
    a) It determines the soil's ability to drain excess water and prevent waterlogging.
    b) It indicates the soil's capacity to retain and supply essential nutrients to plants.
    c) It measures the soil's resistance to temperature fluctuations and climate changes.
    d) It reflects the soil's ability to support microbial life through organic matter decomposition.

13. According to the RNR census 2019, the reported fallow agricultural land in the country is about _____ acres.
    a) 44000
    b) 55000
    c) 65000
    d) 75000

14. Which of the following is the smallest order of class Insecta?
    a) Hemiptera
    b) Odonata
    c) Zeroptera
    d) Coleoptera

15. De-hulled rice grain is called
    a) Rachilla
    b) Awn
    c) Tegmen
    d) Caryopsis

16. Soils with cation exchange capacity in the range of 5-15 meq.100g-1 would be classified as having
    a) Low CEC
    b) Moderate CEC
    c) High CEC
    d) Very high CEC

17. Suppose a tariff is put on the import of Indian rice, the demand curve for Bhutanese-grown rice will
    a) shift to the left.
    b) shift to the right.
    c) move vertically up.
    d) move vertically down.

18. The bulk density (dry mass per unit volume) of typical agricultural soils is near
    a) 1300 kg/m^3
    b) 2000 kg/m^3
    c) 3000 kg/m^3
    d) 3500 kg/m^3

19. The interference exerted by a plant onto its neighbors by way of releasing chemical substances is termed as
    a) Allelopathy
    b) Antipathy
    c) Encephalopathy
    d) Enteropathy

20. In Bhutan, which of the following is a key component of the Integrated Pest Management (IPM) strategy employed for controlling the infestation of the fall armyworm in maize crops?
    a) Utilizing pheromone traps to monitor and reduce pest populations
    b) Applying broad-spectrum chemical insecticides to eliminate all pest species
    c) Introducing genetically modified maize varieties resistant to fall armyworm
    d) Implementing monoculture farming practices to reduce pest spread

21. If a farmer wants to apply 100 kg nitrogen, how much urea should be use?
    a) 40 kg
    b) 87 kg
    c) 115 kg
    d) 217 kg

22. All the essential nutrients required by plants are taken up in
    a) Organic form
    b) Inorganic form
    c) Mixture of organic and inorganic form
    d) All of the above

23. How can marginal analysis be used by farmers to optimize the allocation of resources on their farms?
    a) By determining the total profit from the farm operation and dividing it equally among all resources.
    b) By assessing the additional cost and revenue from using one more unit of a resource to decide whether it should be increased or decreased.
    c) By ensuring that all available resources are used to their maximum capacity regardless of their individual costs.
    d) By calculating the average productivity of all resources and focusing only on the most productive ones.

24. Which of the following best describes a major constraint faced by Bhutanese farmers in adopting organic farming practices on a large scale?
    a) Excessive availability of certified organic seeds and planting materials
    b) Insufficient knowledge and training in organic farming techniques among local farmers
    c) An overabundance of organic certification bodies leading to confusion and excessive costs
    d) High market demand for organic produce, which exceeds local production capacities

25. Which of the following is a key principle of IFOAM's "Basic Standards" for organic farming that is designed to ensure environmental and social sustainability?
    a) Use of genetically modified organisms (GMOs) to enhance crop resilience
    b) Promotion of monoculture systems to increase agricultural efficiency
    c) Integration of crop and livestock systems to enhance nutrient cycling and biodiversity
    d) Reliance on synthetic chemical inputs to boost crop yields and protect against pests

26. According to the Cost-sharing Mechanism Guideline of the Ministry of Agriculture and Livestock 2021, the cost-sharing (Government: Subsistence Farmer) applied for supporting farm machinery is
    a) 60:40
    b) 80:20
    c) 70:30
    d) 50:50

27. The Department of Agriculture, during the preparation of the 13 FYP prioritized four major crops for providing chain-link fencing to protect from wild animals, based mainly on the Human-wildlife conflict ranking and the cultivated area. Which are the four prioritized crops?
    a) Paddy, potato, vegetables, apple
    b) Paddy, maize, potato, vegetables
    c) Paddy, maize, quinoa, barley
    d) Paddy, potato, vegetables, buckwheat

28. According to the available information, what percentage of crop yield is lost to wild animal depredation?
    a) 44-55%
    b) 19-43%
    c) 11-18%
    d) 5-10%

29. By the end of 13 FYP, the Ministry of Agriculture and Livestock targets to increase the country's rice self-sufficiency from
    a) 35-30%
    b) 45-50%
    c) 25-30%
    d) 20-25%

30. *Ganoderma lucidum* is a popular medicinal mushroom promoted by the National Mushroom Centre for export purposes. What are the common names of this mushroom used by the Chinese and the Japanese?
    a) Reishi in China and Lingzhi in China
    b) Lingzhi in China and Reishi in Japan
    c) Lingzhi in both Japan and China
    d) None of the above

PART II – Short Answer Questions [20 marks]

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

1. Digital agriculture is gaining momentum in our country, gradually. What do you mean by digital agriculture? **(5 marks)**

2. Why do you think it is important to enhance food self-sufficiency? **(5 marks)**

3. How can the Ministry of Agriculture and Livestock ensure that the youth stay on the farm? **(5 marks)**

4. What do you mean by climate-smart agriculture? How is it different from climate-resilient agriculture? **(5 marks)**

SECTION B: CASE STUDY [50 marks]

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

CASE I

The shortage of farm labor is a critical issue impacting agriculture in our country. Various strategies are being implemented to tackle this problem, including the import of foreign workers for seasonal farm tasks, which is under process, presently.

1. How will the hiring of foreign farm labor differ from hiring construction workers? **(10 marks)**
2. If the recruitment of farm labor is approved and implemented, what are the advantages and disadvantages of this approach? **(20 marks)**
3. As a new agricultural professional, how would you address the issue of farm labor shortages differently? **(20 marks)**

CASE II

Human-wildlife conflict (HWC) has been identified as a significant issue in agriculture in Bhutan. Various mitigation strategies have been employed to protect crops from wildlife damage, including crop guarding, electric fencing, and recently, chain-link fencing. The 13th Five-Year Plan (FYP) of the Ministry of Agriculture and Livestock has allocated Nu. 5.1 billion for the installation of chain-link fencing.

1. What is meant by human-wildlife conflict, and what are the consequences of failing to address it? **(20 marks)**
2. Do you believe that the provision of chain-link fencing is the ultimate solution to mitigating crop damage caused by wild animals? Justify your answer with reasons. **(20 marks)**
3. "For a large agrarian country like India, crop damage by wild animals is not a significant issue." To what extent do you agree with this statement regarding crop damage by wild animals? Do you think Bhutan could ever make a similar statement? **(10 marks)**

TASHI DELEK