

Professional Foresters Registration Examination

October 10, 2014

PART I

Instructions: APPLICANTS, PLEASE READ THESE INSTRUCTIONS CAREFULLY. You MAY complete PART I by doing ONE of the following two options:

A) Complete the Short Answer Section (Question 1) and Any Two (2) of the Essay Questions (Questions II through V)

OR

B) Complete Any Three of the Essay Questions (Questions II through V) and OMIT answering the Short Answer Question (Question I).

Question I - Short Answer
Question II - Forest Mensuration
Question III - Forest Ecology
Question IV – Forest Economics
Question V - Forest Protection

Professional Foresters Registration
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Sacramento, CA 95814

Answer on these pages, tear from the booklet and submit with the answer packet if you chose Option A for Part I of this examination.

ACRONYMS AND ABBREVIATIONS USED IN THIS EXAMINATION

The following Acronyms and /or Abbreviations **may be used** in this examination. Technical abbreviations that should be known by a forester are NOT included here (e.g. DBH, MAI, MBF). You may remove this page for reference throughout this examination. **It need not be returned.**

<u>Acronym or Abbreviation</u>	<u>Full Text</u>
BLM	Bureau of Land Management, USDI
BOF	California State Board of Forestry and Fire Protection
CCR	California Code of Regulations
CALFIRE	California Dept. of Forestry and Fire Protection
CDF&W	California Department of Fish and Wildlife
FPR	California Forest Practice Rules
PRC	California Public Resources Code
RPF	California Registered Professional Forester
THP	California Timber Harvest Plan
TPZ	California Timber Production Zone
USFS	United States Forest Service, USDA

Answer on these pages, tear from the booklet and submit with the answer packet if you chose Option A for Part I of this examination.

QUESTION I - SHORT ANSWERS

- 4% 1. List four of the seven characteristics used to determine erosion hazard ratings under the Calif. Forest Practice Rules.
- 3% 2. What is the difference between a stand's arithmetic mean diameter and its quadratic mean diameter?
- 3% 3. Give **three** reasons why seed tree and shelterwood systems are **generally** not used to regenerate redwood stands.
- 3% 4. Name three important social issues that are impediments to increased use of prescribed burning.

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- 3% 5. According to the Forest Practice Rules definition, geomorphic feature formed by coalescing scars originating from land-sliding and erosional processes caused by active stream erosion and is identified as that area situated immediately adjacent to the stream channel below the first break in slope is called an _____.
- 3% 6. A stream that derives most or all of its nutrient energy source from such things as terrestrial insect drop and litter-fall from terrestrial vegetation is described as an _____ type of stream?
- 3% 7. A practice or usually a combination of practices that are determined by a state or a designated planning agency to be the most effective and practical means of controlling point and nonpoint sources of pollutants at levels compatible with environmental quality goals is called a _____ (answer is to be given in complete form, not as an abbreviation).
- 3% 8. In the California Forest Practice Regulations, what is the minimum stand acreage for defining "late successional stands?"
- 3% 9. What was the impetus (main reason) for California changing to the Yield Tax on timber in 1976?

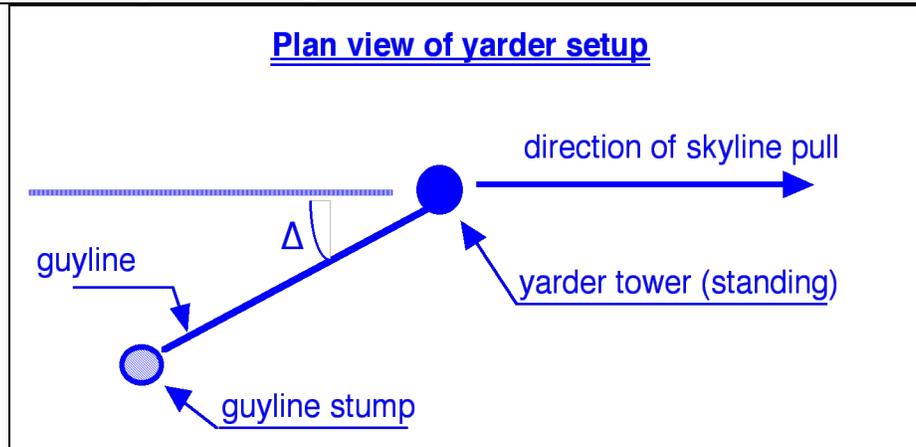
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Answer on these pages, tear from the booklet and submit with the answer packet if you chose Option A for Part I of this examination.

- 4% 10. List 2 situations which may occur during field variable plot cruising, when is it important to know the plot radius factor.
- 3% 11. Water bodies that are listed as impaired under Sec. 303(d) of the Federal Clean Water Act, must have a plan called a _____ developed for each pollutant which is a calculation of the maximum amount of a pollutant that a water-body can receive and still meet water quality standards.
- 3% 12. Under the Endangered Species Act (Federal), what is an "Evolutionary Significant Unit."
- 3% 13. Dunning's Classification is used to classify which species of conifers in the FPRs?
- 3% 14. For tax purposes, logging equipment is usually depreciated and timber is depleted. By what taxation processes are the cost of **permanent** roads recovered by the forest enterprise?
- 3% 15. In the diagram below, the angle Δ represents the horizontal angle a rear yarder guyline deviates from the skyline's axis of pull. (Assume other guylines are in place but are not shown.) This angle should never exceed how many degrees to avoid overstressing the guyline during yarding? _____

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Answer on these pages, tear from the booklet and submit with the answer packet if you chose Option A for Part I of this examination.



- 3% 16. Under the Forest Practice Act regulations governing "nonindustrial timberland," list three characteristics which define a nonindustrial tree farmer."
- 3% 17. As used in the FPRs, what is meant by the term "Properly Functioning Salmonid Habitat?"
- 3% 18. For THP planning purposes, how would you define an "Active Nest" of an Osprey when you have not seen an Osprey occupy the nest in the 3 months you have been doing THP fieldwork?
- 3% 19. Briefly describe what is meant by the term "adaptive management" as it applies to forest management.

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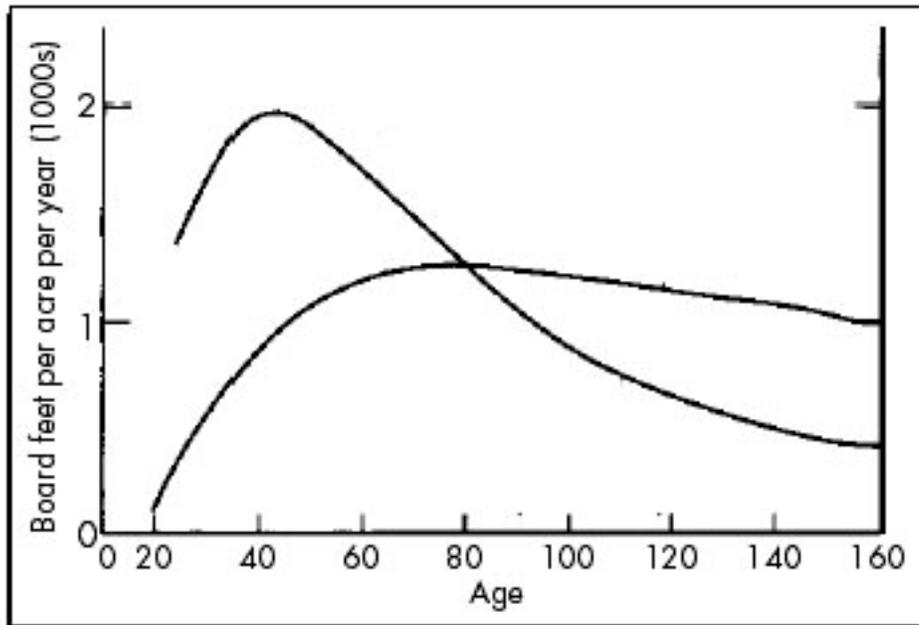
Answer on these pages, tear from the booklet and submit with the answer packet if you chose Option A for Part I of this examination.

- 3% 20. For northern California, list three salmonids that have been placed on the Federally Threatened or Endangered list. Give **either** the common **or** scientific names. (Northern California is commonly defined as that geographic region north of the Tehachapi Mountains.)
- 3% 21. In California, name the three Cadastral Survey Base and Meridian Systems used to facilitate and organize the Public Land Survey System in the State.
- 3% 22. A Channel Migration Zone is recognized as being a riparian feature, particularly along fish bearing watercourses, which may contribute to the long term functions of riparian habitat. Define a Channel Migration Zone.
- 3% 23. According to the CDFFP guidance concerning large old trees, what is the smallest stand size area that must be disclosed in a THP when large old trees are present and of potential significant adverse impacts pertaining to large old trees may occur?
- 3% 24. How do the Forest Practice Rules define "economic feasibility?"

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Answer on these pages, tear from the booklet and submit with the answer packet if you chose Option A for Part I of this examination.

- 3% 25. Combustible materials that provides vertical continuity between vegetation strata and allows fire to climb into the crowns of trees or shrubs are commonly called _____
- 3% 26. What characteristic of true fir requires that special attention be paid to during partial cutting?
- 3% 27. On the graph below, label the graph line that represents Periodic Annual Increment growth (PAI).



- 3% 28. An eight-digit code (e.g.17040206) that uniquely identifies any of the drainage basins in the United States in a nested arrangement from largest (Regions) to smallest (Cataloging Units) is called a _____.

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Answer on these pages, tear from the booklet and submit with the answer packet if you chose Option A for Part I of this examination.

2% 29. The Golden Spotted Oak Borer (*Agrilus auroguttatus*), an invasive wood boring beetle recently located in California, is responsible for the mortality of over 80,000 trees in southwestern California. Name two of the three species that are currently experiencing high rates of mortality in California from GSOB infestation. Common or scientific names are acceptable.

3% 30. Under the CA Forest Practice Rules, what conditions would a cable road need to have erosion control measures specified in the THP and installed?

2% 31. The Forest Practice Rules allow the Review Team how many days to examine a THP so as to assist the Director in determining if the plan is acceptable for filing as submitted? _____

3% 32. Next to the regulatory programs given below, give the correct name of the CA State Agency or Department that administers that program.

CA Regulatory Program

CA Agency or Department

<i>STREAMBED ALTERATION REVIEW</i>	
<i>WATERSHED BASIN PLANS</i>	
<i>FOREST SLASH BURNING</i>	

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Applicant #: _____
Question # I

Answer on these pages, tear from the booklet and submit with the answer packet if you chose Option A for Part I of this examination.

- 4% 33. Using economics as the sole criteria to determine when a project or transaction is economically feasible, name ONE condition that must be met?

END OF QUESTION

QUESTION II - FOREST MENSURATION

OBJECTIVE

To demonstrate your ability to analyze various forest conditions and situations to design and conduct an appropriate cruise.

SITUATION

A client retains you to cruise three separate tracts of timber she owns. She is interested in the volume of net merchantable timber on each tract. The tracts are described below. The client's purpose and her general instructions are also shown for each tract. For all tracts, assume that 1) there is no effect of recovery of value based on forest practice or other environmental regulations and 2) all tracts have nearly the same degree of reasonable access.

Tract I

SIZE: 640 acres

LOCATION: Trinity County, California

TYPE OF TIMBER: Contains larger second-growth and old-growth ponderosa and sugar pine, white fir, and associated conifers over entire area.

BOUNDARIES: No information available from client.

CRUISE PURPOSE: For client's use in estimation of minimum acceptable value.

Timber to be offered for sale on a pay as cut basis at public auction and sold for highest bid from a responsible bidder (provided minimum is met or exceeded).

RESTRICTIONS ON INTENSITY, TIME, CONSTRAINTS, OR COST OF CRUISE: Client requests that cruise intensity be adequate to protect her from setting a minimum acceptable bid which would be either too low or too high, but cannot afford an intensive cruise. Cruise is to be completed within two months.

Tract II

SIZE: 40 acres

LOCATION: Del Norte County, California

TYPE OF TIMBER: Moderate dense stand of virgin old-growth redwood over entire area.

BOUNDARIES: Blazed, flagged, and K-tagged lines marked by a recent recorded survey by a licensed land surveyor retained by client.

CRUISE PURPOSE: For use in court to support client's claim of substantially higher values than offered by a condemning public agency.

RESTRICTIONS ON INTENSITY, TIME, CONSTRAINTS, OR COST OF CRUISE:
None

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Tract III

SIZE: 6,400 acres

LOCATION: Placer County, California

TYPE OF TIMBER: Scattered, older residual stand of mixed conifers with patches of young growth timber left after logging in the 1960-1970s. Approximately one-third of the property is in non-timbered areas including brush-fields, rocky land, and meadows.

BOUNDARIES: No information available from client. Intermingled and adjoining large diameter timber, including some not previously logged stands, of other private and public ownership is known to exist.

CRUISE PURPOSE: For client's use in planning for future management. No timber sales contemplated soon.

RESTRICTIONS ON INTENSITY, TIME, CONSTRAINTS, OR COST OF CRUISE:

Client stipulates cruise costs should be kept to the minimum needed for management planning on a general basis. Time for completion is one year. Cruise intensity to be adequate to give reasonable estimates by species for the entire property. No breakdown of cruise data by smaller subdivisions is necessary.

QUESTIONS:

Answer the following questions for **EACH** tract:

- 60% 1. Briefly describe the type of cruise you would recommend. Justify the cruise intensity, layout, and what measurements are needed. Also state what additional resources or sources of information that should be provided to you or you would procure to accomplish the cruise. Include your reasons for selecting that type of cruise over the alternatives.
- 15% 2. Explain what field tools/instruments and procedures you would use during the cruise to obtain the measurements you recommended in part 1, above.
- 10% 3. What steps would you take to identify the property boundary lines?
- 15% 4. What sources should you use to estimate yield, defect and breakage, and log grade information for this cruise?

END OF QUESTION

QUESTION III-FOREST ECOLOGY

OBJECTIVE

To determine your knowledge regarding the relationship between water and energy, and successful tree regeneration.

QUESTION

The water relations and energy environment of trees are always important and are especially critical during the regeneration stage of a stand.

20% 1. In terms of plant water and energy relationships, explain why duff is usually a poorer seedbed than mineral soil for establishment of conifer seedlings from natural seed fall or broadcast seeding.

20% 2. In terms of plant water and energy, discuss four (4) reasons for the generally beneficial effect of shade on seedling survival (assume that shade is not excessive to be detrimental to seedling health).

30% 3. Describe five (5) common errors in tree planting techniques and explain, in terms of plant water and energy, the adverse effect of each. (Assume satisfactory planting stock and proper handling is used; do not use lack of utilization of dead shade as an answer).

30% 4. Consider a tree seedling recently planted in an unshaded site. Assume "typical" late spring, mid-afternoon, mostly sunny conditions. Indicate the direction of change in rate of transpiration (increase or decrease) you would expect as a result of each of the following changes in environmental conditions. Regard these as five separate, unrelated situations. Explain each response in terms of the applicable physical/biological processes (If you need to make further assumptions to qualify any of your answers, state them briefly):

- a. A cloud shadow passes over the seedling.
- b. Wind speed increases from a slight to moderate breeze.
- c. Air temperature increases with no change in solar radiation.
- d. Relative humidity falls with no change in air temperature.
- e. Soil moisture is gradually depleted, with no change in other conditions.

END OF QUESTION

15% 3. What would be the break-even value at your company's sawmill for delivered Douglas-fir logs? Show your work.

20% 4. Discuss how you would use the break-even value to determine the sawmill's offering price for delivered Douglas-fir logs?

25% 5. Discuss what other information should be considered when developing the company's delivered log price?

15% 6. A potential log seller, who is selling logs for the first time, has asked you to quote a price for delivered logs. His logger who has told him that every mill gets more lumber out of a log than it pays for. After you quote him a delivered log price he asks you why he only gets paid on the Bureau's scale, when he knows your sawmill gets an overrun. He thinks the mill is taking advantage of him because he gets paid for 1000 board feet of logs and the mill gets over 1000 board feet of lumber. How would you answer him, **in general terms**?

END OF QUESTION

QUESTION V- FOREST PROTECTION

OBJECTIVE

To demonstrate your knowledge of Sudden Oak Death disease and its impacts in California's forests.

SITUATION

A relatively new disease to California and Oregon Forests is known as Sudden Oak Death (SOD) disease. SOD is caused by *Phytophthora ramorum*. It was first observed in Marin County, CA, in 1994. The potential for significant damage to California's coastal forests is present, but much is unknown about the disease. Answer the following questions concerning SOD:

QUESTIONS:

- 20% 1. Briefly describe the organism that causes SOD, its history in California and geographic distribution in California.
- 20% 2. Briefly describe the environment and habitat where *P. ramorum* appears to thrive in California's forests.
- 20% 3. List five naturally occurring forest tree species in California and/or Oregon that are known to be attacked by *P. ramorum* and can cause death of the tree. In addition describe the symptoms and signs of *P. ramorum* on these species (e.g. plant parts infected or impacted, lethality).
- 20% 4. As a forester, what control or prevention techniques would you recommend to a landowner who wishes to protect or treat individual trees from *P. ramorum*
- 20% 5. For a forest landowner with several thousand acres of ownership in an area with active areas of SOD infection, discuss what wildland treatments are possible (if any) to treat for a confirmed SOD outbreak on his/her lands.

END OF QUESTION

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PART II

**Applicant Must Answer Three Of The Remaining
Five Essay Questions In Part II**

Question VI-Forest Engineering
Question VII-Silviculture
Question VIII-Forest Administration
Question IX-Forest Policy
Question X-Forest Management

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QUESTION VI-FOREST ENGINEERING

OBJECTIVE

To determine your knowledge of culvert design and installation on forest roads as required in the California Forest Practice Act.

QUESTIONS

10% 1. For permanent and seasonal roads, the California Forest Practice Act (FPA) requires a minimum design storm flood flow (or return period) for watercourse crossing culverts? (Not ditch relief culverts.) Define the term return period and specify the minimum return period required by regulation on these types of roads in a) permanent road stream crossings and b) temporary road crossings.

30% 2. Three common methodologies used to determine design peak flows for a return period are A) the Rational Equation (also known as the California Nomograph Method), B) the U.S. Geological Survey (USGS) Regional Flood Frequency Equations (aka: Magnitude and Frequency Method), and C) Talbot's Equation. For any **TWO** methodologies, define the equation in terms of a mathematical expression or in text (word) terms. Define all symbols and/or variables used and give the units of output and input variables. Be sure to clearly discuss limitations and special circumstances, assumptions built into these methodologies. Where data is to be obtained from special charts, such as precipitation, clearly indicate the source you use. Be specific.

20% 3. As most mountain watercourse crossing culverts on forest road systems operate under "Inlet Control" conditions, define the term inlet control and discuss three variables that influence a culvert's discharge capacity under inlet control.

20% 4. If the watercourse crossing under consideration is a salmonid stream, briefly discuss five items that you would consider in the crossing's design, location, and/or installation to facilitate and enhance fisheries considerations needs at this crossing.

20% 5. For the temporary class of roads in the FPA, describe the culvert size requirements required by the FPA and the steps in final disposition of such crossings.

END OF QUESTION

QUESTION VII-SILVICULTURE

OBJECTIVE

To determine your understanding of ecological pros and cons present when making silvicultural management decisions.

SITUATION

California black oak (*Quercus kelloggii*) is common to a wide portion of California and southeastern and central Oregon. California black oak exceeds all other California oaks in volume, distribution, and altitudinal range. California black oak is a component of six forest cover types. Yet this deciduous hardwood has had little sustained commercial use and almost no management. In some parts of the Sierra Nevada it was common practice to fall all California black oak as part of commercial forest practices.

QUESTIONS:

15% 1. Briefly describe 5 identification characteristics of California black oak that would positively distinguish it from other *Quercus* species.

45% 2. Discuss the significance of California black oak as a component of the mixed conifer forest ecosystem. Include both positive (25 % points) and negative significance (20 % points) of attempts to eradicate California black oak in regenerated areas.

40% 3. Describe why sprouting appears to be the dominant source of most black oak regeneration and its affect on the resulting stand. Discuss how this affects black oak control when it is desirable to reduce the California black oak component in a stand (thinning, sanitation removal for mistletoe, etc.), Discuss five effective control methods that are available?

END OF QUESTION

QUESTION VIII- FOREST ADMINISTRATION

OBJECTIVE

To determine your knowledge about evaluating forest programs requiring monitoring.

SITUATION:

Tens of millions of dollars are invested annually by California forest landowners in habitat restoration-rehabilitation, both terrestrial and aquatic. Often the proposed work and manipulations are performed with little thought as to how the managers are going to document results or the lack of results. Well-designed monitoring must be an integral part of any restoration project. Monitoring is technically defined as systematically checking or scrutinizing something for the purpose of collecting specified categories of data. Besides monitoring types and methods, the appropriate scale both geographical and temporally must be considered.

Assume that you are in charge of an aquatic restoration effort for your ownership to establish sufficient large wood structure (LWS) and to improve salmonid habitat and function. Answer the following questions:

QUESTIONS:

1. Using the assumed project given above, for each of the monitoring types listed below,

30% A) Give a brief, but correct definition for each type of monitoring or the key questions(s) you are trying to answer with this type of monitoring, and

30% B) Give an example of what might be monitored in this project for each type of monitoring.

I. Baseline Monitoring

II. Status Monitoring

III. Trend Monitoring

IV. Implementation/Compliance Monitoring

V. Effectiveness Monitoring

VI. Validation Monitoring

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20% 2. Discuss four restoration-rehabilitation benefits that you are assuming will be obtained with the placement of the large wood structure into the selected stream locations. Limit your response to direct benefits to salmonids, even though there may be benefits to other biota.

20% 3. Assuming that the addition of large wood structure is needed in the stream locations selected, discuss how past forest and fisheries management have led to this deficit in California (and other western states).

END OF QUESTION

QUESTION IX- FOREST POLICY

OBJECTIVE

To demonstrate an understanding of the role of the Registered Professional Forester, California Board of Forestry and Fire Protection and environmental legislation in California.

QUESTION

20% 1. Describe the role of the Registered Professional Forester in managing California's forests and the basic minimum qualification requirements for registration.

20% 2. What is the Board of Forestry and Fire Protection, how are its members appointed, and what are three of its responsibilities?

60% 3. Briefly discuss ANY 6 of the 9 following environmental laws and how they affect forest practices in California.

Federal

Clean Water Act
Federal Endangered Species Act
National Environmental Policy Act
National Forest Management Act
Clean Air Act

State

California Endangered Species Act.
California Environmental Quality Act of 1973
Z'Berg-Nejedly Forest Practice Act of 1973
Forest Taxation Reform Act

END OF QUESTION

QUESTION X- FOREST MANAGEMENT

OBJECTIVE

To demonstrate your ability to integrate range and forest management techniques on a single property.

SITUATION

A rancher owns 2000 contiguous acres of forestland at 4,000 - 5,000 foot elevation that includes 200 acres of wet meadow and a Class II stream. She wishes to manage her property on a sustainable basis for regular income, optimize forage production and grazing opportunities (for possibly both cattle and sheep) in the timberland and meadows, and to provide suitable wildlife habitat (she is predominately interested in deer).

Choose **ONE** of the following forest types:

- A) Pacific slope mixed conifer
- B) Westside Sierra conifer
- C) Eastside Ponderosa and lodgepole pine

QUESTIONS

10% 1. For the timber area and wet_meadow area (combined), identify two trees or shrubs, two grasses and one forb that you would expect to find and which are important forage plants. Indicate the palatability of each plant you have listed (high, medium or low) and for what animal (cattle, sheep and/or deer) your evaluation of palatability is based on. (Common plant names will be sufficient)

10% 2. In terms of range management, briefly describe the difference between biomass and forage, and two methodologies that you would use to estimate the total volume of forage production available. Clearly state your assumptions.

3. When answering the following assume you have selected **either** the Shelterwood or Seed Tree Silvicultural System to manage timber stands and achieve the forage results the owner desires.

15% A. Briefly list and discuss five (5) pretreatment **forage** conditions that might be important items in making any plans for future silvicultural treatment.

5% B. Briefly contrast how the actual silvicultural methods contemplated may affect **forage** resources.

CONTINUED NEXT PAGE

- 5% C. Briefly discuss the effects of contemplated site preparation methods on **forage** resources.
- 5% D. Briefly discuss how effects of intermediate silvicultural treatments will effect the forage resource in terms of forage composition and growth.
- 25% 4. **List** five potential benefits and five potential disadvantages of allowing grazing in plantation or regeneration sites. Also, generally describe how the owner could manage her livestock to enhance benefits and to minimize the disadvantages that you have listed.
- 25% 5. Many resources and/or site conditions on such a property are important for wildlife habitat and fisheries. Describe five ways the wildlife and fisheries resources can be negatively impacted by livestock use. Describe what accepted and commonly used livestock and range management practices can be used to effectively manage these resources.

**END OF QUESTION
END OF EXAMINATION**