

**ROYAL CIVIL SERVICE COMMISSION
COMMON EXAMINATION FOR TECHNICAL GRADUATES 2007**

PAPER III: FORESTRY

Date : October 16, 2007

Maximum Time : 150 mins.

Registration No.

Maximum Marks : 100 %

INSTRUCTIONS

1. Under the provisions of the Technical Graduates Common Examination Procedures of the Royal Civil Service Commission, candidates shall write his/her Roll No. (Registration Number) only on the Question and Answer Booklet in the space provided.
2. Use either **Blue** or **Black** ink pen or **Ball** pen for written part and **H.B. Pencils** for sketches and drawings.
3. No other particulars which would indicate the candidate's identity shall be written either on question or answer booklet. Any candidate found guilty of writing his particular and making any identification marks shall be **disqualified from the consideration for future employment**.
4. This book is the property of Royal Civil Service Commission and shall not be taken away from the examination hall. This book consists of **11 pages** including the cover page and no pages shall be removed or torn.
5. No other materials are permitted in the examination hall besides your Registration (Admission) Card, pens, pencils and eraser. **NO PROGRAMMABLE CALCULATORS**.
6. Candidates are required to produce the **ADMIT CARD** (Registration) as and when demanded.
7. First 10 minutes is being provided to check number of pages, printing errors, clarify doubts and to read the instructions. **NOT PERMITTED TO WRITE**.
8. This booklet consists of two sections – namely **SECTION A** and **SECTION B**.
9. **SECTION A** consists of two (2) parts. Part I consist of 40 questions carrying one (1) mark and is compulsory. Tick or circle the option clearly as instructed. Part II consists of six (6) questions carrying 5 marks and is compulsory. Follow the instructions.
10. **SECTION B** consists of two (2) **CASE STUDIES** related questions. Choose only **ONE**. Each question carries 30 marks, which are split into 3 sub-questions with marks being valued upon the question's expected value.
11. The written answers, the ticked or circled options should be neat and clear. All the diagrams should be clean (if any).
12. Once the examination starts, you are not allowed to ask or borrow any material from the other candidates.
13. You are requested to close the question and answer booklet and to sit quietly if you complete the paper before the stipulated time.

SECTION A (70 Marks)

SECTION A CONSISTS OF TWO (2) PARTS

PART I : Tick or circle clearly the correct answer (s) from the options provided (40 marks). Each question carries 1 mark only

1. The National Forest Policy was promulgated in:
 - i) 1969
 - ii) 1974
 - iii) 1979
 - iv) 2005

2. First Forest Act was passed in:
 - i) 1953
 - ii) 1969
 - iii) 1995
 - iv) 2005

3. The latest name of Forestry Development Corporation Limited is:
 - i) Bhutan Logging Corporation
 - ii) Forest Resource Harvesting Corporation
 - iii) Natural Resources Development Corporation
 - iv) National Forest Harvesting Corporation

4. Total area under protected areas – national parks, wildlife sanctuaries and strict nature reserves of Bhutan is:
 - i) 15 %
 - ii) 26 %
 - iii) 29%
 - iv) 32 %

5. Total area under biological corridor is:
- i) 6.5 %
 - ii) 7 %
 - iii) 9 %
 - iv) 10.5 %
6. Bhutan's endemic pine is:
- i) *Pinus wallichiana*
 - ii) *Pinus roxburghi*
 - iii) *Pinus bhutanica*
 - iv) *Pinus keyisia*
7. Shitake Mushroom is artificially grown on (the best sub-stratum):
- i) Coniferous wood
 - ii) Oak wood
 - iii) Straw
 - iv) Poplar species wood
8. More quantity of timber would be obtained by using actual volume formula than quarter-girth formula:
- i) True
 - ii) False
9. Seed tree silviculture system involves:
- i) Clear felling of the stand
 - ii) Removing all the trees and leaving adequate number of seed trees
 - iii) Felling in strips
 - iv) Felling from one direction
10. Selection-cum-improvement felling involves:
- i) Felling all mature trees of the stand
 - ii) Felling only dead and dying trees
 - iii) Felling in groups
 - iv) Leaving only seeds trees

11. Which of the species is an exotic:
- i) Pinus roxburghi
 - ii) Quercus semicarpifolia
 - iii) Eucalyptus
 - iv) Rhododendron species
12. Bhutanese paper (Desho) is primarily made from:
- i) Pine species
 - ii) Bamboo
 - iii) Daphne species
 - iv) Oak species
13. Particle board is made from:
- i) wood chips
 - ii) leaves
 - iii) barks
 - iv) roots
14. Masutake mushroom is found in:
- i) Sarpang and Samdrup Jongkhar region
 - ii) Thimphu, Paro and Bumthang region
 - iii) Zhemgang and Trongsa region
 - iv) Trashingang and Mongar region
15. The main vegetation in the alpine ecosystem are:
- i) Scrub rhododendron and juniper species
 - ii) Conifer species
 - iii) Broad leaf species
 - iv) Bamboo
16. Where is the only natural habitat for sal (Shorea robusta):
- i) Manas
 - ii) Samdrup Jongkhar
 - iii) Phibsoo
 - iv) Diapham

17. One of the most commonly used instrument for measuring the increment of a tree is:
- i) Measuring tape
 - ii) Increment borer
 - iii) Wedge prism
 - iv) Clinometer
18. Which one is a fodder species:
- i) Pinus bhutanica
 - ii) Poplar species
 - iii) Ficus roxburghi
 - iv) Juniper species
19. Salvage logging is:
- i) Harvesting dead trees
 - ii) Harvesting all trees from a stand
 - iii) Thinning of stand
 - iv) Selective harvesting
20. Most of Bhutan's forests are primary forests:
- i) True
 - ii) False
21. The main cause of forest fires is:
- i) Deliberate lighting by people
 - ii) Lightening
 - iii) Shifting cultivation practice
 - iv) Prolonged dryness of weather
22. Which species is best suited for dry site:
- i) Abies densa
 - ii) Tectona grandis
 - iii) Rhododendron species
 - iv) Prosopis spicigera

23. Difference between a looper and borer is:
- i) Both attack the stem of the tree
 - ii) Both attack the tree from the crown
 - iii) One attacks the leaf and the other the stem
 - iv) Both are harmless
24. All species can be raised in open nurseries:
- i) True
 - ii) False
25. The draft the Constitution stipulates what percentage of the country should be maintained under forest cover for all times to come:
- i) 72 %
 - ii) 65 %
 - iii) 60 %
 - iv) 55 %
26. According to the revised Land Act 2007, all Tsamdro (pasture) and Sokshing (woodlot) will be:
- i) Sold to private individuals
 - ii) Nationalized and leased to individuals/households
 - iii) Can continue to be owned by the present owners
 - iv) None of the above
27. At present the Department of Forest is under:
- i) Ministry of Natural Resources
 - ii) Ministry of Agriculture and Forest
 - iii) Ministry of Trade, Industries and Forest
 - iv) Ministry of Agriculture
28. Remote Sensing is:
- i) Interpreting aerial and satellite imageries
 - ii) Reading maps
 - iii) Retrieving information from a remote location
 - iv) None of the above

29. GIS stands for:
- i) Geological Information System
 - ii) Geographic Information System
 - iii) Geographic Innovative System
 - iv) None of the above
30. Which forest resource will contribute most to poverty alleviation in the rural areas:
- i) Commercial timber
 - ii) Nonwood timber products
 - iii) Water resources
 - iv) Wood based industries
31. Random point sampling method is:
- i) Surveying in a systematic direction
 - ii) Starting surveying from a random point
 - iii) Systematic sampling
 - iv) None of the above
32. Teak (*Tectona grandis*) can be raised by stump-planting:
- i) True
 - ii) False
33. *Budorcas taxicolor* is:
- i) Blue sheep
 - ii) Takin
 - iii) Snow leopard
 - iv) Golden langur
34. Number of known species of *Rhododendron* in Bhutan is:
- i) 50
 - ii) 46
 - iii) 42
 - iv) 35

35. The first Headquarter (1952) of Department of Forest was in:
- i) Punakha
 - ii) Sarpang
 - iii) Thimphu
 - iv) Samtse
36. Re-afforestation is:
- i) Planting in barren area
 - ii) Planting in area after the trees have been harvested
 - iii) Planting in agricultural land
 - iv) None of the above
37. CITES is:
- i) Convention In Timber Exchange and Sale
 - ii) Convention on International Trade in Endangered Species
 - iii) Commission on International Trade in Endangered Species
 - iv) None of the above
38. Bhutan is a member of UN Convention on Biological Diversity/Biodiversity:
- i) True
 - ii) False
39. His Majesty, the Fourth King was awarded by the United Nations:
- i) Protector of Earth Award
 - ii) Champion of the Earth Award
 - iii) Biodiversity Conservation Award
 - iv) Conservation International Award
40. The latest number of bird species found in Bhutan are:
- i) 550
 - ii) 650
 - iii) 770
 - iv) 830

Part II : Answers should be brief and to the point (30 marks). Each question carries 5 marks only

1. Fire is considered to be detrimental to forests. However, it can be also used as a management tool. Elaborate
2. Old fir (*Abies densa*) stands (Chiela, Helela, etc) is replaced by *Rhododendron* species. Briefly explain the phenomenon.
3. Natural regeneration in broad leaf forest is a serious problem in Bhutan. Explain some of the reasons.
4. The draft Constitution of Bhutan has fixed the minimum percentage of the area to be maintained under forest cover for all times to come. Discuss some of the possible reasons for including this provision in the Constitution.
5. *Meconopsis grandis* is the national flower of Bhutan. However, only few Bhutanese have seen it as it occurs only in selected high altitude areas of Bhutan. Should we adopt a flower that can be seen by more Bhutanese? Discuss.
6. Blue pine (*Pinus wallichiana*) is a colonizer and is also one of the best conifers for construction. However, left to nature, it overtakes all other species, particularly Oak species which conserves water and soil better, and is excellent firewood. Using the principles of ecosystem processes, explain why we should or should not intervene.

SECTION B (30 Marks)

From the given two case studies, choose one and attempt all the questions.

CASE STUDY ONE : Timber Supply – a Dilemma

Bhutan has over 72 percent of the country under forest cover and yet there is shortage of timber for construction. The national forest inventory data show that the annual allowable cut is over 1.3 million cubic meters. However, only a fraction of this quantity is harvested by the government designated harvesting agency and farmers in the rural area. This is due to the following reasons:

1. Rugged terrain of the country
2. Only 14 percent of the country is suitable for environmentally safe harvesting of timber
3. Most of the forests in the catchments are set aside for water conservation for sustaining hydro power generation
4. It is very expensive to construct roads to transport timber to the market
5. Strict government regulations for harvesting of timber

Besides meeting the timber requirement for construction, the demand for wood-based industries has to be also met from the forests of the country. With increasing infrastructure development and population, the pressure on the foresters to increase the supply of timber will only mount by the year. This would put the government in a dilemma – whether to increase the production of timber by easing the environmental considerations or continue to be guided by existing regulations and learn to live with shortages.

1. Questions

- 1.1. Do you agree with present policy of the government to harvest only within safe limits of environmental considerations and why? (10 marks)
- 1.2. Suggest some measures of linking up-stream conservation efforts and down-stream beneficiaries. (10 marks)
- 1.3. Given the fact that there is shortage of timber, should there be a moratorium on wood-based industries and why? (10 marks)

OR

CASE STUDY TWO: Human-wildlife Conflict

Farmers of Gasa Dzongkhag practice integrated farming wherein they raise livestock and cultivate paddy, maize, wheat, etc. Since there is a vast variation in the agri-ecological zone, the focus of farming is diverse. For instance, the main source of income for the farmers of Laya is generated from Yak herding and pottering by horses for the tourists. The livestock continued to sustain the livelihoods of the people of Laya for several years. However, as time passed a serious threat to the Yaks and horses emerged in the form of wild dog. Initially, the population of wild dogs was manageable and could absorb the loss of livestock inflicted by the wild dogs. It seems the emergence of the wild dogs was a national phenomenon and farmers throughout the country started to complain about the gradual explosion of population of wild dogs, and the subsequent loss of livestock. Over the years, this became a national issue and a programme to kill all the wild dogs was developed and implemented by the Department of Animal Husbandry. Since biological control was not effective, mass poisoning of wild dogs was adopted as the main approach to reduce the population. In fact, farmers were given cash reward for killing wild dogs.

Over the years the livestock farmers had time to relax while tending their livestock and imperceptibly forgot about the wild dogs. However, another problem, probably more intractable was brewing. The farmers of Gyan Damji practicing agriculture were spending more and more time guarding their fields before the harvest time from a new pest – the wild boar. Some farmers were losing the whole year's crop to the wild boar. Wild boar started to appear in places where it was unheard in the past. The problem of crop loss to wild boar became so serious, the issue was discussed in the National Assembly.

In response to the problems created by the wild animals, government eased the restrictions on killing of selected wild animals. Farmers could legally kill wild animals within the radius of 200 meters of the agricultural field except endangered species such as elephants, and bear. However, the human-wildlife continued.

Research studies show there is a direct relationship between the prey and predator. It was revealed that wild dogs control the population of wild boar and maintain the ecological balance. For instance, in areas where the wild dogs have re-emerged, the wild boar population has gone down. While the farmers practicing agriculture farming are happy with the new development, the livestock farmers are complaining about the wild dogs.

2. Questions

- 2.1. Do you agree with the intervention of the government in reducing the population of wild dogs and why? (10 Marks)
- 2.2. Suggest some measures to reconcile development and conservation (10 marks)
- 2.3. Should the farmers be compensated for the crops/livestock destroyed by wild animals and why?