

Applicant #: \_\_\_\_\_

Question #   I  

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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.**

**Professional Foresters Registration Examination, April 2021**

**PART I**

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

**Complete any Three (3) of Questions I through V.**

**Question I Short Answer  
Question II - Forest Mensuration  
Question III - Forest Ecology  
Question IV-Silviculture  
Question V - Forest Protection**

Professional Foresters Registration  
1416 9th Street, Room 1506-16  
Sacramento, CA 95814

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**Answer on these pages, tear from the booklet and submit with the answer packet if you chose to answer Question 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.**

<b><u>Acronym or Abbreviation</u></b>	<b><u>Full Text</u></b>
BLM	Bureau of Land Management, USDI
BOFFP	California State Board of Forestry and Fire Protection
CA	California
CCR	California Code of Regulations
CAL FIRE	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

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**April 2021 RPF EXAMINATION**

**3%** 1. As used in Silviculture, what is stand density management?

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**3%** 2. What is photosynthesis?

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**3%** 3. When you are presenting forestry information in a public meeting as a RPF representing a client, what must you tell the audience as you begin your talk?

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**3%** 4. Explain what is meant by pool to riffle ratio and how it is measured.

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**3%** 5. What are the physical characteristics of the trees you would select for the shelterwood seed step?

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**3%** 6. Define Seed Tree regeneration method, FPR definition acceptable but not required.

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**3%** 7. List three (3) of the FPR approved stocking sampling procedures you might use to survey a recently harvested parcel to determine stocking adequacy.

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**3%** 8. Define Group Selection unevenaged regeneration method, FPR definition acceptable but not required.

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**3%** 9. By FPR definition, what is the purpose of a Sustained Yield Plan?

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**3%** 10. Name three (3) main individual tree characteristics that determine a tree's relative resistance to fire mortality.

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**3%** 11. List three (3) physical locations in a forested watershed that are most at risk of fire ignitions.

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**4%** 12. Within the FPRs, what is an Active Nest. State two (2) examples.

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**4%** 13. List four (4) parameters commonly used in growth and yield models.

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**3%** 14. As used in Forest Ecology, what is a watercourse Bankfull stage?

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**4%** 15. List four (4) Beneficial Functions of the Riparian Zone.

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**3%** 16. What is a Connected Headwall Swale?

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**3%** 17. As used in forest road engineering, what is a Critical Dip and how does it function?

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**3%** 18. What is a Deactivated Road?

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**3%** 19. What is a 100-year watercourse flood flow? How is it quantified?

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**3%** 20. What is a Hydric soil?

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**3%** 21. What are Ladder Fuels?

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**Answer on these pages, tear from the booklet and submit with the answer packet if you chose to answer Question I of this examination.**

3% 22. What is a Listed Species?

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3% 23. According to the FPRs, what is the Logging Area?

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3% 24. What is a Native American Archaeological or Cultural Site?

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3% 25. As used in forest engineering, what is Rip-Rap?

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3% 26. What is the Road Prism?

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3% 27. What are Tractor Roads?

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**3%** 28. What is Timberland, as defined in the PRC?

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**4%** 29. What are Unstable Soils characteristics?

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**3%** 30. As used in Forest Economics, what is a Supply Curve?

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**3%** 31. Define ad valorem tax and give an example of a forest asset taxed in this manner in California.

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**3%** 32. 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 the \_\_\_\_\_ height.

**END OF QUESTION # I**



## QUESTION II - FOREST MENSURATION

### OBJECTIVE

To demonstrate your ability to analyze, summarize and present basic harvesting data to a public audience.

### SITUATION:

As an RPF, you have been retained by your county's planning commission. You have been charged with reviewing a petition to the County Commissioners requesting they propose county specific rules to the Board of Forestry and Fire Protection limiting Clear-cuts, extensive sanitation/salvage and "similar" site disruptive harvest methods. Your first task is to attend a hearing where you will publicly explain and critique several presentations (CALFIRE, a forest Industry group, and the petitioners: Friends Aware of Clearcut Travesties, FACT) to the planning commissioners. You have agreed to be scrupulously neutral and scientific in your analysis. You have recently applied to both a major forest landowner and Cal Fire for full time RPF positions.

### QUESTIONS:

**20%** 1. In a court of law, a witness swears to present "The truth, the whole truth, and nothing but the truth".

However, an Attorney at Law is duty-bound to advocate zealously for their clients. Rules of Professional Conduct which impose on attorneys a duty of truthfulness to third parties may occasionally conflict with the attorney's duty to advocate zealously on behalf of clients.

Historically attorneys have attempted to categorize such posturing as something other than a statement of material fact. They may assert that a statement of opinion is not actionable, nor is a statement of puffery (exaggerated or extravagant statement). A statement of puffery is one that is "extremely unlikely" to induce reliance. Ultimately, the difference between a statement of fact and mere puffery rests in the specificity or generality of the claim.

In an attempt to characterize situations in the best light for their clients, advocates sometimes "cherry pick" data and create their own "grey literature" rather than publish raw data or cite multiple peer reviewed research. Advocates will often make a true statement of fact then follow with a conclusion that supports their position but may not be completely supported by the fact statement.

(12%) **1.a.** What are the duties of an RPF to their clients regarding the truthfulness and completeness of their statements and actions? How should an RPF distinguish between fact and opinion? How should an RPF respond to a client's requests which may be outside the intent of the FPRs? How should an RPF respond to requests for service beyond the scope of their knowledge or experience?

(8%) **1.b.** What are the duties of an RPF to third parties regarding the truthfulness and completeness of their statements? What are the duties of an RPF with regard to third parties' request for a client's information?

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CALFIRE offers a data sheet describing harvesting in a local 10,000-acre watershed over the past decade. Data from CALFIRE and State Board of Equalization averaged data.

	<i>Clear Cut</i>	<i>Shelterwood Removal</i>	<i>Fire Salvage</i>	<i>Selection</i>	<i>Group Selection</i>
<i># of proposed THPs</i>	10	5	4	15	5
<i># of Approved THPs</i>	10	5	4	15	5
<i>Acres in Approved THPs</i>	2000	1000	2000	3000	1000
<i>Total MBF Volume Harvested</i>	15,000	20,000	40,000	30,000	14,000
<i>Ave. Vol / Acre Harvested</i>	30 MBF	20 MBF	20 MBF	10 MBF	14 MBF
<i>Acres Actually Harvested</i>	500	1000	2000	3000	1000
<i>Acres within approved THP burned before harvest</i>	<i>(500 wildfire burned)</i>	<i>(500 wildfire burned)</i>	<i>All these acres burned after other THPs originally approved</i>	<i>(1000 wildfire burned)</i>	0

- 20%** 2. The petitioners (Friends aware of Clearcut Travesties FACT) make the first presentation. The commissioners ask you to fact check some of their assertions:

For each assertion write a brief paragraph advising the Commissioners as to the truthfulness, completeness, and relevance to the petition for new county rules, of their statements.

- (5%) 2.a. “Virtually all proposed THPs are approved by Cal Fire, therefore there is no regulatory limit on harvesting.”

**Continued on the next page**

(5%) **2.b.** “Clearcuts and harvesting with similar site disturbance (shelterwood removal, fire salvage and group selection (2.5-acre clearcuts) comprise 2/3 of the THP acres.”

(5%) **2.c.** “90% of this watershed was harvested in the past 10 years.”

(5%) **2.d.** “~75% of the volume removed in the past 10 years was derived from heavy disturbance harvesting methods.”

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**20%** **3.** CALFIRE makes the second presentation. The commissioners ask you to fact check some of their assertions:

You stipulate that the CALFIRE statements of facts are correct but you still need to comment on their conclusions.

For each assertion write a brief paragraph advising the Commissioners as to the completeness, and relevance to the petition for new county rules, of their statements.

(5%) **3.a.** “Each proposed THP undergoes an interdisciplinary team review. The County and Public already have the ability to comment and request changes. Every County comment will be addressed by CALFIRE before any THP is approved or denied. Therefore, there is no real need for County specific rules.”

(5%) **3.b.** “Under existing rules, upon receipt, every proposed THP is automatically sent to the county planning agency. Every review team contains a representative of county government when the county government so requests. There is no need for County specific rules for this to happen.”

(5%) **3.c.** “The County as member of the review team may request protective measures for incorporation into the plan, even when authority for such measures is not contained in the rules and regulations of the Board. So, the County may add the effect of any rule it may substantiate even when there are no County specific rules.

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- (5%) **3.d.** “The County as member of the review team may file a non-concurrence with the CALFIRE Director if the review team chairperson does not accept the County request. If a non-concurrence is filed on a plan, the review team chairperson shall prepare a written report explaining how the concerns cited in the non-concurrence have been addressed in the plan and how the natural resources of concern will be protected during timber operations.”
- 

- 20%** **4.** A Forest Products representative makes the third presentation. The commissioners ask you to fact check some of their assertions:

For each assertion write a brief paragraph advising the Commissioners as to the truthfulness, completeness, and relevance to the petition for new county rules, of their statements.

- (5%) **4.a.** “There is no real need for County specific rules as California already has the most restrictive forest practice and environmental protection measures in the USA.”
- (5%) **4.b.** “Forest management and timber harvesting are integral to maintaining open space in the county. County specific rules would force many private timberland owners to develop their lands for residential or commercial purposes.”
- (5%) **4.c.** “Nearly 30% of the harvest area in this watershed was salvage of fire killed trees. The fire was a severe economic loss to forest landowners. These landowners voluntarily at their own expense stabilized the fire devastated area to protect the watershed and reestablished tree cover. Without active private forest management this restoration would not have happened. If County rules limited the recovery of fire killed trees such restoration might not occur.”
- (5%) **4.d.** “The County receives substantial tax revenue through timber taxes, land taxes, sawmill property taxes and the multiplier effect on retail businesses through worker wages spent in the County. Any new County rules would substantially reduce this revenue as forest landowners are forced to limit harvesting unnecessarily.”

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- 20%** What are your professional responsibilities as an RPF?
- (5%) **5.a.** Who is your real party of interest in this scenario?
- (5%) **5.b.** What duty do you owe the real party of interest?
- (5%) **5.c.** What is a fiduciary relationship?
- (5%) **5.d.** Since you are an RPF presenting forestry information in a public meeting, what must you tell the audience as you begin your talks?

**END OF QUESTION**

## QUESTION III-FOREST ECOLOGY

### **OBJECTIVE:**

Fisheries considerations have been at the forefront of Forest Practice Regulations in California since 1997 after the Federal Endangered Species Act listing of Coho in 1996. An understanding of 1) stream and riparian habitat, 2) salmonid and other fish requirements and 3) the inter-relationships between these items has become an important part of a forester's knowledge base. The following questions are intended to determine your understanding of stream habitat and salmonids.

### **QUESTIONS:**

Many of the functional and structural attributes of stream habitat are created and maintained through interaction with riparian vegetation. Riparian areas constitute the interface between terrestrial and aquatic ecosystems, performing functions that affect the quality of salmonid habitat.

**25%** 1. List the FIVE (5) IMPORTANT ways riparian areas influence streams and consequently salmonid habitat. For each way you have listed, briefly explain how the stream habitat is influenced to the benefit of salmonids.

**25%** 2. Pool to riffle ratios are one parameter which defines a stream's ability to support fish, especially salmonids.

(5%) **2.a.** Explain what is meant by pool to riffle ratio **and** how it is measured.

(20%) **2.b.** Define a favorable range of pool to riffle ratio for a stream that is a Class I stream with salmonids. Explain why your specified pool to riffle ratio (or range of values) is favorable to salmonids.

**25%** 3. The National Marine Fisheries Service (NMFS) uses two definitions in describing salmonid ecosystems: "properly functioning conditions" and "fully functioning conditions".

(15%) **3.a.** What is the difference between the two terms?

(10%) **3.b.** Describe (1) one problem in implementing the NMFS concepts.

**25%** 4. Large Woody Debris (LWD) is very important for salmonid habitat. List and briefly describe (5) five effects of insufficient or reduced LWD in a stream.

**END OF QUESTION**

## QUESTION IV FOREST SILVICULTURE

**OBJECTIVE:** Demonstrate your ability to apply basic silviculture knowledge in order to implement an even-age regeneration regime at the stand level.

**SITUATION:** As a California RPF you have been assigned to develop a Shelterwood regeneration plan for a company owned Site Index 80 stand. Company policy seeks to maximize stand growth as measured by sawlog volume production with a target final crop tree size of ~27" DBH (26" to 30"). The company prefers to utilize natural seed fall but will supplement with planting for regeneration gaps when needed. The company is capable of marketing 12" dbh and larger sawlogs. As a hedge against future unknown market fluctuations, exotic diseases, and to maintain wildlife habitat, the company prefers to sustain all the native tree species.

Company biometricians have analyzed copious inventory data from sites similar to your assigned stands to project lifetime average crop tree radial growth rates of four rings per inch by maintaining stand densities within a range of 50% to 75% of normal stocking. This density range also optimizes sawlog volume stand growth.

You have reviewed aerial photography for the 40-acre stand and found it to be situated on a 30% east facing slope. It has good road access below thus is operationally suited to ground skidding. The stand is traversed by a Class II watercourse. There are no listed species issues.

The aerial photographs reveal an even-age well stocked stand due to past management activities (natural seed fall regeneration, weeding, PCT). The stand consists of mixed species (conifer PP, DF, WF, IC, SP (each  $\geq 10\%$  of TPA)) and 10% hardwoods (BO) trees with an average of 15" dbh ranging from 12 to 18-inch dbh size. Density ranges from 150 to 200 averaging 188 sq. ft. / acre basal area. Codominant tree heights are ~ 65 feet.

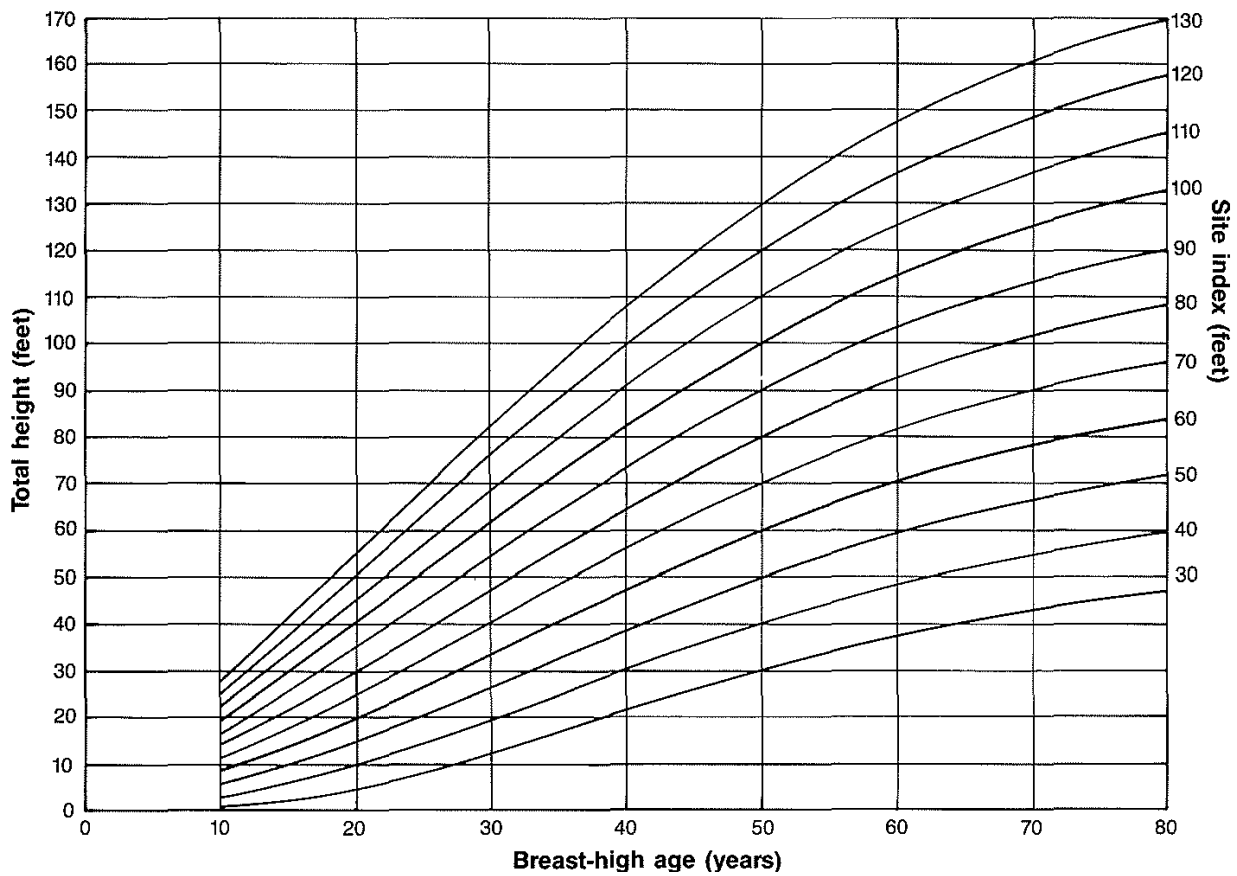
### QUESTIONS:

**5%** 1. Define Shelterwood, FPR definition acceptable but not required.

**10%** 2. In the future, about how long will codominant trees currently in your stand grow before they reach final crop tree size? Please show your work.

**10%** 3. In the future, about how tall will codominant trees now in your stand be when they reach final crop trees size? Please show your work.

**Continued on the next page**



25% 4. When will you execute your first entry for this stand? Describe and justify the essential elements for this stand treatment including residual tree spacing. You may use the D+X SPACING chart below.

**Normal Stand Yield Tables for your Site index 80 stand**

<b>Breast Height Stand Age</b>	<b>Basal Area / Acre Ft<sup>2</sup>/ac</b>
30	180
40	250
50	275
60	280
70	290
80	300
90	310

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## BASAL AREA/ACRE BY SPACING & AVERAGE TREE DIAMETER

D+X SPACING													
DBH	D+0	D+1	D+2	D+3	D+4	D+5	D+6	D+7	D+8	D+9	D+10	D+11	D+12
<b>AVE</b>													
<b>DBH</b>	<b>Basal Area Per Acre in Square Feet</b>												
12"	238	203	174	152	133	118	106	95	85	77	70	65	60
13"	238	205	179	157	139	124	112	100	91	83	76	70	65
14"	238	207	182	161	144	129	117	106	96	88	81	75	69
15"	238	209	185	166	148	134	121	110	102	93	86	79	74
16"	238	211	188	169	152	138	126	115	106	97	90	83	77
17"	238	213	191	172	156	142	131	120	110	102	94	88	82
18"	238	214	193	175	159	145	134	124	115	106	98	92	85
19"	238	215	195	177	161	150	138	128	118	109	102	95	89
20"	238	216	196	179	166	152	140	131	120	113	106	99	92
21"	238	216	198	183	168	156	144	132	125	116	109	102	96
22"	238	219	201	185	169	158	148	137	127	120	112	106	100
23"	238	219	202	186	173	162	150	138	130	123	115	109	103
24"	238	220	204	189	176	163	151	141	135	126	118	112	107

This table is used to determine D+X spacing when basal area is used for density control. Once the average basal area is determined and the average stand QMD dbh is also determined, then the D+X spacing can be established.

To find the proper spacing go down the left-hand column and find the average tree stand diameter. Then follow the line to the right until you come to the appropriate basal area number. If you don't find the exact number locate the closest. From there follow the column upward until you reach the D+X. This is the spacing of the stand.

*Continued on next page*

**25% 5.** When will you execute another (your second) stand treatment? Describe and justify the essential elements for this second stand treatment including residual tree spacing. You may use the D+X SPACING chart .

**25% 6.** Research has demonstrated for your mixed conifer-hardwood stand that shelterwood seed step densities in the 50 to 80 Sq. Ft./Acre range are optimal for the shelterwood seed step so long as good seed producing overstory trees are present.

(5%) **6.a.** What are the physical characteristics of the trees you will select for the shelterwood seed step?

(5%) **6.b.** How many trees of which species will you retain for the shelterwood seed step?

(5%) **6.c.** What will be the approximate ideal spacing for seed trees of the conifer species for the shelterwood seed step?

(5%) **6.d.** What will be the approximate ideal spacing for Black Oak trees for the shelterwood seed step?

(5%) **6.e.** If you execute the seed step when the stand DBH reaches the company's target final crop tree size, what issues can you expect for seed production? How will you mitigate the issues you identify?

<i>Species</i>	<i>Ave. Minimum seed producing age</i>	<i>Ave. Optimal seed producing age</i>	<i>Ave. optimal seed producing dbh size</i>
<i>PP</i>	<i>30</i>	<i>60+</i>	<i>25+</i>
<i>DF</i>	<i>20</i>	<i>Old growth</i>	<i>25+</i>
<i>WF</i>	<i>40</i>	<i>60+</i>	<i>30+</i>
<i>IC</i>	<i>20</i>	<i>40+</i>	<i>24+</i>
<i>BO</i>	<i>50</i>	<i>80-100</i>	<i>20+</i>
<i>SP</i>	<i>50</i>	<i>80+</i>	<i>30+</i>

**See Chart Next Page**

*Continued on next page*

**You may use this chart to help organize and present your answer. Turn it in with your answer if you wish it to be considered part of your answer.**

Time	Current Stand	Pre-Your 1 <sup>st</sup> Entry	Post Your 1 <sup>st</sup> Entry	Pre Your 2 <sup>nd</sup> Entry	Post Your 2 <sup>nd</sup> Entry	Pre Seed Step	Post Seed Step
Stand Age							
Treatment Description	<b>N/A</b>						
Sq.ft./Ac. Basal Area	<b>188</b>						<b>~50+</b>
% Normal Stand Density							
TPA							
QMD Inches	<b>15</b>					<b>~27</b>	
QMD Tree Basal Area							
Tree Spacing							
Notes							

**END of QUESTION**

## QUESTION V- FOREST PROTECTION

### OBJECTIVE

To demonstrate your understanding of the interaction between damaging insects and ecological succession in a drought affected forest situation. To demonstrate your ability to manage such situations.

### SITUATION

Scattered mortality of Douglas-fir is occurring in Plumas County, at elevation 2800 feet. Ponderosa pine, Douglas-fir and some black oak overtop a sapling understory of Douglas-fir, incense-cedar, madrone and black oak. The dead Douglas-fir occur singly or in groups of two to six trees in the size classes of sawtimber and large poles. Few saplings are involved. The greatest area of present accelerated mortality occurs where overstocking existed (greater than 250 sq. ft. of basal area per acre).

The number of DF and PP stumps at sites of previous mortality also indicate that overstocking existed when the initial mortality began with the drought of 1987-1991. Additional mortality occurred during the 2001 to 2005 drought. Mortality continued occurring during the 2012 to 2016 drought. However, growth of the remaining codominant Douglas-firs (now about 90 years old) has been relatively good. Site quality is rated as a low site II, Dunning.

Many of the dead trees are found to be infested with the flatheaded fir borer, Melanophila drummondi (Kirby), and woodpeckers have actively fed on the broods for at least two years. Vertical strips of cambium were killed on some trees.

The drainage was periodically entered for salvage after 1988. The first entry salvaged drought stressed ponderosa pine (killed by the western pine beetle and California flatheaded borer) as well as Douglas-fir, but recent mortality and salvage has been limited to Douglas-fir. As a result, some patches are becoming understocked. This has led to increased brush growth and a significant, competing brush component occurs in natural and man-made openings. No diseases were found to be affecting the trees.

### QUESTIONS

**40% 1.** Discuss how the **interaction of insects, drought, salvage and ecological succession** at this site have resulted in the present stand condition.

**50% 2.** Discuss five (5) near future management options (include a NO Action option) based on your answers to #1 and the past management practices on the property.

**10% 3.** Make and justify a single **recommended action** to manage the area for sawlog production.

**END of QUESTION**

**Professional Foresters Registration Examination April 2021**

**Part II**

**Applicant Must Also Answer Three of the Remaining Five  
Essay Questions in Part II**

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

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## QUESTION VI-FOREST ENGINEERING

### OBJECTIVE

To determine your ability to identify factors which are important in the planning of timber harvesting operations.

### QUESTIONS

**20% 1.** When developing a primary road system that includes utilizing **EXISTING** roads, what are four (4) most important questions should be considered?

**30% 2.** **List** and **explain** six (6) separate FACTORS which dictate what logging equipment and logging systems should be used on a harvesting operation.

**50% 3.** **Describe** each of these five (5) BASIC harvesting systems (high-lead, skyline, conventional tractor, mechanical ground based and helicopter) and explain the **advantages** and **disadvantages** of each as they relate to meeting current environmental, economic and social demands.

**(END OF QUESTION)**

## QUESTION VII-FOREST ECONOMICS

### OBJECTIVE

To demonstrate your understanding of how to prioritize potential forest projects when resources are limited.

### SITUATION

A timberland company employs you. Your assignment is to recommend which of the potential projects proposed by the regeneration forester, timber stand treatment forester, land acquisition forester and the road and watershed restoration forester should be budgeted for next year given the company's limited forest investment fund.

### QUESTIONS

- 10% 1. What financial information will you request each forester provide about each of their proposed individual projects?
- 10% 2. What financial information will you ask your company to provide?
- 20% 3. How will you manage incomplete financial information? For example, a project reports cost in dollar terms but future benefits expressed in non-monetary terms? Give examples.
- 20% 4. What operational (policy, tradition, etc.) information, if any, will you ask your company to provide?
- 20% 5. What non-financial (operational, legal, regulatory, contractual,) information will you request each forester provide about each of their proposed individual projects? Give examples for each information type.
- 20% 6. Once legal and contractual obligations are resolved, what methodology will you utilize to allocate remaining funds to proposed projects? Explain the process.

**End of Question**

## QUESTION VIII- FOREST ADMINISTRATION

### OBJECTIVE

To demonstrate your knowledge of the required minimum stocking requirements for harvested timberlands in California.

### SITUATION

You receive a call from a client who wishes to purchase an 80-acre parcel of California timberland which has recently been harvested (within the last 3 years). She is concerned about the stocking on the harvested area and whether it is adequate to meet the State's requirements under the California Code of Regulations (California Forest Practice Rules and Regulations).

### QUESTIONS

- 20%** 1. Briefly explain the general and specific requirements regarding stocking after the completion of timber operations under the California Forest Practice Rules (FPRs) and Regulations.
- A. (5 %) Explain the general process under the FPRs to your client.
  - B. (5 %) Explain to your client how satisfactory stocking is determined. Include how the new landowner might be affected if stocking requirements are not satisfactory at this time.
  - C. (5 %) Explain to your client any penalties or corrective measures that might apply if stocking is not accomplished.
  - D. (5 %) Explain to your client her options if the owner has not met requirements regarding stocking
- 20%** 2. Briefly, **describe two (2)** of the four types of approved stocking sampling procedures you might use to survey the parcel to determine stocking adequacy. Give (1) one example of how **each** of the two you describe may be applied to a different specific regeneration method.
- 20%** 3. Describe the application of the concept of "least stocked 40" and the underlying sampling assumption related to that concept.
- 10%** 4. Explain the significance of the Group A and Group B commercial species lists in the FPRs and how they relate to resource conservation standards for minimum stocking.
- 10%** 5. Explain to your client, what constitutes a "countable tree" under the FPRs.

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**20% 6.** FPRs allow that a RPF may propose an alternative stocking standard for any proposed regeneration method, intermediate treatment, or special prescription. The proposed alternative stocking must contribute to one (1) or more forest health and ecological goals.

**6.a.** (8%) List four (4) of the permitted goals.

**6.b.** (12%) Discuss the information the RPF must provide to explain and justify the proposed alternative stocking standard.

**(END OF QUESTION)**

## QUESTION IX- FOREST POLICY

### OBJECTIVE

To determine your knowledge regarding options available through California state law and regulation to meet planning and environmental requirements for commercial forest management.

### QUESTIONS

- 75%** 1. Listed below are three (3) State of California sanctioned methods of meeting planning and environmental requirements for commercial forest management. Describe, in detail, each of the (3) three methods. Include type of ownership to which the method is best suited, general administrative description, major constraints, and relative cost. Include a description of an ownership that would be suited to each.

Non-industrial timber management plans (NTMP)

Modified timber harvesting plan (MTHP)

Sustained yield plans (SYP)

- 25%** 2. Describe the conceptual difference between the Timber Harvesting Plan (THP) process and the Program Timberland Environmental Impact Report/Program Timber Harvesting Plan (PTEIR/PTHP) process.

**(END OF QUESTION)**

## QUESTION X- FOREST MANAGEMENT

**OBJECTIVE:** Demonstrate your ability to apply basic management knowledge in order to reduce wildland fire hazard and loss at the watershed scale.

**SITUATION:** As a California RPF you have been assigned to develop an even-aged management plan for a set of company owned Site Index 80 stands. Company policy seeks to maximize volume growth as measured by sawlog production with a target final crop tree size of ~28" DBH (26" to 32"). The company prefers to utilize clearcut and plant regeneration, limiting clearcuts to  $\leq 20$  acres. The company is capable of marketing 11" dbh and larger trees as sawlogs.

The company manages 80,000 acres in one interior forest watershed. You have been assigned a ~ 5,000-acre sub watershed which is totally owned by company.

Your assignment is to develop stand structure, composition, and spatial distribution goals to meet company sawlog goals and reduce wildland fire loss.

Company biometricians have analyzed copious inventory data from sites similar to your assigned stands to project lifetime average crop tree radial growth rates of five rings per inch by maintaining stand densities within a range of 50% to 70% of normal stocking. This density range also optimizes sawlog volume growth.

You have reviewed aerial photography for the sub watershed and found it to be situated on a modest west facing slope ranging from a main ridgetop at 4,500 ft elevation to class I watercourse and public road at 3,500 ft elevation. It has good road access thus is suited to tractor operations. The sub watershed is traversed by several Class II watercourses. There are no listed species issues.

The aerial and satellite imagery reveal a variety of even-aged stands due to past management activities. Stands older than 40 years are more irregular in composition, spacing and density as the result of natural seed fall regeneration, commercial thins and past sporadic high grading. These stands consist of mixed species (conifer PP, DF, WF, IC, SP (each  $\geq 10\%$  of TPA)) and 10% hardwoods (BO) trees with a QMD range of 22" to 28" dbh.

Younger stands are more regular as result of site prep, planting, weeding and PCT. These stands are primarily PP and DF with  $\leq 5\%$  each WF, IC, GS, BO, and SP.

Natural and activity fuel management have **not** been a high priority in the past.

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**QUESTIONS:**

**10%** 1. What are the main stand structure elements that determine the relative resistance or ease of crown fire initiation within a forest and subsequent spread in the **absence** of extreme weather and wind events?

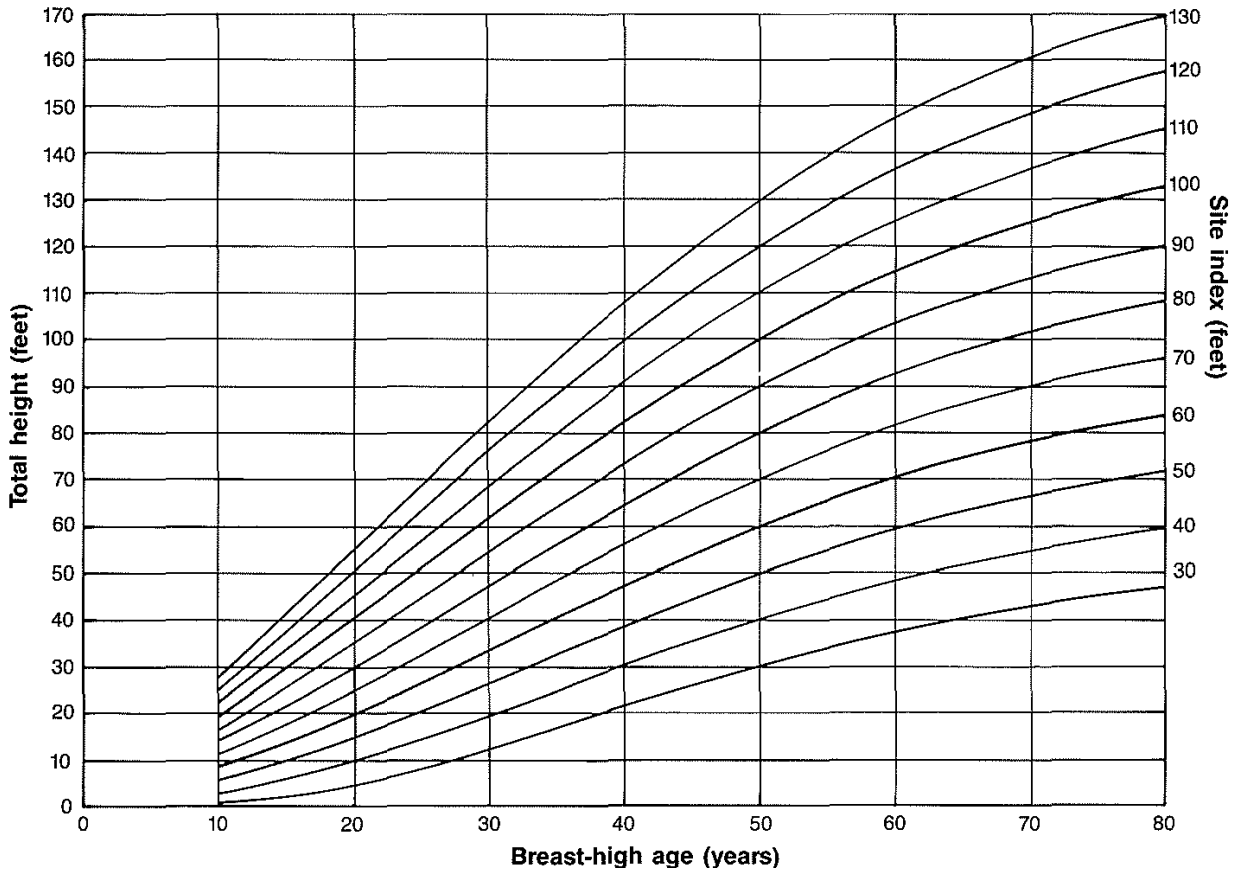
**5%** 2. What are the main individual tree characteristics that determine their relative resistance to fire mortality?

**10%** 3. Name (5) five physical locations in your sub watershed which are most at risk of fire ignitions? Explain why.

**15%** 4. What typical stand management and operational considerations would you prescribe for three (3) of the locations you discussed in # 3 above? Explain and justify your answers.

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**Site Index**



**Normal Stand Yield Tables for your Site index 80 stand**

Breast Height Stand Age	Basal Area / Acre Ft <sup>2</sup> /ac
30	180
40	250
50	275
60	290
70	300
80	305
90	310

**30% 5.** Describe a typical stand management regime for an entire rotation, that meets company goals and reduces risk of wildfire losses, for this sub watershed. Explain and justify your answer. Be specific about treatment types, timing and desired effect.

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Company inventory shows the following stand types and acres available\* for treatment in your sub watershed.

	<b>Stand Type</b>	<b>Acres</b>	<b>Average DBH</b>	<b>MBF/Acre</b>	<b>Stand Density sq.ft./ac.</b>	<b>Surface Fuel Load</b>
<b>A</b>	<b>Well stocked 80 Yr Old</b>	<b>150</b>	<b>28</b>	<b>48</b>	<b>210</b>	<b>Moderate from past harvest fuels</b>
<b>B</b>	<b>Well stocked 70 Yr Old</b>	<b>500</b>	<b>26</b>	<b>41.7</b>	<b>200</b>	<b>Moderate from past harvest fuels</b>
<b>C</b>	<b>Well stocked 60 Yr Old</b>	<b>600</b>	<b>22</b>	<b>40</b>	<b>200</b>	<b>Moderate from past harvest fuels</b>
<b>D</b>	<b>Irregularly Stocked 80 Yr Old</b>	<b>300</b>	<b>27</b>	<b>27.7</b>	<b>120</b>	<b>High from past harvest fuels</b>
<b>E</b>	<b>Irregularly Stocked 70 Yr Old</b>	<b>200</b>	<b>27</b>	<b>31</b>	<b>150</b>	<b>High from past harvest fuels</b>
<b>F</b>	<b>Poorly Stocked 60 Yr Old</b>	<b>150</b>	<b>24</b>	<b>19</b>	<b>100</b>	<b>Moderate from past harvest fuels</b>
<b>G</b>	<b>Overstocked Stocked 40 Yr Old Plantations</b>	<b>700</b>	<b>14</b>	<b>25.7</b>	<b>190</b>	<b>Moderate from mortality &amp; past harvest fuels</b>
<b>H</b>	<b>Well Stocked 30 Yr old Plantations</b>	<b>590</b>	<b>10</b>	<b>Non merc h</b>	<b>125</b>	<b>High from past harvest &amp; PCT fuels</b>
<b>I</b>	<b>Well Stocked 20 Yr old Plantations</b>	<b>500</b>	<b>4</b>			<b>Low from past harvest fuels</b>
<b>J</b>	<b>Well Stocked 10 Yr old Plantations</b>	<b>560</b>	<b>1</b>			<b>Moderate from past harvest fuels</b>
	<b>* Acres available Exclude WLPZ Roads&amp; Landings</b>					

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**20% 6.** Given the current stand structure distribution types listed above, how will you prioritize stand treatments (other than critical ignition risk areas addressed in # 5 above) to achieve company goals and reduce wildfire losses? Explain and justify your scheduling.

**10% 7.** If the sub watershed is a regulated forest managed to meet stated company rotation lengths, what proportion of the area would be capable of resisting a self-regenerating crown fire (not a red flag day strong wind driven crown fire during extreme conditions)? Explain your calculations.

**END of QUESTION**

**END of Exam**