Professional Foresters Registration Examination

April 7, 2006

Part I

Applicant Must Answer Question I - Short Answer

Question I - Short Answer

Applicant Must Also Answer Two of the Remaining Essay Questions in Part I

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

Applicant #:_____
Question # __I_____

You MUST answer this Question to pass the examination.
Answer on these pages, tear from the booklet and submit with the answer packet

QUESTION I - SHORT ANSWER

3% 1. List three (3) instream conditions that can negatively impact fish populations as a result of land management activities.

3% 2. A rectangular piece of land measures 26.5 chains by 38.7 chains. How many acres are in this piece of property?

3% 3. The THP is a part of a process that has been certified as _____ to an EIR subsequent to a decision by the Secretary of the California Resources Agency.

3% 4. What makes an orthophotograph different from other aerial photographs?

3% 5. Briefly discuss why a conventional high-lead logging system is not suitable for logging a partial cut on steep terrain.

3% 6. You wish to thin a stand of trees to an average 20 ft x 20 ft square spacing. How many trees per acre would your thinned stand have on the average acre?

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2% 7.What forester stated the Utilitarian philosophy cited below (in 1905) and charted the course for American Federal Forestry through today?

"Where conflicting interests must be reconciled, the question shall always be answered from the standpoint of the greatest good of the greatest number in the long run."

4% 8. Describe the difference between litter and humus.

3% 9. What is the "coefficient of variation" used to measure?

2% 10. In economic terms, the actual quantity of a commodity or service that buyers are willing to purchase in the market at a given price over a specified time period is called _____ .

2% 11. The line closest to the watercourse or lake where riparian vegetation is permanently established is defined by the California Code Of Regulations as the

3% 12. In a standard township, what section is northwest of section 15? _____

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3% 13. According to the California Code Of Regulations, which silvicultural method is used to develop an uneven-aged stand from a stand that currently has an unbalanced irregular or even-aged structure. This method is used no more than twice to increase stocking and improve the balance of age classes so as to allow the residual stand to be managed by selection or group selection.

3% 14. Typically, riparian vegetation is more important as a source of energy "inputs" in the headwaters areas of of California and other western U.S. rivers than towards the lower end. Briefly explain why.

2% 15. What law requires forest practices regulations to address archeological resources?

3% 16. *Armillaria mellea* (oak root rot) is endemic in California. What are two ways in which the activities of man may increase the prevalence of this problem?

2% 17. The height above ground or (in some regions) above stump height, to which a tree stem is salable for a particular product is commonly termed _____ height.

2% 18. The difference between the greater volume actually sawn over the lesser estimated log scale volume is called _____ .

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3% 19. The Board of Forestry membership is appointed from three catagories of representation. Briefly describe the catagories from which the Board members are selected.

3% 20. What is the Allowable Cut Effect.

3% 21. 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% 22. The establishment of a forest or stand in an area where the preceeding vegetation or land use was not forest is called _____ .

3% 23. In terms of water quality law, define the term TMDL and from what law (s) does it derive?

3% 24. For tax purposes, the cost of logging equipment is usually recovered by depreciation and timber is depleted. By what taxation process is the cost of roads recovered by the forest enterprise?

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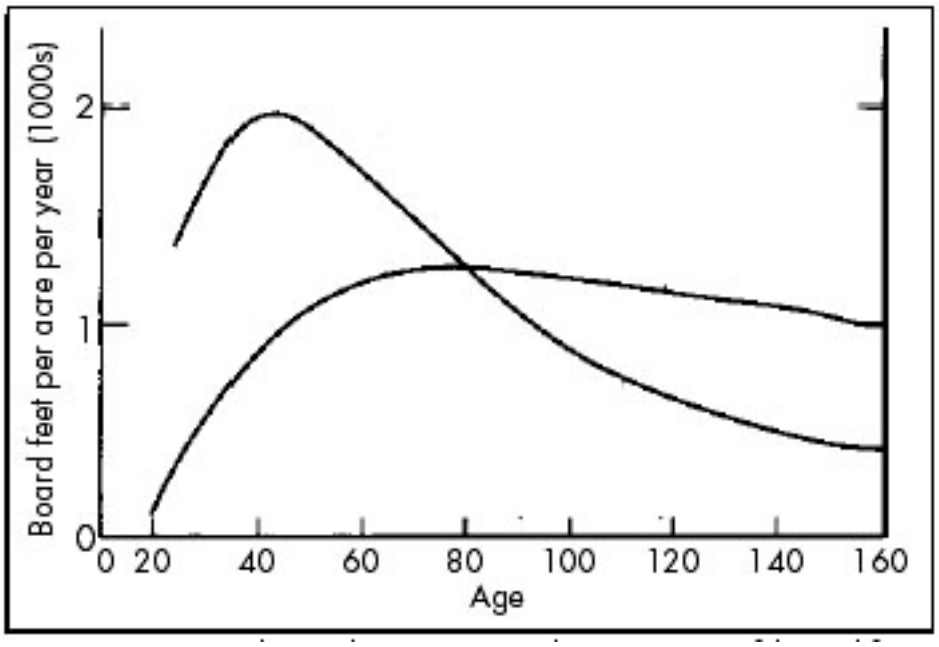
3% 25. Define direct and indirect control of insects.

2% 26. The abiotic parts of an ecosystem can generally be defined as

2% 27. On the graph below, label the graph line that represents Periodic Annual Increment growth (PAI).



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3% 28. Differentiate between a live skyline and a standing skyline system.

3% 29. According to the CA Forest Practice Rules, what is the definition of a Class II watercourse.

5% 30. The use of WLPZs and other mitigations within a THP are intended to provide protection for numerous in-stream and near-stream site factors. List 5 of these site factors specified in the CA Forest Practice Rules.

3% 31. What characteristic of true fir requires that special attention be paid to during partial cutting?

4% 32. What was the impetus (main reason) for California changing to the Yield Tax on timber in 1976?

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2% 33. For a GPS unit suitable for Forestry Purposes (e.g. Resource Grade unit), name two of the three types of X, Y, Z coordinates a point be recorded in?

4% 34. What is the basal area of a 14-inch dbh tree in square feet?

END OF QUESTION

QUESTION II- FOREST MENSURATION

OBJECTIVE
To assess your knowledge regarding computerized growth simulators

SITUATION
Computerized growth and yield, stand simulators have become increasingly sophisticated, user friendly and affordable.

QUESTIONS
25% 1. Briefly describe what a growth/stand simulator is, three mensurational or forest management uses it can be used for and why the profession has seen the great growth in the number and use of these simulators

Most of the commonly used growth/stand simulators are of three types or levels:

A. Individual-tree, distance-independent
B. Individual-tree, distance-dependent, and
C. Whole Stand

15% 2. Define and compare the three types of simulators listed above.

3. Shown below are the Acronyms of several Forest Growth Simulators COMMONLY used in the western U.S. or Western Canada:

I. CACTOS
II. CRYPTOS
III. FVS
IV. ORGANON
V. FPS
VI. DFSIM
VII. PPSIM
VIII. FORECAST

Pick any ONE Simulator and answer the following questions:

10% A. Define the complete title of the Simulator you have chosen to discuss. (E.g.- What does the acronym stand for?) And who or what organization developed the simulator.

50% B. Discuss how the simulator is utilized including appropriate species, the geographic range of the original data, what data ranges are most appropriate and general information about what data is necessary to execute the simulator. (If you are using FVS be certain to state which variant you are discussing).

END OF QUESTION

QUESTION III- FOREST ECOLOGY

OBJECTIVE: To demonstrate your understanding of the effects fire has on various aspects of the forest ecosystem.

SITUATION: California' forests and wildland vegetation have developed in close association with fire. Fire is also an important ecosystem component and tool for forest managers..

QUESTIONS:

1. What has been the impact of fire suppression on mixed conifer forests (assume no stand replacing wildfire and no other stand management activities), such as those found in the Sierra Nevada mountains of California with regard to:

(5%)A. Change in conifer species composition:

(5%)B. Dead fuel loading trend and prognosis over the rotation of a managed stand:

(5%)C. Within stand diversity of vascular plants:

(5%)D. Wildlife diversity:

2. Briefly describe a minimum of three of **all** of the following species' (found in the Sierra Nevada mountains) fire adaptation(s). If there are not three adaptations, affirmatively state this rather than leaving the impression your answer is partially complete.

(3%)A. Ponderosa pine

(3%)B. Sequoia redwood (Big Tree or CA Sequoia)

(3%)C. white fir

(3%)D. knobcone pine

(3%)E. green leaf manzanita

(CONTINUED ON NEXT PAGE)

3. Discuss what ecological impacts are associated with **spring** burning vs. **fall** burning, in California, on the following biological or environmental elements of the ecosystem.

(5%)A. Plant buds

(5%)B. Shrubs, damage and mortality

(5%)C. Tree root systems

(5%)D. Air quality:

(5%)E. Wildlife

4. Some ecosystems experience soil water repellency (hydrophobicity) problems following fire.

(15%)A. Describe the physics involved in creating hydrophobicity and what generalized soil texture group is most prone to this problem. Using your physics discussion, explain why this soil texture group is most affected.

(10%) B. Describe what fire, fuel and soil conditions are most likely to cause a water-repellant zone in soils.

(15%)C. Compare and contrast the possible burning conditions and subsequent risk of formation of a hydrophobic layer in the burning of a chaparral ecosystem compared to a mixed-conifer ecosystem.

END OF QUESTION

QUESTION IV-FOREST ECONOMICS

OBJECTIVE

This question is to assess your ability to use economic analysis to determine an optimal allocation of reforestation funds.

SITUATION

Assume you are in charge of the reforestation program for a private landowner with approximately 100,000 acres of unstocked or poorly stocked forestland. (The need for restocking is not a result of harvesting activity.) Individual areas in need of regeneration vary widely in site quality, location, climatic conditions, and presence of competing vegetation. You are given a budget of $1 million with instructions to allocate it over the next five years in the most financially appropriate manner among various reforestation opportunities (reforestation projects) that are available to you. Be certain to state your assumptions.

QUESTION

45% 1. Using **generally accepted** economic principles, BRIEFLY describe three economic criteria/methodologies you might use for judging the **financial appropriateness** of a single reforestation opportunity.

30% 2. Explain briefly the type of information you would need for assessing or using these criteria.

25% 3. Develop and justify **ONE** method for allocating your total budget among the alternative opportunities, as required by your employer.

(END OF QUESTION)

QUESTION V - FOREST PROTECTION

OBJECTIVE
To determine your ability to assess the criteria needed for a comprehensive fuels management plan.

The Problem. Wildfires continue to be an increasing menace in California, annually destroying lives, property, and natural resources. As a forester for a private timberland owner in the Sierra Nevada mountains of California, you have been instructed by your employer to prepare a fuel management plan for the owner's 50,000 acres of typical mixed conifer forest that is zoned as TPZ.

During the past 75 years, timber harvesting has concentrated on the removal of Ponderosa pine and sugar pine, leaving many mature white fir and incense cedar still standing. As a result of suppressing all wildfires to as small an acreage as possible, the current result on much of the land is a stand of timber that has few maturing pine trees but, rather, has a high density of white fir of all age classes.

In recent years, the prolonged drought in California has weakened the white fir and made them highly susceptible to attacks by insects and diseases. Large white fir have died and are still dying by the hundreds, at an average of 5 to 10 mature trees (over 150 feet in height) per acre. Together with the dense under-story of young white fir (many of which have died) and various brush species, your employer's 50,000 acres of forest is now "a stand replacement wildfire waiting to happen."

Your Objective: Your objective is to prepare a cost-effective plan of fuel management to reduce flammability and to reduce resistance to control of wildland fires for the 50,000 acres while supporting your employer's land-management objectives. Those land-management objectives include providing at least the following items:

a. A sustainable harvest of timber annually for the foreseeable future.
b. Establishment of Ponderosa and sugar pine as major components in the forest.
c. An aggressive salvage program.
d. Reduced damages by wildfires to life, property, and natural resources, with special concern for the increasing number of residences being built on lands adjacent to your employer's timberlands.

(CONTINUED ON NEXT PAGE)

QUESTION

10% 1. a) Prepare a list of ten (10) most important items that you should include in your action plan for fuel management.

50% b) Discuss five (5) of your listed items in detail .

20% 2. List ten (10) benefits or improvements in the ownership (other than those listed above under objectives) that you would expect to accrue to your employer's 50,000 acres from activating a plan of fuel management. Specify whether each of the 10 is A) a benefit that would arise only to the extent that there is a demonstrated reduction in catastrophic fires or B) an improvement in one or more resources from the implementation of the Fuel Management Plan.

20% 3. List (5) disadvantages that might accrue to the 50,000 acres because of activating a plan of fuel management. Briefly explain why these disadvantages may exist.

(END OF QUESTION)

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Part II

Applicant Must Also 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 harvesting equipment selection and basic harvesting system concepts.

SITUATION

Each harvest unit has a set of management objectives that likely include aspects of safety, profitability, residual stand structure and composition, water quality, and legal, social and regulatory concerns. If the equipment and system chosen for a unit are mismatched to the site and stand conditions, then it may be impossible to achieve any or all of these objectives. The ramifications of improper equipment selection may range from unsafe working conditions to unacceptable costs to violations under the forest practice regulations. Making sound choices aims to reduce the risk of those events happening.

QUESTIONS:

50% 1. Using the following list of seven factors that would affect harvesting equipment selection listed below, discuss **any five (5)** of these factors as to how the factor being discussed would influence the attainment of the following management objectives- safety, profitability, forest health, water quality, and other environmental concerns:

A. Terrain Characteristics
B. Soil Characteristics
C. Timber Characteristics
D. Business Requirements
E. Weather and Climate
F. Silvicultural Requirements
G. Legislation, BMP Regulations and THP Requirements

NOTE: For the next question, **graph paper is provided**, (You must hand this graph paper in with other answer sheets for this Forest Engineering Question)

25% 2. For a skidder or tractor logging system, A) plot the general trend in the change in the cost of roads as road spacing increases, within the limits shown on the X-axis of the graph. B) Also, plot the general trend in the of the cost of skidding as road spacing increases, within the limits shown on the X-axis of the graph. On your graph, mark the most economical road spacing (ERS)? C) Briefly explain how you determined the ERS. (Use the blank piece of graph paper on the next page. Be sure to hand it in with your Applicant's Number filled-in.)

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Page holder for graph paper

BE sure to put in space for applicant's number

10% 3A) Diagram a typical shotgun skyline logging system with slack-pulling lateral–yarding capability (in profile view). For the logging system components listed below, clearly label the necessary components of this logging system on your diagram. **(Use the blank piece of graph paper on the next page. Be sure to hand it in with your Applicant's Number filled-in.)**

State, if any of these components are not necessary and the reason why:

A. Skyline Cable
B. Haulback Cable
C. Mainline Cable
D. Strawline Cable
E. Carriage

5% B) Briefly describe the topographic and equipment conditions necessary for the shotgun cable system to effectively operate.

10% C) Briefly describe how the carriage you are depicting derives its slack-pulling capability and how the carriage you are describing maintains its position during slack-pulling logs into the cableway. You may draw a diagram to aid your description, if you find that to be useful.

END OF QUESTION

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QUESTION VII-SILVICULTURE

QUESTION VII-SILVICULTURE

OBJECTIVE

To test your ability to develop a silvicultural prescription for a stand of your choice and to demonstrate your understanding of specific regulatory requirements providing maximum sustained production of high quality timber products (MSP).

QUESTION

20% 1. List the essential elements of a silvicultural prescription.

70% 2. Consider a forest stand on private property with which you are familiar. In outline format, based on the elements listed above, describe in detail how you would develop a silvicultural prescription for the stand. Include the procedure you would use, the information you would obtain, the analysis and the recommendation you would make.

10% 3. Assume your stand prescription is anticipated to reduce the after harvest stocking standards or even aged prescription limitation below that of the most closely associated standard method provided in the CA Forest Practice Rules. Discuss what must be demonstrated in your prescription.

END OF QUESTION

QUESTION VIII- FOREST ADMINISTRATION

OBJECTIVE

To assess your understanding of cumulative impact and assessment when preparing a Timber Harvesting Plan.

SITUATION

You are a consulting forester hired by a timber company having large fee holdings in northern California. You have been asked to write and submit a Timber Harvesting Plan for a 300 acre tract.

QUESTION

10% 1. Define what are significant adverse cumulative impacts on the environment and briefly describe the legal basis for the requirement to assess cumulative impacts for THP's.

45% 2.As an RPF, describe your responsibility and the steps you should follow when making an analysis of cumulative impacts. What information is needed in a description of cumulative impacts when writing a THP? Be specific.

45% 3.Discuss in general terms how soil productivity, water quality, wildlife, recreation and aesthetics should each be evaluated for possible significant adverse cumulative impacts when preparing and proposing a Timber Harvesting Plan.

(END OF QUESTION)

QUESTION IX-FOREST POLICY

OBJECTIVE

To determine your knowledge of governmental entities which have a major impact on the development and implementation of forest policy in California.

QUESTION

15 % 1. List five (5) governmental agencies, Boards or commissions which have authority to develop and/or implement policy on forest lands in California. For each entity identify its level in the hierarchy of government and its general jurisdiction (i.e. Federal, state, local, private, tribal land, etc.) in California.

45% 2. Choose three (3) of the entities, each in a different general jurisdiction, that you listed in part 1. Name and describe two fundamental laws guiding each entity in its policy development or implementation. DO NOT USE THE SAME ENTITY OR LAW MORE THAN ONCE.

40% 3. Choose four (4) of the following subjects:

a. Protection
b. Regulation
c. Incentives
d. Taxation and revenue
e. Research

For each subject you have chosen name two governmental entities which interact in the development or implementation of forest policy regarding that subject, and briefly discuss how that interaction takes place.

(END OF QUESTION)

QUESTION X-FOREST MANAGEMENT

OBJECTIVE

To demonstrate your understanding of the dynamics of forest tree and stand growth and management implications.

QUESTION

50% 1. Assume that you are reviewing a forested area that has three different Ponderosa Pine stands that share the same site, species composition, and harvest history, but have different densities. The densities are low-density sawtimber, medium density sawtimber, and high-density sawtimber. For each stand, provide initial numeric values of stocking and growth representing a commercial forest type with which you are familiar.

- For each of the stands, discuss the relationship between stocking levels and growth. You may use the Langsaeter Curve as the basis for your answer.
- How does the density of each of the tree stands change over time? Include discussion of individual trees and the stand as a whole.

25% 2. In theory, for this forested area, how might you maximize stand productivity and achieve maximum sustained production of timber products?

25% 3. Given the management practice of thinning, discuss the physiological and economic tradeoffs of using a short re-entry versus a long re-entry management regime.

END OF QUESTION

END OF EXAMINATION