

# ROYAL CIVIL SERVICE COMMISSION

## BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2010

EXAMINATION CATEGORY: TECHNICAL

PAPER III: SUBJECT SPECIALIZATION PAPER for FORESTRY

Date : 24<sup>th</sup> November 2010  
Total Marks : 100  
Examination Time : 2.5 Hours  
Reading Time : 15 Minutes

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### INSTRUCTIONS

1. 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 **Pencils** for the sketches and drawings.
4. All answers should be written on the Answer Booklet provided.
5. This Question Booklet consists of **10 pages** including this Instructions page. It is divided into two sections – namely **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 all questions are **compulsory**.  
**Part II** consists of four (4) short answer questions of five (5) marks each and all questions are **compulsory**.
7. **SECTION B** consists of two **Case Studies**. Choose only **ONE** case study and answer all the questions under the case study of your choice. The case study carries a total of fifty (50) marks.
8. Marks will be awarded based on the knowledge of the subject, clarity and preciseness of your answers.

**SECTION A: Consists of Part I and Part II carrying a total of fifty (50) marks**

**PART 1 (30 Marks)**

*All questions are compulsory and each question carries one (1) mark. In the answer booklet, please clearly write down the question number and your answer choice along with the answer. For example:*

1. *In which year was the first Forest Act passed in the country?*

- (a) 1969*
- (b) 1971*
- (c) 1975*
- (d) 1995*

**Answer: 1. (a) 1969**

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1. The UN General Assembly in 2006 declared which year as the International Year of Forests?

- (a) 2010
- (b) 2011
- (c) 2012
- (d) 2013

2. According to FAO Global Forest Resources Assessment 2010 (FRA 2010), what percentage of the world area is under forest cover?

- (a) 15 %
- (b) 25 %
- (c) 31 %
- (d) 40%

3. According to FAO FRA 2010, the average rate of global deforestation was 16 million hectares per year in 1990s. The average rate of global deforestation in 2000s was:

- (a) 20 million ha per year
- (b) 25 million ha per year
- (c) 13 million ha per year
- (d) 10 million ha per year

4. Forests store a vast amount of carbon. What according to the FAO FRA 2010 is the total carbon storage in the world forests?
  - (a) 100 gigatonnes (Gt) of carbon
  - (b) 150 gigatonnes (Gt) of carbon
  - (c) 289 gigatonnes (Gt) of carbon
  - (d) 500 gigatonnes (Gt) of carbon
  
5. Rainforests are only found in warm regions close to the equator.
  - (a) True
  - (b) False
  
6. Rainforests play a significant role in maintaining which of the following?
  - (a) Weather pattern
  - (b) The Earth's limited supply of drinking and fresh water
  - (c) More species of plants and animals than any other ecosystems on Earth
  - (d) All of the above
  
7. Bhutan in 2010 hosted an important international forestry meeting. Which of the following was it?
  - (a) Commonwealth Forestry Conference
  - (b) Third REDD Readiness Field Dialogue
  - (c) 23<sup>rd</sup> Session of Asia Pacific Forestry Commission Meeting
  - (d) Expert Meeting on National Forest GHG Inventories – a stock taking
  
8. As per the Hon'ble Prime Minister's second Annual Report to Parliament on 1<sup>st</sup> July 2010, what was the total number of community forests established in the country?
  - (a) 100
  - (b) 200
  - (c) 300
  - (d) 400

9. Who was the first Bhutanese Director of the Department of Forests?
- (a) Dorji Tenzin
  - (b) Sangay Thinley
  - (c) Chenkyab Dorji
  - (d) Ugyen Thinley
10. In which year was the first Forest Training School for Foresters and Forest Guards in Bhutan established?
- (a) 1971
  - (b) 1979
  - (c) 1981
  - (d) 1982
11. In which year was the Flora of Bhutan Volume 1 Part 1 published?
- (a) 1952
  - (b) 1974
  - (c) 1983
  - (d) 1990
12. In which year was the concluding part of the Flora of Bhutan *The Orchids of Bhutan* (Vol 3 Part 3) published?
- (a) 1987
  - (b) 1991
  - (c) 1999
  - (d) 2002
13. In which year was the Bhutan Trust Fund for Environmental Conservation (BT FEC) established?
- (a) 1990
  - (b) 1995
  - (c) 1996
  - (d) 2000

14. In which year was the Royal Society for Protection of Nature (RSPN) established?
- (a) 1987
  - (b) 1990
  - (c) 1995
  - (d) 2000
15. In which year was the Forest Development Corporation Limited (FDCL) renamed as the Natural Resources Development Corporation Limited (NRDCL) with the Druk Holding and Investment (DHI) taking over its ownership?
- (a) 1984
  - (b) 1996
  - (c) 2007
  - (d) 2008
16. The Natural Resources Development Corporation Limited (NRDCL) carries out which of the following activities?
- (a) Harvesting and marketing of timber
  - (b) Extraction and marketing of sand
  - (c) Afforestation and reforestation
  - (d) All of the above
17. Which is the silvicultural system followed in the conifer forest for commercial harvesting in Bhutan?
- (a) Single tree selection system
  - (b) Clear felling system
  - (c) Group selection system
  - (d) Coppice system
18. In which year was the collection of *Cordyceps sinensis* legalized for the high altitude communities in the north?
- (a) 2000
  - (b) 2001
  - (c) 2002
  - (d) 2004

19. Matsutake is an important wild mushroom exported to Japan. What is its name in Dzongkha?
- (a) Goli shamu
  - (b) Jitchu Kangru shamu
  - (c) Dungshing shamu
  - (d) Sangay shamu
20. Which of the following RNR RD Centres has the national mandate for forestry research?
- (a) RNR RD Centre Yusipang, Thimphu
  - (b) RNR RD Centre Bajo, Wangdue
  - (c) RNR RD Centre Jakar, Bumthang
  - (d) RNR RD Centre Wengkhar, Mongar
21. The latin name for the national animal Takin is...
- (a) *Moschus chrysogaster*
  - (b) *Budorcas taxicolor*
  - (c) *Neofelis nebulosa*
  - (d) *Capricornis sumatraensis*
22. Which of the following conifer species sheds its leaves in winter?
- (a) Hemlock
  - (b) Spruce
  - (c) Fir
  - (d) Larch
23. Plants that have “naked” seeds and do not protect their seeds inside fruits are called...
- (a) Vascular plants
  - (b) Deciduous
  - (c) Angiosperms
  - (d) Gymnosperms

24. Diameter at breast height (DBH) is measured at..... metres above ground level.
- (a) 1.0 m
  - (b) 1.2 m
  - (c) 1.5 m
  - (d) 1.7 m
25. When the tree crown is visible, you can estimate height using a...
- (a) Clinometer
  - (b) Calliper
  - (c) Dendrometer
  - (d) Compass
26. A hectare is...
- (a) 2500 m<sup>2</sup>
  - (b) 5000 m<sup>2</sup>
  - (c) 10,000 m<sup>2</sup>
  - (d) 15,000 m<sup>2</sup>
27. Aspect is...
- (a) The direction a slope faces
  - (b) The direction of the sun
  - (c) A tree's sun facing position
  - (d) None of the above
28. Basal area is...
- (a) Cross sectional area of a tree
  - (b) Patch of wild, herbaceous material
  - (c) The butt log portion of a tree
  - (d) None of the above

29. Dendrometer is...
- (a) An instrument used to measure tree volume
  - (b) An instrument used to measure tree diameter
  - (c) An instrument used to measure photosynthesis
  - (d) All of the above
30. Epicormic branching is...
- (a) Disease inhabited branches
  - (b) Shoots growing rapidly from main stem buds
  - (c) Branching patterns formed by shade
  - (d) None of the above
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**PART II (20 Marks)**

*All questions are compulsory and each question carries five (5) marks. Marks will be awarded based on the knowledge of the subject, clarity and preciseness of your response.*

1. Why is thinning necessary in forest crops? Please discuss.
2. What is the greenhouse effect and why does an increased greenhouse effect lead to climate change?
3. The Constitution requires the Royal Government to maintain a minimum of sixty percent of country's total land under forest cover for all time. Why is maintaining forest cover important?
4. A forest fire is seen as a disaster to be prevented. Are all forest fires bad? Please discuss.



## SECTION B (50 Marks)

*From the two case studies below, choose one (1) and attempt all questions under the case study you have chosen. The mark for each question is given against it. Marks will be awarded based on the knowledge of the subject, clarity and preciseness of your response.*

### **CASE STUDY 1: Changing Perceptions and Attitudes to Conservation**

Our approach to the environment has traditionally been anchored in our Buddhist beliefs and values. We not only respect nature, we also confer upon it a living mysticism. Places are identified with deities, divinities and spirits, and a large part of the landscape is mapped in such terms in our minds.

We must recognize that some of the measures that we have taken to protect and preserve the environment and biodiversity may also have contributed to its erosion. The establishment of nature reserves and protected areas has introduced lines of demarcation between humans and nature that formerly never existed. The introduction of rules and regulations that must be respected have stripped some locations of their mysticism and prevented the communion with nature that was once common. Our belief that we should manage our biodiversity and environment in accordance with international standards may have unwittingly contributed to a hardening of traditional attitudes, perceptions and values

*An extract from Bhutan 2020. A Vision for Peace, Prosperity and Happiness. Royal Government of Bhutan, Thimphu, Bhutan.*

1. What do you understand by the above extract? Please discuss. (25 Marks)
2. Wildlife-People conflict is a serious policy and social issue in the country. Farmers perceive that the forest conservation policies are not people friendly. Do you agree? Please discuss. (25 Marks)

**OR**

## **CASE STUDY 2: Silvicultural System in Mixed Conifer Forests in Bhutan**

The silvicultural system practiced in the mixed conifer forests is group selection system. The harvesting is done with fixed skyline and gravity line system. With the use of this system, the impact from road construction is minimized. Cable harvesting also causes far less damage to soils than other harvesting systems. Cable lines can reach up to 1000 m maximum. The minimum inter spacing of cable lines is 60 m. This system has been introduced in preference to a single tree selection system as an effective way of regenerating mixed conifer forest type in Bhutan. Small groups are created in the stand allowing light to reach the forest floor, creating conducive microclimate conditions for seed germination and establishment of seedlings. These small group openings mimic the natural disturbances in the forest ecosystem for the regeneration of shade tolerant species. The forest managers consider this system appropriate for encouraging natural regenerations.

The group openings alternate on either side of the cable lines. The distance between the groups, along the extraction lines is approximately 50 m. The shape and size of the group can vary, mostly irregular, depending on the site and terrain conditions. The extraction corridors must be as narrow as possible and must not be wider than 4 m and the maximum size of opening must be less than 0.2 ha (i.e. one and half tree length diameter).

The silvicultural system which encourages natural regeneration is considered as the most suitable method for sustainable forest management. The size of the group opening was found to exert marked influence on natural regeneration survival and establishment. In order to meet new silvicultural, ecological and social management objectives, silvicultural systems have evolved beyond their traditional emphasis on timber production to include the broader objectives of protecting sensitive species & sustaining ecosystem functions. Similarly, the forest management goal of a forest management unit has evolved to manage forests on a multiple use and sustainable yield basis at the same time maintaining the diversity of tree species.

*An extract from Natural regeneration at cable crane logged sites in the mixed conifer belt of Gidakom Forest Management Unit, Thimphu, Bhutan. Shacha Dorji, MSc Thesis 2004, UNI BOKU, Vienna.*

1. What is a silvicultural system? Why must we determine an appropriate silvicultural system for a particular forest type? (20 Marks)
2. What silvicultural considerations have led the Bhutanese forest managers adopt the group selection system in the mixed conifer forests? Please discuss. (20 Marks)
3. Please discuss the environmental benefits of timber harvesting and transport by cable cranes. (10 Marks)