

**ROYAL CIVIL SERVICE COMMISSION  
CIVIL SERVICE COMMON EXAMINATION (CSCE) 2009  
EXAMINATION CATEGORY: TECHNICAL  
PAPER III: SUBJECT SPECIALIZATION PAPER for BSc/MSc FORESTRY**

<b>Date</b>	<b>: November 8, 2009</b>
<b>Total Marks</b>	<b>: 100</b>
<b>Examination Time</b>	<b>: 2 hours 30 minutes</b>
<b>Reading Time</b>	<b>: 15 minutes</b>

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**INSTRUCTIONS**

1. Write your Roll. No. (Registration Number) clearly on the space provided in the answer booklet.
2. The first fifteen 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 ballpoint pen for the written part and H.B pencils for sketches and drawings.
4. This Question Booklet consists of 10 pages including the instruction page. The question paper is divided into two sections – viz., **SECTION A and SECTION B.**
5. **SECTION A** consists of two parts: **Part I and Part II.**

**Part I** consists of thirty (30) multiple choice questions carrying one (1) mark each and all questions are compulsory. The answer of your choice should be clearly written in whole along with the question number and answer 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.

6. **SECTION B** consists of two (2) **CASE STUDIES** and questions related to the case studies. Choose only one case study and answer all the questions of the case study you have chosen. Each case study carries fifty (50) marks in total.
7. Marks will be awarded based on the knowledge of the subject, clarity, and preciseness of your response. Long bulky answers may not necessarily be awarded marks unless the answers are analysed and communicated well.

**GOOD LUCK!!!**

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

**PART I (30 Marks)**

*All questions are compulsory and each question carries one (1) mark. The answer of your choice should be clearly written in whole along with the question number and answer option number on your answer booklet.*

1. Bhutan continues to be guided by the first national forest policy of Bhutan promulgated by His Majesty the 4<sup>th</sup> Druk Gyalpo Jigme Singye Wangchuck. In which year was the national forest policy promulgated?
  - a. 1961
  - b. 1974
  - c. 1986
  - d. 1995
  
2. The Department of Forests is one of the oldest government departments to be established by the Royal Government. When was the Department of Forests established?
  - a. 1949
  - b. 1952
  - c. 1964
  - d. 1972
  
3. Besides the national system of protected areas, the Royal Government has set aside a significant portion of the country under biological corridors. What is the main function of these biological corridors?
  - a. To allow movement of tigers from one park to the other
  - b. To maintain gene-flow through uninterrupted wildlife movements
  - c. To allow movement of threatened migratory birds
  - d. To provide safe passage for elephants
  
4. What is the measurement system currently used in Bhutan to measure merchantable log volume?
  - a. Quarter Girth system
  - b. True Volume system
  - c. Half Girth System
  - d. None of the above
  
5. Foresters use one of the following instruments for measuring tree height. Choose the correct one.

- a. Clinometer
  - b. Altimeter
  - c. Compass
  - d. Calliper
6. Raven is the national bird of Bhutan. Which one of the following is the Latin name for Raven?
- a. *Corvus splendens*
  - b. *Corvus corax tibetanus*
  - c. *Corvus macrorhynchos*
  - d. None of the above
7. Ugyen Wangchuck Institute of Conservation and Environment is Bhutan's premiere institute of excellence in conservation and environment. Where is this new institute located?
- a. Taba, Thimphu
  - b. Taksha, Trongsa
  - c. Lamegonpa, Bumtha
  - d. None of the above
8. The South Asian Association for Regional Cooperation (SAARC) has established a regional SAARC Forestry Centre in Bhutan. This Centre is mandated to coordinate forestry programs within SAARC Member States. When was the SAARC Forestry Centre established?
- a. 1985
  - b. 1990
  - c. 2003
  - d. 2008
9. How many species of pines are found in Bhutan?
- a. 3 species
  - b. 8 species
  - c. 15 species
  - d. 24 species
10. Bhutan is known for its rich diversity of *Rhododendron*. How many species of *Rhododendron* are recorded in Bhutan?
- a. 76 species
  - b. 46 species

- c. 86 species
  - d. 56 species
11. *Ardea insignis* is a bird of rivers, marshes and lakes. BirdLife International has listed it as Critically Endangered. A handful of this bird is found in Bhutan. What is the common name of this bird?
- a. Rufous-necked Hornbill
  - b. Scarlet Minivet
  - c. Himalayan Monal
  - d. White-bellied Heron
12. Biodiversity Hotspots were initially proposed in a seminal paper by Norman Myers in 1988 with the objective of devising cost effectiveness in biodiversity conservation. Over the last several years these hotspots have been assessed and re-assessed. Conservation International has identified a list of Biodiversity Hotspots in recent years based on Myers paper. How many Biodiversity Hotspots are currently recognized globally?
- a. 10
  - b. 200
  - c. 34
  - d. 241
13. One of the conifer species found in Bhutan sheds its leaves in winter. Which of the following conifers sheds its leaves in winter?
- a. Hemlock
  - b. Larch
  - c. Spruce
  - d. Fir
14. For the formation of a Community Forest Management Group (CFMG), the Forest and Nature Conservation Rules 2006 require a minimum number of households to form a CFMG. What is the minimum number of households required?
- a. 5 households
  - b. 10 households
  - c. 15 households
  - d. 20 households
15. Black-necked cranes are migratory birds some of which migrate to Bhutan in winter. There are two main wintering habitats of the Black-necked Cranes in Bhutan, of which one is a protected area. What is the name of this protected area?

- a. Jigme Dorji National Park
  - b. Sakteng Wildlife Sanctuary
  - c. Thrumingla National Park
  - d. Bumdeling Wildlife Sanctuary
16. Wedge prism is an instrument used by foresters. What does it measure?
- a. Basal area in diameter at man's height
  - b. Basal area in diameter at any height
  - c. Basal area in diameter at breast height
  - d. Basal area in diameter at the tree base
17. Natural Sal is found only in a small pocket of Bhutan and this area is considered the northern limit of its range. Where in Bhutan is Sal found in its natural habitat?
- a. Dagana
  - b. Sarpang
  - c. Zhemgang
  - d. Samtse
18. How many ha are there in one km<sup>2</sup>?
- a. 400 ha
  - b. 300 ha
  - c. 200 ha
  - d. 100 ha
19. The Royal Society for the Protection of Nature, a national NGO manages one of the Conservation Areas in Bhutan on lease from the Ministry of Agriculture. What is the name of this Conservation Area?
- a. Dochula, Thimphu dzongkhag
  - b. Chelela, Haa-Paro dzongkhags
  - c. Phobjekha, Wangduephodrang dzongkhag
  - d. Dhur Tshachu, Bumtha dzongkhag
20. Natural Resource Development Corporation Limited (NRDCL) is a public company under the umbrella of Druk Holdings & Investments. What is NRDCL responsible for?
- a. Sustainable harvesting and marketing of timber, sand and stone in Bhutan
  - b. Sustainable management of mines in Bhutan
  - c. Sustainable management of water resources in Bhutan
  - d. None of the above

21. *Cordyceps sinensis*, popularly known as Yar-tsa Goen-bup, completes its life cycle dependent on the larvae of one of the following insects. Choose the correct one.
- Butterfly
  - Dragon fly
  - Moth
  - Silk worm
22. The wild relative of the domestic Mithun is found in the wilderness of Bhutan. Which one of the following is a close relative of Mithun?
- Banteng
  - Asiatic Wild Buffalo
  - Guar
  - Wild Yak
23. There are frequent forest fires in Bhutan in the dry season starting from November – May each year. Most of these fires occur in the conifer belts of the country. What is the single major cause of forest fires in Bhutan?
- Lightning
  - Rolling stones
  - Anthropogenic
  - None of the above
24. Blue Poppy is the national flower of Bhutan. Which of the following is the correct botanical name for the national flower of Bhutan?
- Meconopsis horridula*
  - Meconopsis grandis*
  - Meconopsis simplicifolia*
  - None of the above
25. The number of needles differs among different pine species (e.g between Blue Pine and Chir Pine). How many needles are found in a cluster of leaves in a Chir Pine tree?
- 8 needles
  - 7 needles
  - 5 needles
  - 3 needles

26. Wangchuck Centennial National Park established in 2008 is the newest addition to the Protected Areas of Bhutan. Which of the following dzongkhags does this new national park partially encompass?
- Parts of Wangdue, Trongsa, Bumtha, Zhemgang
  - Parts of Bumtha, Lhuentse, Trashiyangtse
  - Parts of Gasa, Wangdue, Bumtha, Lhuentse
  - None of the above
27. What are deciduous plants?
- Plants that do not shed their leaves at the end of each growing season
  - Plants that shed their leaves at the end of each growing season
  - Plants that continually shed and replaces their leaves at any time of the year
  - None of the above
28. The Department of Forests is pursuing Community Forestry programme in a big way and there have been good responses from local communities towards this programme. What does community forestry offer local communities?
- Community forestry gives local communities right to ownership of forest land in and around their village or community
  - Community forestry empowers local communities to manage and use wood and NWFP resources in and around their village or community
  - Community forestry gives local communities access and use rights to mineral resources in and around their village or community
  - None of the above
29. The peculiar moose-like Takin is the national animal of Bhutan. To which family does it belong?
- Mustelidae
  - Ursidae
  - Bovidae
  - Canidae
30. The Forest and Nature Conservation Act of Bhutan 1995 repealed and replaced the first Forest Act of Bhutan. When was the first Forest Act of Bhutan enacted?
- 1959
  - 1969
  - 1979
  - 1989

## **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. In recent years Payment for Environmental Services (PES) has attracted attention globally and is increasingly considered as one of the important and innovative mechanism for financing forest resource management in future. Different countries are at different stages in the implementation of PES. The Department of Forests, Royal Government of Bhutan is in the process of initiating PES on pilot scales. In your view what are some of the important criteria for PES to be successful and sustainable?
2. What does REDD stand for? While many countries are taking REDD as an opportunity for funding forestry programs, Bhutan has not shown much interest in this program. What could be the reason for this?
3. Many people, both within and outside the government are of the view that the present national forest policy needs to be revised. The Ministry of Agriculture and the Department of Forests, has taken the necessary steps to revise the current forest policy through a series of consultative meetings and workshops across the country culminating in the national level stakeholder workshop in August this year. In your opinion, what are the main reasons for the need to revise the present national forest policy?
4. Fire is a good environment management tool if applied wisely. In what kind of forest types and ecosystems can we best make use of fire and how?



## SECTION B (50 Marks)

From the following case studies below, choose one (1) and attempt all questions of the case study you have chosen.

### CASE STUDY 1: Increased Human Wildlife Conflict in Bhutan

Modern conservation in Bhutan started in 1993 with the development of a system of protected areas and the enactment of the Forest and Nature Conservation Act 1995. Farmers were allowed to remain in these areas, but those accustomed to having free access to natural resources had to change their lifestyles because there were restrictions on traditional resource uses, bans on shifting cultivation and hunting, enforced limitations on extractions of timber and non-wood forest products, and limitations on grazing in community and reserve forests. In addition, development projects in protected areas were to include stringent environmental impact assessments and had to be non-commercial. Subsequent increases in wildlife populations resulted in increased threats to humans, crops, and livestock. This inevitably created conflicts among local people, wildlife, and park management officials. There is ample evidence to support growing concern that these conflicts have increased over the past two decades.

Annual crop loss ranges from 0.3 to 18% of total household income. On average farmers spend about two months per year guarding their maize and rice from wildlife. Guarding, which is mostly done at night costs farmers untold hardships, additional expenses, and possible personal injury. In the mid-1990s, due to crop damage by wildlife, 23% of the farmers in Zhemgang district stopped growing rice while 39% abandoned dry land agriculture; whereas in Tomiyangtse (eastern district of Tashi Yangtse), 14% of the work force had emigrated in search of non-farming work. Reports of livestock loss to wildlife are more common. For example in 2003, one leopard killed 40 livestock during one month, and during the course of nine months, a pack of dholes (*Cuon alpinus*) killed 24 mules, six cattle, and two yaks in Jigme Dorji National Park. In the south, elephants have created nightmares for the farmers and their lives.

Farmers who tolerated wildlife damage in the past have come forward demanding action by the government and some people have retaliated by killing wild animals. Human wildlife conflicts are negatively impacting the government's objective of increasing food security and are also jeopardizing the future of Bhutan's conservation programs.

Questions:

- (i) Your minister has directed you to develop a practical human-wildlife conflicts reduction strategy in ways that reduces crop and livestock loss to wildlife and at the same time, without affecting conservation programs. What steps and measures would you take to balance livelihoods and conservation? (25 Marks)
- (ii) How would research assist in developing a balanced strategy for managing certain problematic wildlife species? Provide a case for a particular species management based on your proposed research? (25 Marks)

## **CASE STUDY 2: Management of Non-Wood Forest Products (NWFP) for poverty alleviation**

Bhutan has proven to be a haven for a wide array of NWFPs and to date more than 600 medicinal plants, 97 mushrooms, 97 fruits and nuts, 34 bamboos, 14 canes, 25 oil/resin species, 20 spices, 38 fibres, 70 ornamental plants, 181 fodder species, 36 dyes, 12 food crops (yams) and 77 forest vegetables have been identified and described.

At the household level NWFPs are used mainly for subsistence purposes and for the local market. Numerous case studies have shown the potential of NWFPs for income generation. According to Renewable Natural Resource Statistics 2000, about 42% of households in the country use bamboo resources for a variety of purposes, while about 21% of households are engaged in harvesting mushrooms from the wild, and 38.6% of households are involved in fern top harvesting during summer months. Farmers from Mongar, Lhuentse, Trashigang, and Trashiyangtse earned an income worth Nu. 51,247,045 over a period of 10 years (1994-2004) from the sale of lemon grass oil according to reports from Essential Oil Industry of Bhutan. In Bjoka, Zhemgang Dzongkhag a study revealed that 66% of the monetary income was derived from bamboo and cane products. The Laya communities located at 3,700 meters above sea level are semi-nomadic pastoralists with income from a variety of activities, including: 12% of income from yak husbandry, 8% from agriculture, 14% from incense making, and 50% of their income is derived from the collection and sale of *Cordyceps sinensis* in 2007. In 2008, highland communities earned nearly 100 million ngultrums from the sale of *Cordyceps* alone. On average Chirata (*Swertia chirayita*) contributed to 42% of the household cash income of Shingkhar Lauri farmers in 1996-97 and star anise (*Illicium griffithii*) provided good cash income for farmers in Yabrang (Trashigang Dzongkhag) and Aja Nye (Mongar Dzongkhag).

In line with the Royal Government's theme of Poverty Alleviation for the 10<sup>th</sup> FYP, NWFP management is expected to play a crucial role in the years ahead in enhancing the livelihoods of rural communities and contribute to poverty alleviation.

Questions:

- (i) Outline strategic directions for the sustainable management of NWFPs in the country gearing towards reducing rural poverty and enhancing rural livelihoods and cash income for farmers? (20 Marks)
- (ii) What steps would you take to ensure that in the name of poverty alleviation, NWFP resource base do not deplete? (10 Marks)
- (iii) If you are asked to conduct a value chain analysis of one important NWFP, what species would you choose and what are the main steps will you take in conducting the value chain analysis? (20 Marks)