Exam Sheet, Part 1

name _____

		a.	b.	c.	d.	e.	f.	g.	h.
	A) Anatomy and Biology of Wood Formation; Wood Identification								
1.	The average length of longitudinally-oriented cells is greater in hardwoods than in softwoods.	true	false						
2.	Is the following wood a hardwood or a softwood? Specific gravity = 0.50 sapwood moisture content = 120% heartwood moisture content =110% has scalariform performations some cells have bordered pits	hardwood	softwood						
3.	List in order the features found in a tree trunk from the center to the exterior.	outer bark, phloem, vascular cambium, sapwood, heartwood, pith	pith, heartwood, sapwood, vascular cambium, phloem, outer bark.	pith, heartwood, sapwood, phloem, vascular cambium, outer bark.	pith, sapwood, heartwood, vascular cambium, phloem, outer bark.				
4.	When individuals with ring-porous wood are fast-grown, their wood density tends to increase.	true	false						
5	Is the following wood a hardwood or a softwood? Has windowlike (fenestriform) cross-field pits sapwood moisture content = 105% has uniseriate rays	hardwood	softwood						
6	Juvenile wood can be heartwood.	true	false						
7	An example of a wood with coarse texture is _____.	Pacific yew	cherry	redwood	western redcedar				
8	Inner bark transports _____.	only down the tree	only up the tree	up and down the tree	only in the radial direction				
9	Compared to mature wood in softwoods, juvenile wood usually has higher tangential shrinkage and swelling.	true	false						
10	Tracheid length is generally higher in the trunk than branch of a softwood.	true	false						
11	The part of this stem the image (Question 11) marked with the white bar is called the _____.	growth ring	compression wood	tension wood	included heartwood	false ring			

		a.	b.	c.	d.	e.	f.	g.	h.
12	In photosynthesis, _____.	water comes from the air, carbon comes from the soil.	the water and carbon both come from the air.	the water and carbon both come from the soil.	water comes from the soil, carbon comes from the air.				
13	The wood in the image (Question 13) has resin canals.	true	false						
14	Materials can only move upward in the phloem.	true	false						
15	Compression wood helps right a stem by which one of the following mechanisms?	expanding during development	producing less wood than normal, which helps with the overturning moment	increasing cellulose content for added strength	causing increased root growth directly beneath the lean				
16	Western hemlock has normal resin canals.	true	false						
17	Juvenile wood and mature wood always differ in _____.	decay resistance	odor	pit frequency	cell length				
18	The breakage shown in the image (Question 18) (between the tips of the two arrows) is called a _____.	shake	check	both shake and check					
19	What occurs in the cambial zone?	phloem transport	photosynthesis	heartwood formation	cell elongation				
20	Compared to mature wood in softwoods, juvenile wood usually has longer fiber length.	true	false						
21	The wood in the image (Question 21) is a softwood.	true	false						
22	Which wood type is very unlikely to be harvested from the Pacific Northwest?	madrone	tulip-poplar	red alder	ash	maple			
23	The wood in the image (Question 23) is ring-porous.	true	false						
	B) Physical Properties								
24	Liquids that swell wood and can penetrate wood cell wall are most likely to be _____.	polar	non-polar						
25	The specific gravity of heartwood is usually _____ the specific gravity of sapwood.	greater than	less than	the same as					
26	The oven-dry method (ASTM D-4442) calls for the oven temperature to be at _____ °C.	56	60	100	103	105			

		a.	b.	c.	d.	e.	f.	g.	h.
27	Diffusion coefficient in wood depends strongly on the moisture concentration.	true	false						
28	Rank wood, air, and liquid water in respect to their specific heats (highest first):	1. liquid water, 2. wood, 3. air	1. wood, 2. liquid water, 3. air	1. air, 2. liquid water, 3. wood					
29	Radial shrinkage is greater than tangential shrinkage.	They are the same	This is species-dependent	true	false				
30	Arranged from highest to lowest by equilibrium moisture content, the components of wood should be in the following order.	Cellulose, hemicellulose, lignin	Cellulose, lignin, hemicelluloses	Lignin, cellulose, hemicelluloses	Lignin, hemicellulose, cellulose	Hemicellulose, cellulose, lignin	Hemicellulose, lignin, cellulose		
31	The shrinkage value for a species is 7%. If a board is 10 cm thick when cut green, what will be its thickness after kiln drying to 7% moisture content.	9.77 cm	9.46 cm	9.30 cm	9.16 cm	can't be calculated from the information given			
32	The thermal conductivity of wood _____ with increasing moisture content.	is constant	increases	decreases					
33	Wood is an orthotropic material because it has different properties (unique and independent) in three mutually perpendicular directions (Longitudinal, Radial, Tangential).	true	false						
34	A vertical-grain board is 10.00 inches wide when green. The shinkage rate for this species is 4% in the radial direction and 7% in the tangential direction. What will be the board's width (to two decimal points) after it reaches a moisture content of 15%?	9.30 inches	9.80 inches	9.60 inches	9.65 inches	10.00 inches			
35	What is the wet-basis moisture content of a piece of wood that weighs 50 grams if its oven-dry weight is 150 grams?	33%	50%	67%	100%	150%	less than any of the above	greater than any of the above	none of the above
36	If the moisture content of wood changes from 7 to 12%, the change in electrical resistance is _____ than when the moisture content of wood changes from 17 to 22%.	greater	less	neither, the change in electrical resistance would be the same					
37	Which of the following liquids are least likely to swell wood during absorption.	water	ethanol	hexane	ammonia				

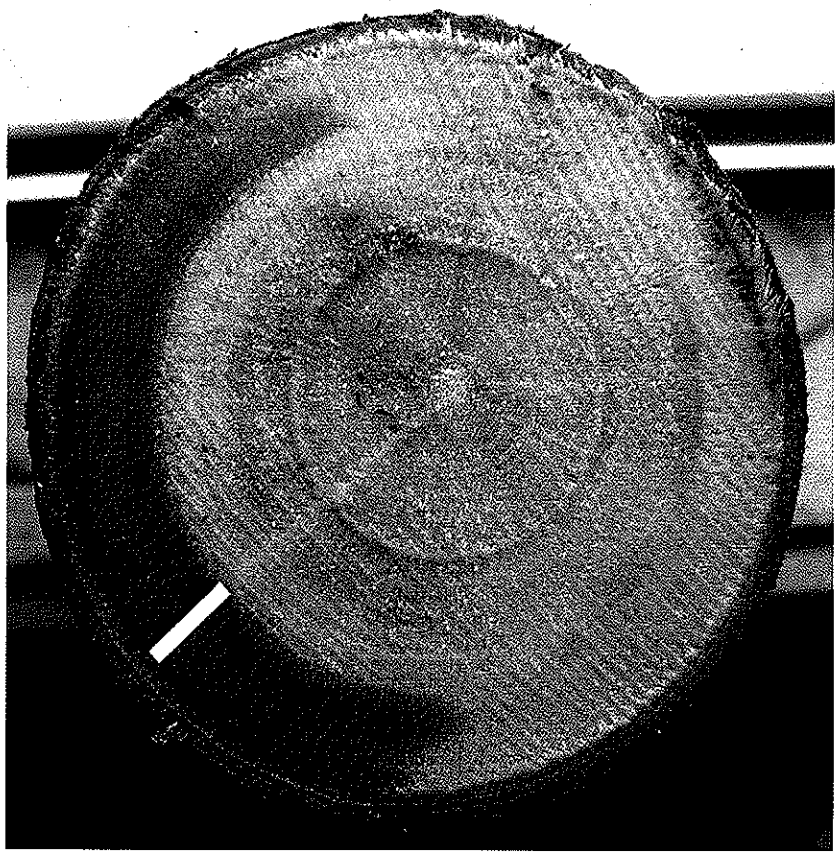
		a.	b.	c.	d.	e.	f.	g.	h.
38	When permeability is used to calculate flow or flux in wood, the driving force is the _____ gradient.	temperature	pressure	concentration	moisture content	specific gravity			
39	A species is 70% lumen and 30% cell wall when dry. How much does a cubic meter of this species weigh (when dry)?	112 kg	462 kg	712 kg	1078 kg				
40	The effect of grain orientation on the dielectric properties of wood appears very insignificant when compared to the effect of moisture content.	true	false						
41	Pit pairs in the cell wall play a crucial role in the diffusion of **bound water** in wood in the tangential direction.	true	false						
42	What is the moisture content of a piece of wood that weighs 100 grams if its oven-dry weight is 50 grams?	33%	50%	67%	100%	150%	less than any of the above	greater than any of the above	none of the above
43	Rank wood, coal, and natural gas in respect to their heat of combustion (highest first):	1. wood, 2. coal, 3. natural gas	1. coal, 2. natural gas, 3. wood	1. natural gas, 2. wood, 3. coal	1. natural gas, 2. coal, 3. wood				
	C) Mechanical Properties								
44	Variability (Coefficient of Variation) in bending strength (MOR) of wood is the same across all species.	true	false						
45	Large sizes of lumber (e.g., 2X12) carry more load than smaller sizes (e.g. 2X4)	true	false						
46	The Y-component of a force (F), which makes angle theta (θ) from Y-axis, is F.Sinθ.	true	false						
47	Wood's MOE and strength depend on direction of loading relative to the grain.	true	false						
48	What happens to wood when it is loaded beyond it's proportional limit?	iinear deformation	rupture	creep	irreverisble deformation	decrease in load			
49	Normal Strain is defined as change in length divided by the original length (.i.e., elongation per unit length).	true	false						
50	Small, clear beams of wood in bending first fail in tension zone followed by failure in the compression zone.	true	false						
51	Stress is defined as the intensity of force or force per unit area.	true	false						

		a.	b.	c.	d.	e.	f.	g.	h.
52	Higher values of strength are obtained for wood loaded at 2mm/second than at 2 mm/day.	true	false						
53	Mechanical properties of wood are affected by changes in moisture content only below the fiber saturation point.	true	false						
54	Knots have no effect on tensile strength of wood	true	false						
55	Allowable properties of lumber from small, clear specimens are adjusted for:	a. seasoning	b. defects	c. general adjustment factor	d. a and b only	e. a, b, and c			
56	Shear strength of wood parallel to grain is equal to the shear strength of wood perpendicular to grain.	true	false						
57	Compressive strength (parallel to grain) of lumber (e.g., 2X4, etc.) is about the same as the tensile strength parallel to grain.	true	false						
58	A free body diagram (FBD) is a simplified diagram of a real world situation.	true	false						

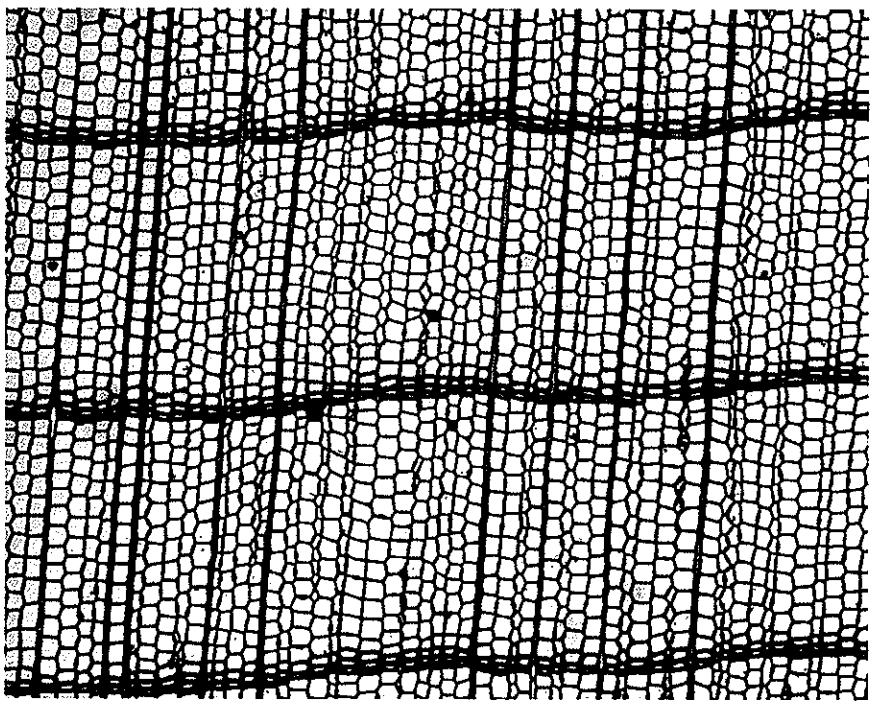
(Note - these were given to students in color)

Image Sheet

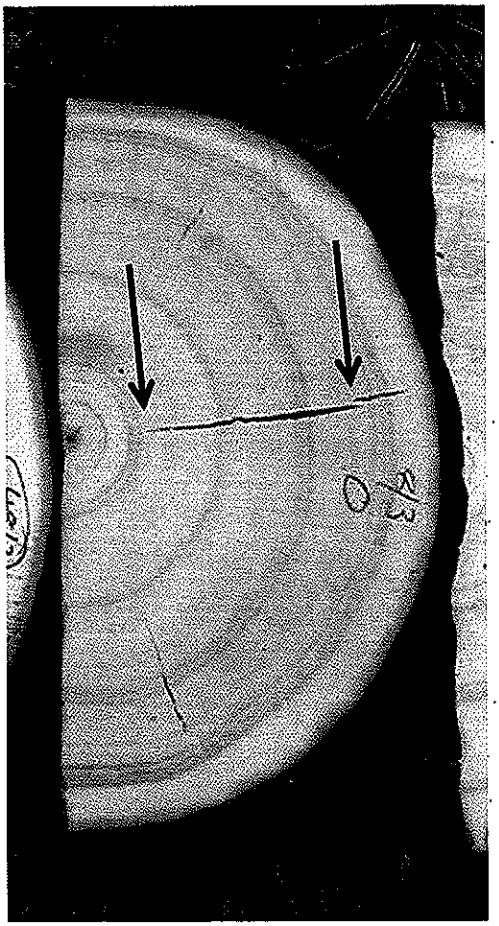
Question 11



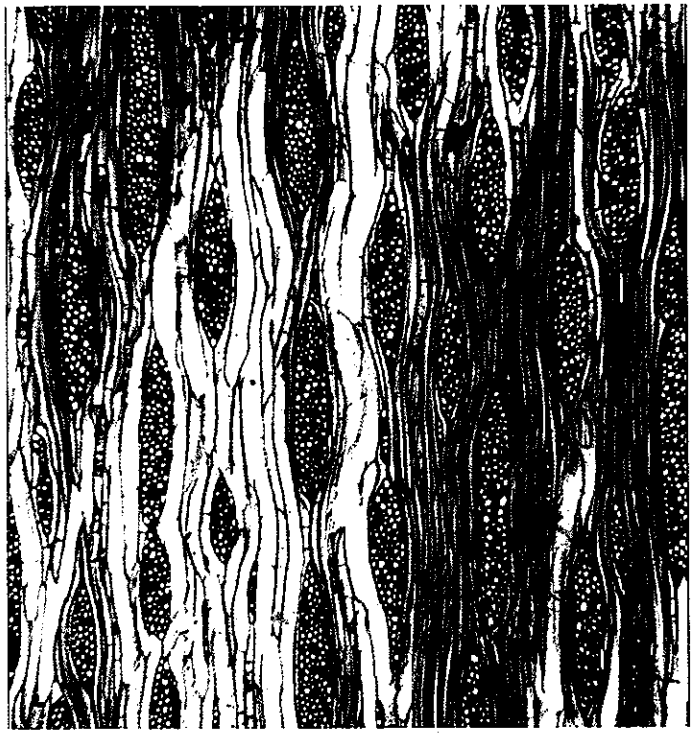
Question 13



Question 18



Question 21



Question 23