

CIVIL SERVICE COMMON EXAMINATION 2009
EXAMINATION CATEGORY: TECHNICAL

PART III: Subject Specialization paper for BSc Agriculture

Registration No.

Time allowed : **150 minutes**

Total Marks: **100**

Please read the following instructions carefully

1. General Guidelines:

- 1.1. All questions should be answered in the answer book provided. A candidate shall write his/her **Registration No. only** on the answer book provided.
- 1.2. No other particulars of a candidate shall be written on this book.
- 1.3. This book consists of 7 pages including this page.
- 1.4. This paper consists of two sections: A and B.

2. Specific Instruction:

- 2.1. Do not write anything during the first 15 minutes. Use this time to read the instructions and questions.
- 2.2. Any misprint or clarification in the questions must be raised during the first 15 minutes.
- 2.3. Once the examination begins, you will not be allowed to ask questions or leave the examination hall.
- 2.4. Section A has two parts. Part I with 30 multiple choice questions of 1 point each, and Part II with 4 short questions of 5 points each.
- 2.5. Section B has 3 case studies. You pick **one case study to answer**. This case study carries 50 points.

Section A

Part I: 30 questions (*Pick the correct answer*)

1. The annual import of rice is increasing in Bhutan. This rise is attributed to
 - a) Population growth
 - b) Rice is the preferred staple food
 - c) Paddy yield is generally low compared to other countries
 - d) Loss of paddy land to other land uses
 - e) All of the above

2. The acreage under paddy cultivation in Bhutan is found highest in the
 - a) Northern Region
 - b) Central Region
 - c) Southern Region
 - d) None of the above

3. A popular maize variety adopted by the farmers of eastern Bhutan (below 1800 masl) before it was released is
 - a) Suwan 8529
 - b) Palmira
 - c) Yangtsipa
 - d) None of the above

4. According to the Labour Survey 2007 report, the percent of population in Bhutan employed by the Agriculture sector is about
 - a) 45 %
 - b) 70%
 - c) 65%
 - d) 23.5%

5. Problem with Organic farming in Bhutan is
 - a) Land holding is very small
 - b) Certification is very expensive
 - c) Labor requirement is very high
 - d) All of the above

6. International Rice Research Institute (IRRI) provided technical assistance to MOA to breed improved rice varieties. The head office of IRRI is in
 - a) Thailand
 - b) Cambodia
 - c) Philippines
 - d) Mexico

7. What percent of the population in Bhutan is engaged in farming?
 - a) 60 %
 - b) 69 %
 - c) 56%
 - d) None of the above

8. The focus of RNR Research Centre in Bajo is on
 - a) Field Crops research
 - b) Horticulture Crops research
 - c) Forest research
 - d) Livestock research

9. What percentage of the total area of Bhutan is under arable land?
 - a) 16 %
 - b) 13%
 - c) 7.8%
 - d) 17.5%

10. Among the dzongkhags, the mineral fertilizer consumption in the last five years was highest in
 - a) Bumthang
 - b) Thimphu
 - c) Trashigang
 - d) Wangdiphodrang

11. A popular pre-emergence weedicide used in Bhutan is
 - a) Butachlor
 - b) Glyphosate
 - c) metribuzim

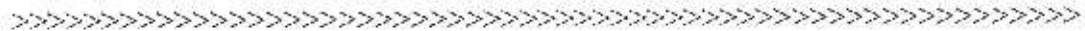
12. There was an outbreak of rice Blast in Bhutan in 1996. The casual agent of the blast disease is
 - a) Fungus
 - b) Virus,
 - c) Bacteria
 - d) Insects

13. The number of improved rice varieties released in Bhutan as of 2006 is
 - a) 30
 - b) 20
 - c) 17
 - d) 16

14. Standing water or water logged condition is not good for maize/wheat crops because it
- a) Reduces oxygen supply to the root zone
 - b) Increases the rate of organic matter decomposition
 - c) Increases disease incidences
 - d) All of the above
15. Standing water in paddy field is maintained to
- a) Reduce weed population
 - b) Avoid soil cracking
 - c) Dissolve fertilizers
 - d) All of the above
16. The most popular mineral fertilizer among the farmers in Bhutan is:
- a) Suphala
 - b) Single Super Phosphate (SSP)
 - c) Urea
 - d) Muriate of Potash (MOP)
 - e) Boron
17. The number of mineral elements essential to plants to complete its life cycle is
- a) 20
 - b) 17
 - c) 16
 - d) 18
18. Which one of them is not a micro-nutrient?
- a) Magnesium
 - b) Boron
 - c) Iron
 - d) Zinc
 - e) Copper
19. Soil Acidity is caused by
- a) The removal of bases through harvest
 - b) Lack of liming practice
 - c) Addition of acidifying fertilizers
 - d) All of the above
20. Crop rotation is encouraged to
- a) Reduce incidences of pest and disease problems
 - b) Increase yield
 - c) Reduce water holding capacity
 - d) Improve soil texture

21. Minimal tillage is recommended on sloping land to
- a) Minimize soil losses through erosion
 - b) Hasten soil organic matter decomposition
 - c) Reduce weed pressure
 - d) Increase rooting depth
22. Fertilizer recommendation for crops is best determined by
- a) Soil analysis report
 - b) Plant analysis report
 - c) Visual diagnosis report
 - d) All of the above
23. Paddy lodging is common when
- a) Excess potassium nutrient is applied
 - b) When there is no water in the field
 - c) Excess application of urea fertilizers
 - d) When variety cultivated is high yielding
24. Definition of Food Security by FAO captures
- a) Availability of Food
 - b) Access to Food
 - c) Stability of Food Supply
 - d) Safe and healthy Food Utilization
 - e) All of the above
25. One of the risks under Climate change is drying up of water sources. Researchers should
- a) Breed drought tolerant varieties
 - b) Breed disease resistant varieties
 - c) Breed vitamin rich rice varieties
 - d) Identify suitable local varieties
26. Biofuels can be produced from
- a) Maize
 - b) Sugar cane
 - c) Rice
 - d) Soybean
 - e) All of the above
27. Genetics is the study of
- a) Human psychology
 - b) Chromosomes
 - c) Heredity
 - d) Human behavior

28. A plant hormone found in the growing tips of shoots, and actively involved in shoot elongation is
- a) Cytokinins
 - b) Ethylene
 - c) Auxin
 - d) Gibberline
 - e) None of the above
29. Bhutanese farmers send plant samples for nutrients analysis to the
- a) National Plant Protection Center
 - b) National Post Harvest Center
 - c) National Soil Service Center
 - d) Agriculture Machinery Center
30. A good quality seed for farmers should be screened or tested by this group
- a) Breeder Seed
 - b) Foundation Seed
 - c) Certified Seed
 - d) All of the above



Part II: Attempt all 4 Questions (5 points each).

1. C3 and C4 plants differ on chloroplast structures and carbon dioxide fixation products. Give 3 examples of C3 crops and 2 examples of C4 crops cultivated in Bhutan.
2. Mineral fertilizer urea is widely used by the farmers in cereal and potato production.
 - a) What important nutrient is supplied by urea?
 - b) Give one agronomic measure to reduce the losses of this nutrient from soil.
 - c) What symptom does a crop exhibit if this nutrient is not adequately supplied?
 - d) Where would the symptom appear first? (old or young leaves)
3. The Department of Agriculture is focusing on Integrated Pest Management (IPM) to control pests and diseases.
 - a) What is IPM technology?
 - b) Is the use of chemicals totally discouraged under IPM? Support your answer.
 - c) Give two advantages of IPM.
4. Researchers are conducting rice variety trials in high altitude areas like Haa and Bumthang. Give two reasons to support this research, and two reasons to discourage this research.

Section B: Select One Case Study (50 points)

Case Study 1

Rice is the staple food of Bhutan and the capita consumption is about 172kg. This is one of the highest in Asia. MOA is concerned with the rapid loss of wet land (irrigated paddy fields) to other forms of land use. As a new graduate joining the RNR sector what advice would you give to protect the wet land to:

- a) Politicians
- b) Planners
- c) Researchers
- d) Extension staff
- e) Farmers

(You should justify your advice)

Case Study 2

A farmer has identified a virgin site to grow crops in. He was asked to examine or measure abiotic factors of the site (see the list below) by an agriculture expert from Thimphu. The measured altitude ranged from 2000 to 2600 masl; Soil depth varied from 50 cm to 100cm, the site is located on south facing river terraces and the area is poorly drained.

1. Why did agriculture expert choose these parameters a) Altitude, b) Soil depth, and c) drainage?
2. What crop (give one example) would you recommend given the above information?
3. What agronomic practices would you recommend if you are asked to grow root crops?
4. What additional parameters would be useful to make it a more comprehensive assessment of the site?

Case Study 3

Farming is known to be of the biggest greenhouse gas (GHG) emitters. It is also known that agriculture has significant mitigation potential which could change the position of agriculture from a big emitter to smaller emitter or even a net sink. There are a wide range of mitigation options in agriculture. Mitigation is defined as a change in management practices to reduce emissions of GHG or enhance carbon sinks. Commonly promoted agriculture management options to reduce GHG emissions are: a) Agronomic practices, b) Nutrient Management, c) Water management, and d) Reduced Tillage

- a. What greenhouse gases are emitted from farming?
- b. How can one reduce GHG emission through nutrient management and reduced tillage?
- c. What is Carbon sequestration?
- d. How can agronomic practices enhance carbon sequestration?
- e. Can water management reduce GHG emission? Explain