

**ROYAL CIVIL SERVICE COMMISSION  
BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2011**

**EXAMINATION CATEGORY: TECHNICAL**

**PAPER III: SUBJECT SPECIALIZATION PAPER FOR HORTICULTURE**

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Date: 30<sup>th</sup> October, 2011

Total Marks: 100

Examination Time: 2.5 hours

Reading Time: 15 Minutes (Prior to examination time)

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**General Instructions**

1. Please write your **ROLL NUMBER** clearly on the answer booklet in the space provided
2. The first 15 minutes is being provided to check the number of pages, printing errors, clarify doubts and to read the instructions. You are **NOT PERMITTED TO WRITE** during this time.
3. Use either Blue or Black ink pen or ball point pen for the written part and H.B Pencils for the sketches and drawings.
4. All answers should be written on the Answer Booklet provided. Candidates are not allowed to write anything on the question paper.
5. This Question Booklet consists of 7 pages. It is divided into two sections – **SECTION A** and **SECTION B**.
6. **SECTION A** consists of two parts – **PART I** and **PART II**  
**PART I** consists of 30 multiple choice questions carrying one (1) mark each and is compulsory. The answer of your choice should be clearly written in whole along with the question and option number on your answer booklet.  
**PART II** consists of four (4) short answer questions of five (5) marks each and all questions are compulsory.  
**SECTION B** consists of two Case Studies. Choose only ONE case study and answer the questions under your choice. Each case study carries fifty (50) marks in total.

## SECTION A

(Answer all the Questions)

### PART I: Choose the correct answer (30 x 1 = 30 marks)

1. The coordination centre for horticulture research in Bhutan is located in
  - RNRRDC Yusipang
  - RNRRDC Wangdiphodrang
  - RNRRDC Mongar
  - RNRRDC Bumthang
  
2. From the list of four vegetable, put them in order of highest to lowest production in the Bhutan.
  - Egg plant
  - Chili
  - Cabbage
  - Radish
  
3. Desiree is one of the most popular potato varieties in Bhutan. It is originated from
  - Bangladesh
  - India
  - Pakistan
  - Netherlands
  
4. Bulk of the apples produced in Bhutan are exported to
  - China
  - Thailand
  - India
  - Bangladesh
  
5. The latin name of Sangay Shamong is
  - *Cantherellus cibarius*
  - *Lentinus edodes*
  - *Tricholoma matsutake*
  - *Lyophyllum shimeji*

6. One of the following term is related to horticulture

- silviculture
- arboriculture
- floriculture
- vermiculture

7. The latin name of Loquat is

- *Eriobotrya japonica*
- *Pieris japonica*
- *Camellia japonica*
- *Lonicera japonica*

8. Colocasia is modified underground stem, it is classified as

- Bulb
- Tuber
- Corm
- Rhizome

9. Which of the following is an artificial vegetative propagation technique?

- Roots
- Buds
- Stolon
- Inarching

10. Identify the step, that is not related to hybridization

- Selfing of parent plants
- Layering
- Emasculation
- Crossing

11. The process of uptake of oxygen and production of carbondioxide in light by photosynthesizing tissue is called

- Photolysis
- Photophosphorylation
- Photorespiration
- Photosynthesis

12. Transfer of pollen by insect is called

- Ornithophily
- Cheiropteriphily
- Entomophily
- Anemophily

13. Stunted growth and dark green leaves in matured plants are always associated with deficiency of

- Nitrogen
- Phosphorus
- Chlorine
- Zinc

14. Transpiration of plant is not affected by

- Humidity
- Wind speed
- Temperature
- Number of branches

15. The element categorized as macronutrient for plants is

- Boron
- Zinc
- Manganese
- Sulphur

16. Malathion is a widely used pesticide, it is a

- Carbamates
- Organochlorides
- Organophosphate
- Pyrethroids

17. Shelf life of fruits can be extended to more than five months by

- Zero energy storage
- Cold storage
- Controlled Atmosphere Storage
- Well ventilated storage

**Fill in the blanks**

18. Latin name of cabbage is *Brassica oleracea* var. \_\_\_\_\_
19. A hardy shrub native to Mongolia and Siberia (*Hippophae rhamnoides*) is found along the road and riverbank in Bumthang valley, can you give the common name?  
\_\_\_\_\_
20. The element commonly found in green leafy vegetables like spinach, turnip greens, and mustard greens is \_\_\_\_\_
21. Grading of apple is done based on shape, colour and what is the third characteristic used?  
\_\_\_\_\_
22. Give the local name and botanical name of Betel Vine.  
Local name : \_\_\_\_\_  
Botanical name : \_\_\_\_\_
23. Formation of fruit without fertilization is called \_\_\_\_\_
24. \_\_\_\_\_ is the multiplication of plants by tissue culture technique
25. Gibberellins is a hormone that induces development of fruit \_\_\_\_\_
26. Plants that grow and obtain their nourishment from dead and decaying organic matter of plants and animals are called \_\_\_\_\_
27. Science of growing plants without using soil, but by misting the roots with oxygenated nutrient-enriched water is called \_\_\_\_\_
28. Yellowing of leaves due to low chlorophyll content is called \_\_\_\_\_
29. Edible part of apple is \_\_\_\_\_
30. The acceleration of the ability to flower by a chilling treatment is called \_\_\_\_\_

**PART II Answer the following short questions (4 x 5 = 20 marks)**

1. *Mango is classified as Drupe* (Fleshy fruit), what is the classification (Type of fruit) of following fruits?

- Pineapple \_\_\_\_\_
- Tomato \_\_\_\_\_
- Gourd \_\_\_\_\_
- Apple \_\_\_\_\_
- Orange \_\_\_\_\_

2. Horticulture is often mentioned as an important sector in Bhutan. Give five reasons to prioritize horticulture.

3. Can you list the most destructive disease of following crops in Bhutan?

- Citrus
- Apple
- Cardamom
- Chili
- Ginger

4. Differentiate Organic farming from Conventional farming (*Please make five comparisons*)

## SECTION B

Please read the two case studies and associated questions **CAREFULLY**, choose **ONE** of the case studies presented and answer the questions (50 marks)

1. You have completed a survey on estimating cost of production of potato in Chhokhor, Chumey, Tang and Ura geogs of Bumthang Dzongkhag. The data compiled from the 4 geogs are as follows:

|   |                          |       |
|---|--------------------------|-------|
| 1 | Potato yield (Kg/Acre)   | 8000  |
| 2 | Price of Potato (Nu./Kg) | 20    |
| 3 | Material cost (Nu/Acre)  | 15600 |
| 4 | Labour Cost (Nu/Acre)    | 7200  |
| 5 | Draught cost (Nu/Acre)   | 400   |

Calculate the following using the above data? (**Please show the details of calculation**)

- i. Total Direct Cost (Nu/Hectare)
  - ii. Gross Profit (Nu/Hectare)
  - iii. Net Profit (Nu/Hectare)
  - iv. Net Return (Nu/Hectare)
  - v. Cost of Production (Nu/Kg)
2. You as the Dzongkhag Agriculture Officer in Paro received an application from 10 farmers of Dogar geog. The farmers who own a 10 years old apple orchard want to buy chemical fertilizers for 25 acres of apple orchard.

Please calculate the quantity of chemical fertilizers (Recommended rate may be considered as 20:20:20 NPK kg/ac) (**Please show the details of calculation**)

- Quantity of Urea needed per acre (Kg/ac)
- Quantity of Single Super Phosphate (Kg/ac)
- Quantity of Muriate of Potash (Kg/ac)
- Total quantity of fertilizers that will be purchased from supplier based on the farmers' request. (Kg)